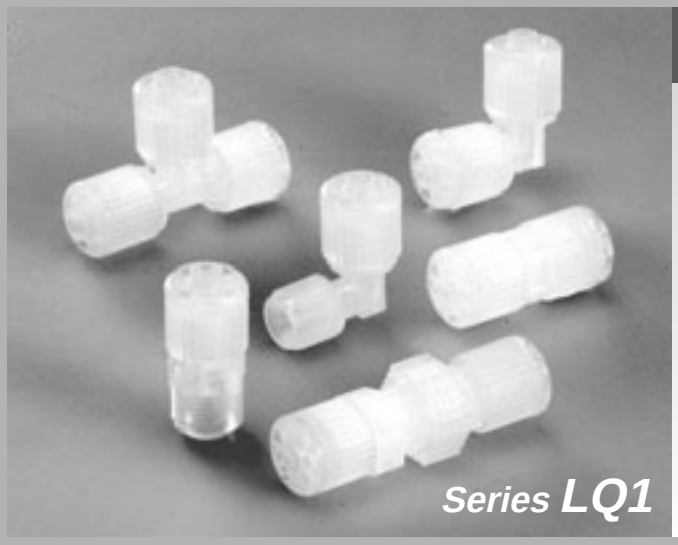
# High Purity Fluoropolymer Fittings/Needle Valve/Tubing

# Series LQ1/LVN/TL/TIL

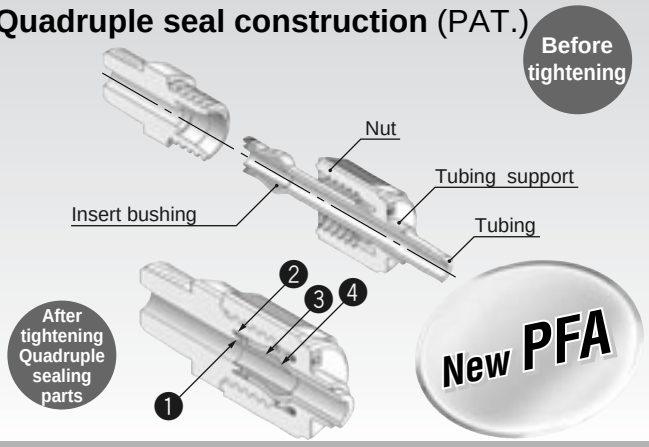
Clean Wet Series






## HYPER FITTING® Series LQ1

- **Quadruple seal construction** (PAT.)

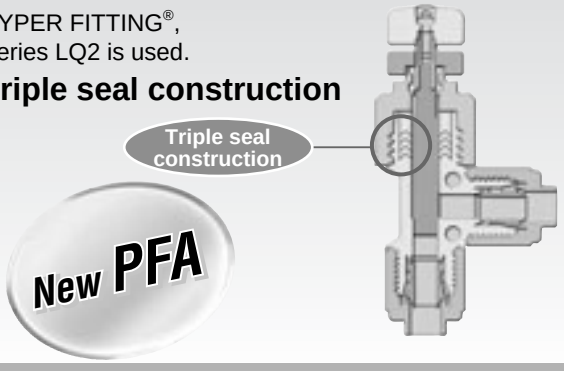




## Needle Valve Series LVN

- **Fluid adjustment range 0 to 12 ℓ/min**
- **Integral fitting construction**

  HYPER FITTING®, Series LQ2 is used.
- **Triple seal construction**





## Tubing Series TL/TIL

- **ø1/8" x ø1/16" additionally released.**
- **Size variations**

  Metric sizes: ø4 to ø19 (6 sizes)
  Inch sizes: ø1/8" to ø1/2" (8 sizes)

Super PFA

## Quadruple sealing construction

The quadruple sealing construction (PAT.) based on SMC's original idea results in highly reliable sealing characteristics with outstanding leakage prevention effect.

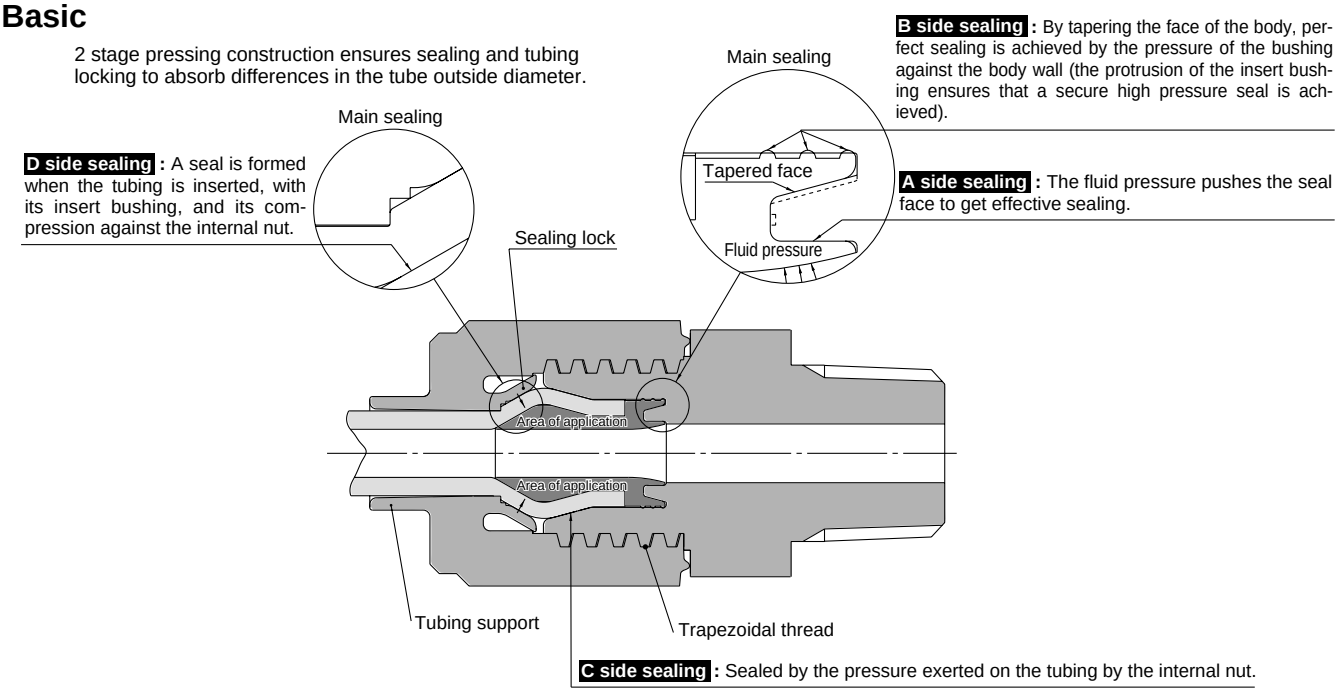
## Flow-through characteristics

Excellent flow-through characteristics are achieved by minimizing liquid deposit.

## Locking

- Locking mechanism utilizes sealing lock by the nut.
- Trapezoidal thread allows application of high torque
- 2 stage pressing by the tubing holder of the nut ensures secure tube holding.

### Basic




## Strong resistance to tube bending and deformation.

Able to withstand lateral loads with the tubing support.

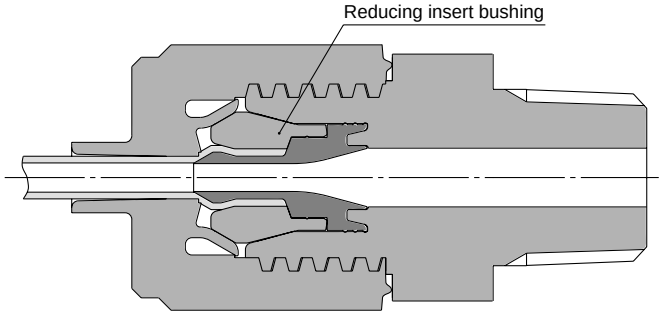
## Easy tightening of nuts.

- No positioning guide is required, simply tighten up the tubing to the end of the fitting body.
- The trapezoidal thread prevents oblique nut insertion.

## Tubing sizes are interchangeable.

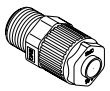
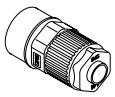
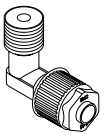
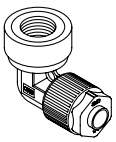
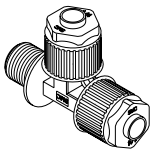
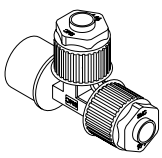
- The reducer method allows tubing size changes without replacing the body.
- Helps standardize fitting items resulting in less stock requirements.

### Reducing type

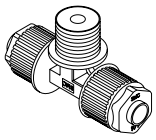
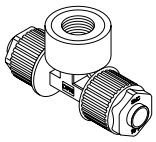
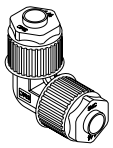
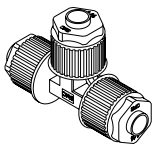
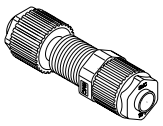
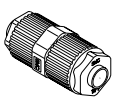


## Series LQ1

P.592

| Series | | Appearance | Class | Port size | | | | | | | Tubing O.D. | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Metric size | | | | | | | | Inch size | | | | | | |
| | | | | None | 1/8" | 1/4" | 3/8" | 1/2" | 3/4" | 1" | ø3 | ø4 | ø6 | ø8 | ø10 | ø12 | ø19 | ø25 | 1/8" | 3/16" | 1/4" | 3/8" | 1/2" | 3/4" | 1" |
| **Connector** **LQ1H** | **Male** |  P.595 | **1** | – | ○ | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ○ | – | – | – | – | – | – |
| | | | **2** | – | ○ | ○ | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – |
| | | | **3** | – | – | ○ | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – | – | ● | ○ | – | – | – |
| | | | **4** | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – | – |
| | | | **5** | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – |
| | | | **6** | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ |
| | **Female** |  P.596 | **1** | – | ○ | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ○ | – | – | – | – | – | – |
| | | | **2** | – | ○ | ○ | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – |
| | | | **3** | – | – | ○ | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – | – | ● | ○ | – | – | – |
| | | | **4** | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – | – |
| | | | **5** | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – |
| | | | **6** | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ |
| **Elbow** **LQ1L** | **Male** |  P.597 | **1** | – | ○ | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ○ | – | – | – | – | – | – |
| | | | **2** | – | ○ | ○ | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – |
| | | | **3** | – | – | ○ | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – | – | ● | ○ | – | – | – |
| | | | **4** | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – | – |
| | | | **5** | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – |
| | | | **6** | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ |
| | **Female** |  P.598 | **1** | – | ○ | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ○ | – | – | – | – | – | – |
| | | | **2** | – | ○ | ○ | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – |
| | | | **3** | – | – | ○ | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – | – | ● | ○ | – | – | – |
| | | | **4** | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – | – |
| | | | **5** | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – |
| | | | **6** | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ |
| **Run tee** **LQ1R** | **Male** |  P.599 | **1** | – | ○ | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ○ | – | – | – | – | – | – |
| | | | **2** | – | ○ | ○ | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – |
| | | | **3** | – | – | ○ | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – | – | ● | ○ | – | – | – |
| | | | **4** | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – | – |
| | | | **5** | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – |
| | | | **6** | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ |
| | **Female** |  P.600 | **1** | – | ○ | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ○ | – | – | – | – | – | – |
| | | | **2** | – | ○ | ○ | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – |
| | | | **3** | – | – | ○ | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – | – | ● | ○ | – | – | – |
| | | | **4** | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – | – |
| | | | **5** | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – |
| | | | **6** | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ |

Note) ○Basic size ●With reducer

| Series | | Appearance | Class | Port size | | | | | | | Tubing O.D. | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Metric size | | | | | | | | Inch size | | | | | | |
| | | | | None | 1/8" | 1/4" | 3/8" | 1/2" | 3/4" | 1" | ø3 | ø4 | ø6 | ø8 | ø10 | ø12 | ø19 | ø25 | 1/8" | 3/16" | 1/4" | 3/8" | 1/2" | 3/4" | 1" |
| **Branch tee** **LQ1B** | **Male** |  P.601 | **1** | – | ○ | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ○ | – | – | – | – | – | – |
| | | | **2** | – | ○ | ○ | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – |
| | | | **3** | – | – | ○ | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – | – | ● | ○ | – | – | – |
| | | | **4** | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – | – |
| | | | **5** | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – |
| | | | **6** | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ |
| | **Female** |  P.602 | **1** | – | ○ | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ○ | – | – | – | – | – | – |
| | | | **2** | – | ○ | ○ | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – |
| | | | **3** | – | – | ○ | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – | – | ● | ○ | – | – | – |
| | | | **4** | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – | – |
| | | | **5** | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – |
| | | | **6** | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ |
| **Union elbow** **LQ1E** | |  P.603 | **1** | ○ | – | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ○ | – | – | – | – | – | – |
| | | | **2** | ○ | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – |
| | | | **3** | ○ | – | – | – | – | – | – | – | – | ● | ● | ○ | – | – | – | – | – | ● | ○ | – | – | – |
| | | | **4** | ○ | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – | – |
| | | | **5** | ○ | – | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – |
| | | | **6** | ○ | – | – | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ |
| **Union tee** **LQ1T** | |  P.604 | **1** | ○ | – | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ○ | – | – | – | – | – | – |
| | | | **2** | ○ | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – |
| | | | **3** | ○ | – | – | – | – | – | – | – | – | ● | ● | ○ | – | – | – | – | – | ● | ○ | – | – | – |
| | | | **4** | ○ | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – | – |
| | | | **5** | ○ | – | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – |
| | | | **6** | ○ | – | – | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ |
| **Panel mount union** **LQ1P** | |  P.605 | **1** | ○ | – | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ○ | – | – | – | – | – | – |
| | | | **2** | ○ | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – |
| | | | **3** | ○ | – | – | – | – | – | – | – | – | ● | ● | ○ | – | – | – | – | – | ● | ○ | – | – | – |
| | | | **4** | ○ | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – | – |
| | | | **5** | ○ | – | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – |
| | | | **6** | ○ | – | – | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ |
| **Union** **LQ1U** | |  P.606 | **1** | ○ | – | – | – | – | – | – | ○ | ○ | – | – | – | – | – | – | ○ | – | – | – | – | – | – |
| | | | **2** | ○ | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ● | ○ | – | – | – | – |
| | | | **3** | ○ | – | – | – | – | – | – | – | – | ● | ● | ○ | – | – | – | – | – | ● | ○ | – | – | – |
| | | | **4** | ○ | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – | – |
| | | | **5** | ○ | – | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – |
| | | | **6** | ○ | – | – | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ |
| **Union flange** **LQ1F** | | P.606 | **4** | ○ | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – | – |
| | | | **5** | ○ | – | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ | – |
| | | | **6** | ○ | – | – | – | – | – | – | – | – | – | – | – | – | ● | ○ | – | – | – | – | – | ● | ○ |

Note) ○Basic size ●With reducer

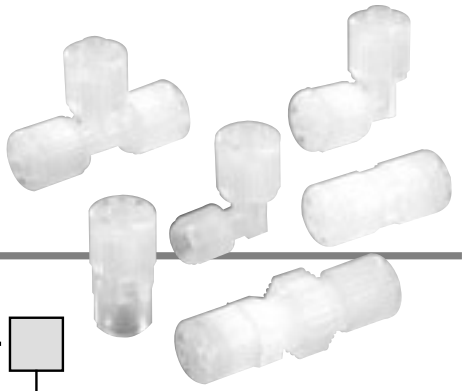
## Needle Valve P.609

| Series | | Applicable tubing O.D. | |
|---|---|---|---|
| LVN |  | Metric size | ø4 |
| | | | ø6 |
| | | | ø8 |
| | | | ø10 |
| | | | ø12 |
| | | Inch size | 1/8" |
| | | | 3/16" |
| | | | 1/4" |
| | | | 3/8" |
| | | | 1/2" |

## High Purity Fluoropolymer Tubing P.613

| Series | | Tubing O.D. | |
|---|---|---|---|
| TL | **Material: Super PFA** | Metric size | ø4 |
| | | | ø6 |
| | | | ø8 |
| | | | ø10 |
| | | | ø12 |
| | | | ø19 |
| TIL |  | Inch size | 1/8" |
| | | | 3/16" |
| | | | 1/4" |
| | | | 3/8" |
| | | | 1/2" |

# Fluoropolymer Fittings
# Hyper Fittings
# *Series* LQ1



## How to Order

**Threaded connection**

**LQ1 H 11 [ ] – M [ ] – [ ]**

**Fitting type**

| Symbol | Type |
|---|---|
| **H** | Connector |
| **L** | Elbow |
| **B** | Branch tee |
| **R** | Run tee |

**Thread type**

| Symbol | Type |
|---|---|
| **Nil** | R, Rc |
| **N** | NPT |

**Piping type**

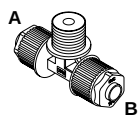
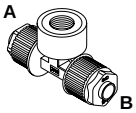
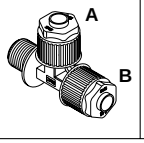
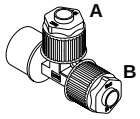
| Symbol | Type |
|---|---|
| **M** | Male |
| **F** | Female |

**Packaging**

| | |
|---|---|
| **Nil** | Clean packaging equivalent to Class M3.5 |
| **1** | Standard packaging equivalent to Class M5.5 |

**For different diameter (on B side)**

| Symbol | Application |
|---|---|
| **Nil** | Same tubiing size |
| Refer to the applicable tubing table. | Different diameter tubing can be selected within the same body class. |

| LQ1B | | LQ1R | |
|---|---|---|---|
| Branch tee male | Branch tee female | Run tee male | Run tee female |
|  |  |  |  |

The table of combination is the same as that for A side.
Note 1) Only branch tees and run tees can take different diameters.
Note 2) Use of different diameters is not available with size 1.

**Size combination**

| Class | No. | Applicable tubing size (mm) | Tubing O.D. |
|---|---|---|---|
| **1** | **1** | 4 x 3 | 1/8" |
| **1** | **2** | 3 x 2 | |
| **2** | **1** | 6 x 4 | 1/8" |
| **2** | **2** | 4 x 3 | |
| **2** | **C** | 3 x 2 | |
| **2** | **3** | 6 x 4 | 1/4" |
| **2** | **4** | 4 x 3 | |
| **2** | **F** | 3 x 2 | |
| **3** | **1** | 10 x 8 | 1/4" |
| **3** | **2** | 8 x 6 | |
| **3** | **3** | 6 x 4 | |
| **3** | **4** | 10 x 8 | 3/8" |
| **3** | **5** | 8 x 6 | |
| **3** | **6** | 6 x 4 | |
| **4** | **1** | 12 x 10 | 3/8" |
| **4** | **2** | 10 x 8 | |
| **4** | **3** | 12 x 10 | 1/2" |
| **4** | **4** | 10 x 8 | |
| **5** | **1** | 19 x 16 | 1/2" |
| **5** | **2** | 12 x 10 | |
| **5** | **3** | 19 x 16 | 3/4" |
| **5** | **4** | 12 x 10 | |
| **6** | **1** | 25 x 22 | 3/4" |
| **6** | **2** | 19 x 16 | |
| **6** | **3** | 25 x 22 | 1" |
| **6** | **4** | 19 x 16 | |

| Class | No. | Applicable tubing size (inch) | Tubing O.D. |
|---|---|---|---|
| **1** | **A** | 1/8" x 0.086" | 1/8" |
| **—** | **—** | —— | —— |
| **2** | **A** | 1/4" x 5/32" | 1/8" |
| **2** | **B** | 3/16" x 1/8" | |
| **2** | **C** | 1/8" x 0.086" | |
| **2** | **D** | 1/4" x 5/32" | 1/4" |
| **2** | **E** | 3/16" x 1/8" | |
| **2** | **F** | 1/8" x 0.086" | |
| **3** | **A** | 3/8" x 1/4" | 1/4" |
| **3** | **B** | 1/4" x 5/32" | |
| **3** | **C** | 3/8" x 1/4" | 3/8" |
| **3** | **D** | 1/4" x 5/32" | |
| **4** | **A** | 1/2" x 3/8" | 3/8" |
| **4** | **B** | 3/8" x 1/4" | |
| **4** | **C** | 1/2" x 3/8" | 1/2" |
| **4** | **D** | 3/8" x 1/4" | |
| **5** | **A** | 3/4" x 5/8" | 1/2" |
| **5** | **B** | 1/2" x 3/8" | |
| **5** | **C** | 3/4" x 5/8" | 3/4" |
| **5** | **D** | 1/2" x 3/8" | |
| **6** | **A** | 1" x 7/8" | 3/4" |
| **6** | **B** | 3/4" x 5/8" | |
| **6** | **C** | 1" x 7/8" | 1" |
| **6** | **D** | 3/4" x 5/8" | |

Note) For each body class, the second and later numbers or symbols indicate reducing. However, in case of size 1, the tubing cannot be changed by reducing.

## How to Order

**Tubing connection**

**LQ1 E 11 [ ] – [ ]**

**Packaging**

| | |
|---|---|
| **Nil** | Clean packaging equivalent to Class M3.5 |
| **1** | Standard packaging equivalent to Class M5.5 |

**Fitting type**

| Symbol | Type |
|---|---|
| **E** | Union elbow |
| **T** | Union tee |
| **P** | Panel mount union |
| **U** | Union |
| **F** | Union flange |

**Combination of different diameter (on B side)**

| Class | No. | Applicable tubing size (mm) |
|---|---|---|
| **1** | **1** | 4 x 3 |
| **1** | **2** | 3 x 2 |
| **2** | **1** | 6 x 4 |
| **2** | **2** | 4 x 3 |
| **2** | **C** | 3 x 2 |
| **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 |

| Class | No. | Applicable tubing size (inch) |
|---|---|---|
| **1** | **A** | 1/8" x 0.086" |
| **—** | **—** | —— |
| **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" |

Note) For each body class, the second and later numbers or symbols indicate reducing. However, use of different diameters is not available with size 1.

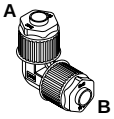
**Size combination**

| Class | No. | Applicable tubing size (mm) |
|---|---|---|
| **1** | **1** | 4 x 3 |
| **1** | **2** | 3 x 2 |
| **2** | **1** | 6 x 4 |
| **2** | **2** | 4 x 3 |
| **2** | **C** | 3 x 2 |
| **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 |

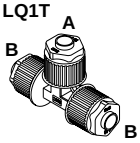
| Class | No. | Applicable tubing size (inch) | Applicable flange |
|---|---|---|---|
| **1** | **A** | 1/8" x 0.086" | — |
| **—** | **—** | —— | |
| **2** | **A** | 1/4" x 5/32" | — |
| **2** | **B** | 3/16" x 1/8" | |
| **2** | **C** | 1/8" x 0.086" | — |
| **3** | **A** | 3/8" x 1/4" | |
| **3** | **B** | 1/4" x 5/32" | |
| **4** | **A** | 1/2" x 3/8" | 15 A |
| **4** | **B** | 3/8" x 1/4" | |
| **5** | **A** | 3/4" x 5/8" | 20 A |
| **5** | **B** | 1/2" x 3/8" | |
| **6** | **A** | 1" x 7/8" | 25 A |
| **6** | **B** | 3/4" x 5/8" | |

| Symbol | Application |
|---|---|
| **Nil** | Same tubing size |
| Refer to the applicable tubing table. | Different diameter tubing can be selected within the same body class. |

Union elbow **LQ1E**




Union tee **LQ1T**



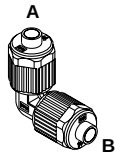

Panel mount union **LQ1P**


Union **LQ1U**


Note 1) For each body class, the second and later numbers or symbols indicate reducing. However, in case of size 1, the tubing cannot be changed by reducing.
Note 2) Sizes 1 to 3 are not available for the union flange
Note 3) For Union flange, nut sizes 4 and 5 are as shown below.
LQ1F4□: LQ-4N□□
LQ1F5□: LQ-5N□□

### Different diameter tubing order example

Different diameter tubing (with plug-in reducer) can be selected within the same body class.
(Example) Union elbow
Body class 3
A side: ø10 x ø8
B side: ø8 x ø6
Order as shown below.



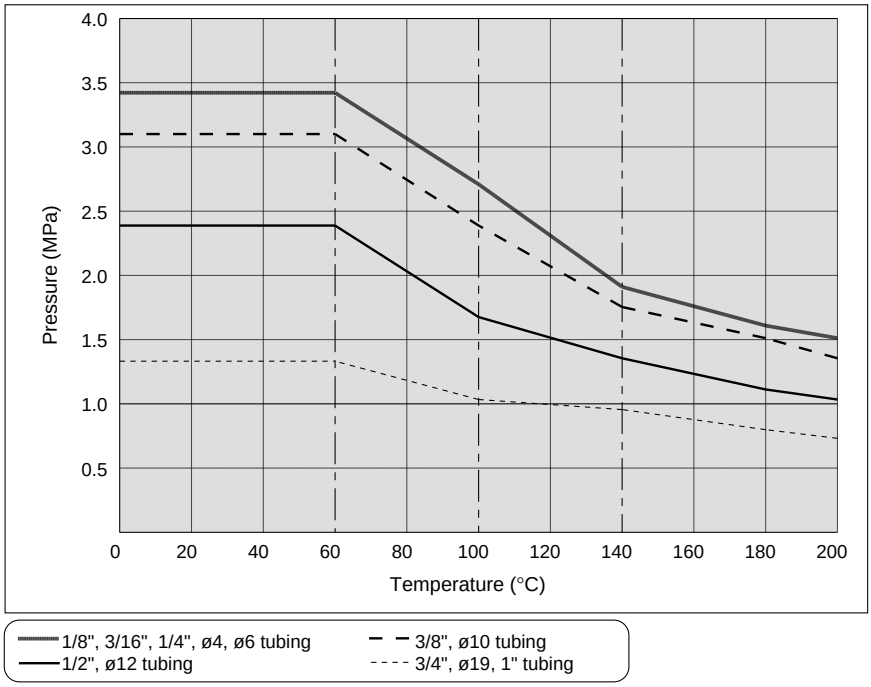

**LQ1 E 31 32**

- **Only select combinations from the same body class.**
- **Different dia. tubing size (B side)**
- **Applicable tubing size (A side)**
- **Union elbow**

## Specifications

| Feature \ Model | LQ1□10 | LQ1□20 | LQ1□30 | LQ1□40 | LQ1□50 | LQ1□60 |
|---|---|---|---|---|---|---|
| **Material** | NEW PFA | | | | | |
| **Maximum operating pressure (at 20°C)** | 1.0 MPa | | | | | |
| **Proof pressure** | Refer to the withstand pressure and heat resistance performance curves. | | | | | |
| **Operating temperature** | 0 to 200°C | | | | | |

## Burst Pressure and Heat Resistance Performance




# ⚠ Specific Product Precautions

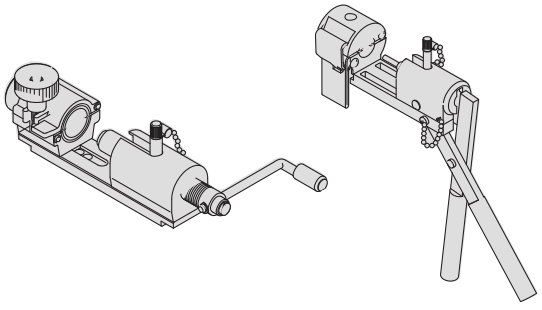
**Be sure to read before handling. Refer to front matters 42 and 43 for Safety Instructions.**

**Piping**

## ⚠ Caution

**1. Connect tubing with special tools**

Please refer to the LQ1, 2 series mounting method in "High Purity Fluoropolymer Fittings: HYPER FITTINGS®" (M-E05-1) for tubing connection and special tools. (Downloadable from our web site.)



## ⚠ Caution

**2. Tighten the nut to the end surface of the body. As a guide, refer to the proper tightening torque shown below.**

**Tightening torque for piping**

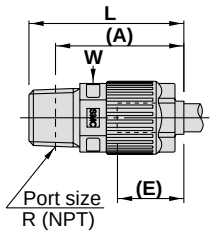
| Body class | Torque (N·m) |
|---|---|
| **2** | 0.3 to 0.4 |
| **3** | 0.8 to 1.0 |
| **4** | 1.0 to 1.2 |
| **5** | 2.5 to 3.0 |
| **6** | 5.5 to 6.0 |

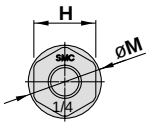
Note) In the case of body class 1, the nut should be tightened manually.

## Dimensions

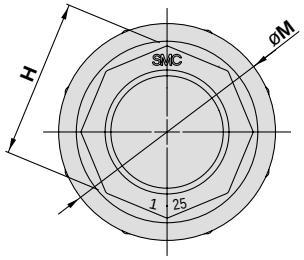
### Male Connector: LQ1H-M


Class 1




Class 2 to 5




Class 6

(A) shows the reference dimension after connection.
(E) shows the approximate dimension of the inserted tubing from the end of the nut.
"W" is width across flats dimension.

#### Metric sizes

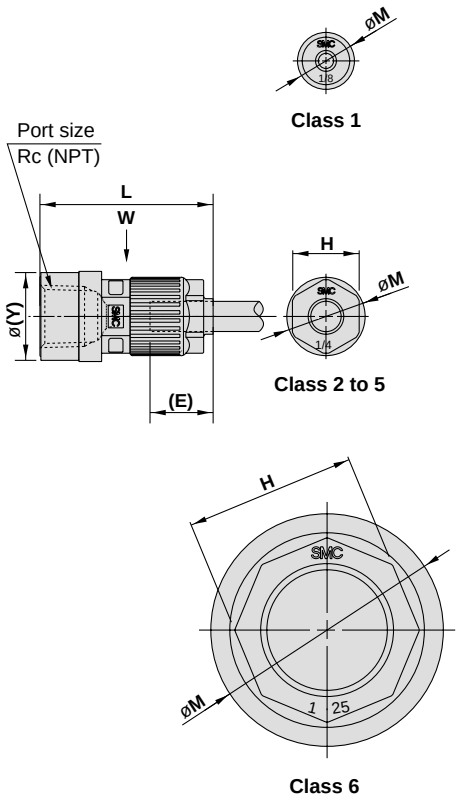
| Model | Applicable tubing O.D. | Connection threads R/NPT | A | E | H | L | M | W |
|---|---|---|---|---|---|---|---|---|
| **LQ1H11-M□** | **ø4** | 1/8" | 21 | 10 | – | 25 | 11.5 | 10 |
| **LQ1H12-M□** | **ø3** | | | | | | | |
| **LQ1H21-M□** | **ø6** | 1/8" | 31.5 | 15 | 14 | 35 | 16.5 | 14 |
| **LQ1H22-M□** | **ø4** | | | | | | | |
| **LQ1H2C-M□** | **ø3** | | | | | | | |
| **LQ1H23-M□** | **ø6** | 1/4" | 29 | | | | | |
| **LQ1H24-M□** | **ø4** | | | | | | | |
| **LQ1H2F-M□** | **ø3** | | | | | | | |
| **LQ1H31-M□** | **ø10** | 1/4" | 36.5 | 20 | 17 | 42.5 | 23 | 19 |
| **LQ1H32-M□** | **ø8** | | | | | | | |
| **LQ1H33-M□** | **ø6** | | | | | | | |
| **LQ1H34-M□** | **ø10** | 3/8" | 36 | | | | | |
| **LQ1H35-M□** | **ø8** | | | | | | | |
| **LQ1H36-M□** | **ø6** | | | | | | | |
| **LQ1H41-M□** | **ø12** | 3/8" | 46 | 24 | 21 | 52 | 28 | 23 |
| **LQ1H42-M□** | **ø10** | | | | | | | |
| **LQ1H43-M□** | **ø12** | 1/2" | 44 | | | | | |
| **LQ1H44-M□** | **ø10** | | | | | | | |
| **LQ1H51-M□** | **ø19** | 1/2" | 55 | 29 | 26 | 62.5 | 39 | 32 |
| **LQ1H52-M□** | **ø12** | | | | | | | |
| **LQ1H53-M□** | **ø19** | 3/4" | 53.5 | | | | | |
| **LQ1H54-M□** | **ø12** | | | | | | | |
| **LQ1H61-M□** | **ø25** | 3/4" | 72 | 39.5 | 36 | 81 | 49 | 46 |
| **LQ1H62-M□** | **ø19** | | | | | | | |
| **LQ1H63-M□** | **ø25** | 1" | 71 | | | | | |
| **LQ1H64-M□** | **ø19** | | | | | | | |

#### Inch sizes

| Model | Applicable tubing O.D. | Connection threads Rc/NPT | A | E | H | L | M | W |
|---|---|---|---|---|---|---|---|---|
| **LQ1H1A-M□** | 1/8" | 1/8" | 21 | 10 | – | 25 | 11.5 | 10 |
| **LQ1H2A-M□** | 1/4" | 1/8" | 31.5 | 15 | 14 | 35 | 16.5 | 14 |
| **LQ1H2B-M□** | 3/16" | | | | | | | |
| **LQ1H2C-M□** | 1/8" | | | | | | | |
| **LQ1H2D-M□** | 1/4" | 1/4" | 29 | | | | | |
| **LQ1H2E-M□** | 3/16" | | | | | | | |
| **LQ1H2F-M□** | 1/8" | | | | | | | |
| **LQ1H3A-M□** | 3/8" | 1/4" | 36.5 | 20 | 17 | 42.5 | 23 | 19 |
| **LQ1H3B-M□** | 1/4" | | | | | | | |
| **LQ1H3C-M□** | 3/8" | 3/8" | 36 | | | | | |
| **LQ1H3D-M□** | 1/4" | | | | | | | |
| **LQ1H4A-M□** | 1/2" | 3/8" | 46 | 24 | 21 | 52 | 28 | 23 |
| **LQ1H4B-M□** | 3/8" | | | | | | | |
| **LQ1H4C-M□** | 1/2" | 1/2" | 44 | | | | | |
| **LQ1H4D-M□** | 3/8" | | | | | | | |
| **LQ1H5A-M□** | 3/4" | 1/2" | 55 | 29 | 26 | 62.5 | 39 | 32 |
| **LQ1H5B-M□** | 1/2" | | | | | | | |
| **LQ1H5C-M□** | 3/4" | 3/4" | 53.5 | | | | | |
| **LQ1H5D-M□** | 1/2" | | | | | | | |
| **LQ1H6A-M□** | 1" | 3/4" | 72 | 39.5 | 36 | 81 | 49 | 46 |
| **LQ1H6B-M□** | 3/4" | | | | | | | |
| **LQ1H6C-M□** | 1" | 1" | 71 | | | | | |
| **LQ1H6D-M□** | 3/4" | | | | | | | |

## Dimensions

### Female Connector: LQ1H-F




(E) shows the reference of the inserted tubing from the end of the nut.
"W" is width across flats dimension.

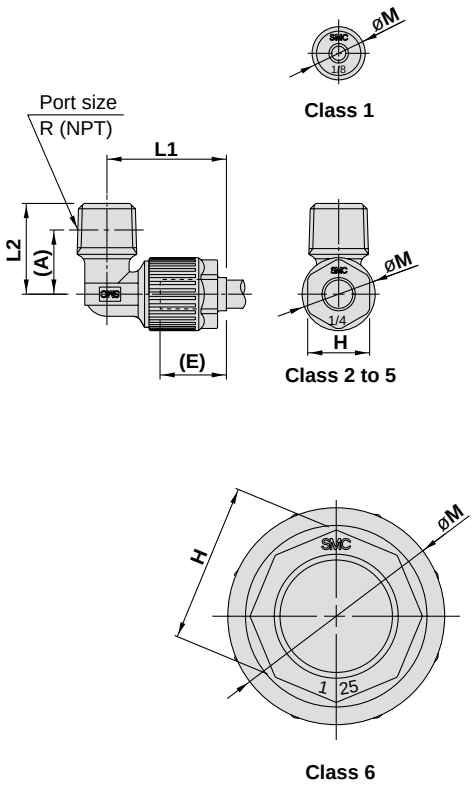
#### Metric sizes

| Model | Applicable tubing O.D. | Connection threads Rc/NPT | E | H | L | M | W | Y |
|---|---|---|---|---|---|---|---|---|
| **LQ1H11-F□** | **ø4** | 1/8" | 10 | – | 26.5 | Ø11.5 | 10 | Ø18.5 |
| **LQ1H12-F□** | **ø3** | | | | | | | |
| **LQ1H21-F□** | **ø6** | 1/8" | 15 | 14 | 35 | Ø16.5 | 14 | Ø18.5 |
| **LQ1H22-F□** | **ø4** | | | | | | | |
| **LQ1H2C-F□** | **ø3** | | | | | | | |
| **LQ1H23-F□** | **ø6** | 1/4" | | | 36.5 | | | Ø21.5 |
| **LQ1H24-F□** | **ø4** | | | | | | | |
| **LQ1H2F-F□** | **ø3** | | | | | | | |
| **LQ1H31-F□** | **ø10** | 1/4" | 20 | 17 | 42.5 | Ø23 | 19 | Ø21.5 |
| **LQ1H32-F□** | **ø8** | | | | | | | |
| **LQ1H33-F□** | **ø6** | | | | | | | |
| **LQ1H34-F□** | **ø10** | 3/8" | | | | | | Ø25 |
| **LQ1H35-F□** | **ø8** | | | | | | | |
| **LQ1H36-F□** | **ø6** | | | | | | | |
| **LQ1H41-F□** | **ø12** | 3/8" | 24 | 21 | 47.5 | Ø28 | 23 | Ø25 |
| **LQ1H42-F□** | **ø10** | | | | | | | |
| **LQ1H43-F□** | **ø12** | 1/2" | | | 50 | | | Ø29.5 |
| **LQ1H44-F□** | **ø10** | | | | | | | |
| **LQ1H51-F□** | **ø19** | 1/2" | 29 | 26 | 58.5 | Ø39 | 32 | Ø29.5 |
| **LQ1H52-F□** | **ø12** | | | | | | | |
| **LQ1H53-F□** | **ø19** | 3/4" | | | 60 | | | Ø36 |
| **LQ1H54-F□** | **ø12** | | | | | | | |
| **LQ1H61-F□** | **ø25** | 3/4" | 39.5 | 36 | 75 | Ø49 | 46 | Ø36 |
| **LQ1H62-F□** | **ø19** | | | | | | | |
| **LQ1H63-F□** | **ø25** | 1" | | | 78.5 | | | Ø44.5 |
| **LQ1H64-F□** | **ø19** | | | | | | | |

#### Inch sizes

| Model | Applicable tubing O.D. | Connection threads Rc/NPT | E | H | L | M | W | Y |
|---|---|---|---|---|---|---|---|---|
| **LQ1H1A-F□** | 1/8" | 1/8" | 10 | – | 26.5 | Ø11.5 | 10 | Ø18.5 |
| **LQ1H2A-F□** | 1/4" | 1/8" | 15 | 14 | 35 | Ø16.5 | 14 | Ø18.5 |
| **LQ1H2B-F□** | 3/16" | | | | | | | |
| **LQ1H2C-F□** | 1/8" | | | | | | | |
| **LQ1H2D-F□** | 1/4" | 1/4" | | | 36.5 | | | Ø21.5 |
| **LQ1H2E-F□** | 3/16" | | | | | | | |
| **LQ1H2F-F□** | 1/8" | | | | | | | |
| **LQ1H3A-F□** | 3/8" | 1/4" | 20 | 17 | 42.5 | Ø23 | 19 | Ø21.5 |
| **LQ1H3B-F□** | 1/4" | | | | | | | |
| **LQ1H3C-F□** | 3/8" | 3/8" | | | | | | Ø25 |
| **LQ1H3D-F□** | 1/4" | | | | | | | |
| **LQ1H4A-F□** | 1/2" | 3/8" | 24 | 21 | 47.5 | Ø28 | 23 | Ø25 |
| **LQ1H4B-F□** | 3/8" | | | | | | | |
| **LQ1H4C-F□** | 1/2" | 1/2" | | | 50 | | | Ø29.5 |
| **LQ1H4D-F□** | 3/8" | | | | | | | |
| **LQ1H5A-F□** | 3/4" | 1/2" | 29 | 26 | 58.5 | Ø39 | 32 | Ø29.5 |
| **LQ1H5B-F□** | 1/2" | | | | | | | |
| **LQ1H5C-F□** | 3/4" | 3/4" | | | 60 | | | Ø36 |
| **LQ1H5D-F□** | 1/2" | | | | | | | |
| **LQ1H6A-F□** | 1" | 3/4" | 39.5 | 36 | 75 | Ø49 | 46 | Ø36 |
| **LQ1H6B-F□** | 3/4" | | | | | | | |
| **LQ1H6C-F□** | 1" | 1" | | | 78.5 | | | Ø44.5 |
| **LQ1H6D-F□** | 3/4" | | | | | | | |

## Male Elbow: LQ1L-M




(A) shows the reference dimension after connection.
(E) shows the approximate dimension of the inserted tubing from the end of the nut.

### Metric sizes

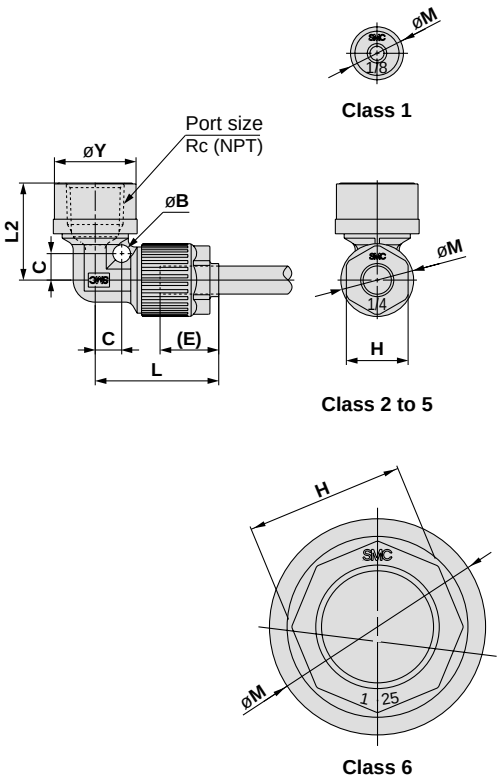
| Model | Applicable tubing O.D. | Connection threads R/NPT | A | E | H | L1 | L2 | M |
|---|---|---|---|---|---|---|---|---|
| **LQ1L11-M□** | **ø4** | 1/8" | 11.5 | 10 | – | 18 | 15 | Ø11.5 |
| **LQ1L12-M□** | **ø3** | | | | | | | |
| **LQ1L21-M□** | **ø6** | 1/8" | 14.5 | 15 | 14 | 27 | 20.5 | Ø16.5 |
| **LQ1L22-M□** | **ø4** | | | | | | | |
| **LQ1L2C-M□** | **ø3** | | | | | | | |
| **LQ1L23-M□** | **ø6** | 1/4" | | | | | | |
| **LQ1L24-M□** | **ø4** | | | | | | | |
| **LQ1L2F-M□** | **ø3** | | | | | | | |
| **LQ1L31-M□** | **ø10** | 1/4" | 20 | 20 | 17 | 35 | 26.5 | Ø23 |
| **LQ1L32-M□** | **ø8** | | | | | | | |
| **LQ1L33-M□** | **ø6** | | | | | | | |
| **LQ1L34-M□** | **ø10** | 3/8" | | | | | | |
| **LQ1L35-M□** | **ø8** | | | | | | | |
| **LQ1L36-M□** | **ø6** | | | | | | | |
| **LQ1L41-M□** | **ø12** | 3/8" | 25 | 24 | 21 | 45 | 33 | Ø28 |
| **LQ1L42-M□** | **ø10** | | | | | | | |
| **LQ1L43-M□** | **ø12** | 1/2" | | | | | | |
| **LQ1L44-M□** | **ø10** | | | | | | | |
| **LQ1L51-M□** | **ø19** | 1/2" | 30.5 | 29 | 26 | 54 | 40 | Ø39 |
| **LQ1L52-M□** | **ø12** | | | | | | | |
| **LQ1L53-M□** | **ø19** | 3/4" | | | | | | |
| **LQ1L54-M□** | **ø12** | | | | | | | |
| **LQ1L61-M□** | **ø25** | 3/4" | 35 | 39.5 | 36 | 68.5 | 46 | Ø49 |
| **LQ1L62-M□** | **ø19** | | | | | | | |
| **LQ1L63-M□** | **ø25** | 1" | | | | | | |
| **LQ1L64-M□** | **ø19** | | | | | | | |

### Inch sizes

| Model | Applicable tubing O.D. | Connection threads R/NPT | A | E | H | L1 | L2 | M |
|---|---|---|---|---|---|---|---|---|
| **LQ1L1A-M□** | 1/8" | 1/8" | 11.5 | 10 | – | 18 | 15 | Ø11.5 |
| **LQ1L2A-M□** | 1/4" | 1/8" | 14.5 | 15 | 14 | 27 | 20.5 | Ø16.5 |
| **LQ1L2B-M□** | 3/16" | | | | | | | |
| **LQ1L2C-M□** | 1/8" | | | | | | | |
| **LQ1L2D-M□** | 1/4" | 1/4" | | | | | | |
| **LQ1L2E-M□** | 3/16" | | | | | | | |
| **LQ1L2F-M□** | 1/8" | | | | | | | |
| **LQ1L3A-M□** | 3/8" | 1/4" | 20 | 20 | 17 | 35 | 26.5 | Ø23 |
| **LQ1L3B-M□** | 1/4" | | | | | | | |
| **LQ1L3C-M□** | 3/8" | 3/8" | | | | | | |
| **LQ1L3D-M□** | 1/4" | | | | | | | |
| **LQ1L4A-M□** | 1/2" | 3/8" | 25 | 24 | 21 | 45 | 33 | Ø28 |
| **LQ1L4B-M□** | 3/8" | | | | | | | |
| **LQ1L4C-M□** | 1/2" | 1/2" | | | | | | |
| **LQ1L4D-M□** | 3/8" | | | | | | | |
| **LQ1L5A-M□** | 3/4" | 1/2" | 30.5 | 29 | 26 | 54 | 40 | Ø39 |
| **LQ1L5B-M□** | 1/2" | | | | | | | |
| **LQ1L5C-M□** | 3/4" | 3/4" | | | | | | |
| **LQ1L5D-M□** | 1/2" | | | | | | | |
| **LQ1L6A-M□** | 1" | 3/4" | 35 | 39.5 | 36 | 68.5 | 46 | Ø49 |
| **LQ1L6B-M□** | 3/4" | | | | | | | |
| **LQ1L6C-M□** | 1" | 1" | | | | | | |
| **LQ1L6D-M□** | 3/4" | | | | | | | |

## Dimensions

### Female Elbow: LQ1L-F




(E) shows the reference dimension of the inserted tubing from the end of the nut.

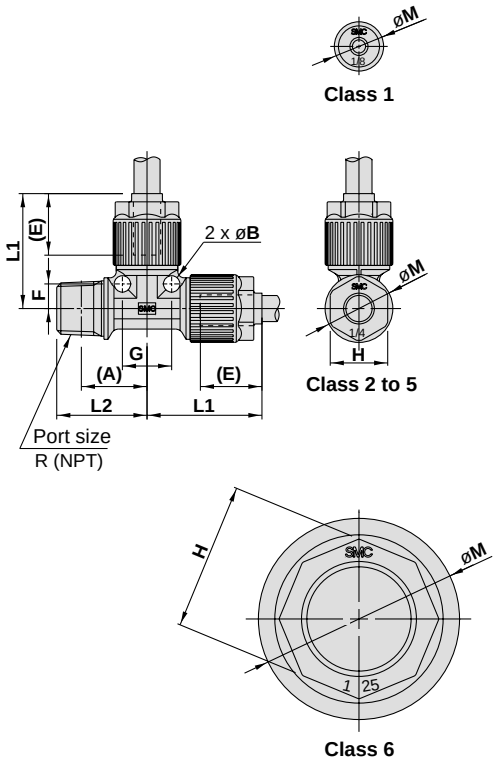
**Metric sizes**

| Model | Applicable tubing O.D. | Connection threads Rc/NPT | B | C | E | H | L1 | L2 | M | Y |
|---|---|---|---|---|---|---|---|---|---|---|
| **LQ1L11-F□** | **ø4** | 1/8" | ø2 | 4 | 10 | – | 18 | 17 | ø11.5 | ø18.5 |
| **LQ1L12-F□** | **ø3** | | | | | | | | | |
| **LQ1L21-F□** | **ø6** | 1/8" | ø4 | 6 | 15 | 14 | 27 | 19.5 | ø16.5 | ø18.5 |
| **LQ1L22-F□** | **ø4** | | | | | | | | | |
| **LQ1L2C-F□** | **ø3** | | | | | | | | | |
| **LQ1L23-F□** | **ø6** | 1/4" | | | | | | 22.5 | | ø21.5 |
| **LQ1L24-F□** | **ø4** | | | | | | | | | |
| **LQ1L2F-F□** | **ø3** | | | | | | | | | |
| **LQ1L31-F□** | **ø10** | 1/4" | ø5 | 9 | 20 | 17 | 35 | 23 | ø23 | ø21.5 |
| **LQ1L32-F□** | **ø8** | | | | | | | | | |
| **LQ1L33-F□** | **ø6** | | | | | | | | | |
| **LQ1L34-F□** | **ø10** | 3/8" | | | | | | 25 | | ø25 |
| **LQ1L35-F□** | **ø8** | | | | | | | | | |
| **LQ1L36-F□** | **ø6** | | | | | | | | | |
| **LQ1L41-F□** | **ø12** | 3/8" | ø6 | 9 | 24 | 21 | 45 | 29 | ø28 | ø25 |
| **LQ1L42-F□** | **ø10** | | | | | | | | | |
| **LQ1L43-F□** | **ø12** | 1/2" | | | | | | 32.5 | | ø29.5 |
| **LQ1L44-F□** | **ø10** | | | | | | | | | |
| **LQ1L51-F□** | **ø19** | 1/2" | ø7 | 14 | 29 | 26 | 54 | 37.5 | ø39 | ø29.5 |
| **LQ1L52-F□** | **ø12** | | | | | | | | | |
| **LQ1L53-F□** | **ø19** | 3/4" | | | | | | 39.5 | | ø36 |
| **LQ1L54-F□** | **ø12** | | | | | | | | | |
| **LQ1L61-F□** | **ø25** | 3/4" | ø8 | 18 | 39.5 | 36 | 68.5 | 44.5 | ø49 | ø36 |
| **LQ1L62-F□** | **ø19** | | | | | | | | | |
| **LQ1L63-F□** | **ø25** | 1" | | | | | | 48 | | ø44.5 |
| **LQ1L64-F□** | **ø19** | | | | | | | | | |

**Inch sizes**

| Model | Applicable tubing O.D. | Connection threads Rc/NPT | B | C | E | H | L1 | L2 | M | Y |
|---|---|---|---|---|---|---|---|---|---|---|
| **LQ1L1A-F□** | 1/8" | 1/8" | ø2 | 4 | 10 | – | 18 | 17 | ø11.5 | ø18.5 |
| **LQ1L2A-F□** | 1/4" | 1/8" | ø4 | 6 | 15 | 14 | 27 | 19.5 | ø16.5 | ø18.5 |
| **LQ1L2B-F□** | 3/16" | | | | | | | | | |
| **LQ1L2C-F□** | 1/8" | | | | | | | | | |
| **LQ1L2D-F□** | 1/4" | 1/4" | | | | | | 22.5 | | ø21.5 |
| **LQ1L2E-F□** | 3/16" | | | | | | | | | |
| **LQ1L2F-F□** | 1/8" | | | | | | | | | |
| **LQ1L3A-F□** | 3/8" | 1/4" | ø5 | 9 | 20 | 17 | 35 | 23 | ø23 | ø21.5 |
| **LQ1L3B-F□** | 1/4" | | | | | | | | | |
| **LQ1L3C-F□** | 3/8" | 3/8" | | | | | | 25 | | ø25 |
| **LQ1L3D-F□** | 1/4" | | | | | | | | | |
| **LQ1L4A-F□** | 1/2" | 3/8" | ø6 | 9 | 24 | 21 | 45 | 29 | ø28 | ø25 |
| **LQ1L4B-F□** | 3/8" | | | | | | | | | |
| **LQ1L4C-F□** | 1/2" | 1/2" | | | | | | 32.5 | | ø29.5 |
| **LQ1L4D-F□** | 3/8" | | | | | | | | | |
| **LQ1L5A-F□** | 3/4" | 1/2" | ø7 | 14 | 29 | 26 | 54 | 37.5 | ø39 | ø29.5 |
| **LQ1L5B-F□** | 1/2" | | | | | | | | | |
| **LQ1L5C-F□** | 3/4" | 3/4" | | | | | | 39.5 | | ø36 |
| **LQ1L5D-F□** | 1/2" | | | | | | | | | |
| **LQ1L6A-F□** | 1" | 3/4" | ø8 | 18 | 39.5 | 36 | 68.5 | 44.5 | ø49 | ø36 |
| **LQ1L6B-F□** | 3/4" | | | | | | | | | |
| **LQ1L6C-F□** | 1" | 1" | | | | | | 48 | | ø44.5 |
| **LQ1L6D-F□** | 3/4" | | | | | | | | | |

## Male Run Tee: LQ1R-M




(A) shows the reference dimension after connection.
(E) shows the approximate dimension of the inserted tubing from the end of the nut.

### Metric sizes

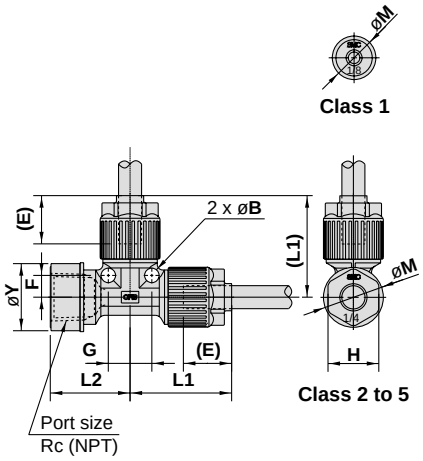
| Model | Applicable tubing O.D. | Connection threads R/NPT | A | B | E | F | G | H | L1 | L2 | M |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LQ1R11-M□** | **ø4** | 1/8" | 12 | Ø2 | 10 | 4 | 8 | — | 18.5 | 15.5 | 11.5 |
| **LQ1R12-M□** | **ø3** | | | | | | | | | | |
| **LQ1R21-M□** | **ø6** | 1/8" | 16 | Ø4 | 15 | 6 | 12 | 14 | 28 | 19.5 | 16.5 |
| **LQ1R22-M□** | **ø4** | | | | | | | | | | |
| **LQ1R2C-M□** | **ø3** | | | | | | | | | | |
| **LQ1R23-M□** | **ø6** | 1/4" | | | | | | | | 22 | |
| **LQ1R24-M□** | **ø4** | | | | | | | | | | |
| **LQ1R2F-M□** | **ø3** | | | | | | | | | | |
| **LQ1R31-M□** | **ø10** | 1/4" | 19 | Ø5 | 20 | 9 | 18 | 17 | 36.5 | 25 | 23 |
| **LQ1R32-M□** | **ø8** | | | | | | | | | | |
| **LQ1R33-M□** | **ø6** | | | | | | | | | | |
| **LQ1R34-M□** | **ø10** | 3/8" | 21 | | | | | | | 27 | |
| **LQ1R35-M□** | **ø8** | | | | | | | | | | |
| **LQ1R36-M□** | **ø6** | | | | | | | | | | |
| **LQ1R41-M□** | **ø12** | 3/8" | 23 | Ø6 | 24 | 9 | 18 | 21 | 43 | 29 | 28 |
| **LQ1R42-M□** | **ø10** | | | | | | | | | | |
| **LQ1R43-M□** | **ø12** | 1/2" | 24.5 | | | | | | | 32 | |
| **LQ1R44-M□** | **ø10** | | | | | | | | | | |
| **LQ1R51-M□** | **ø19** | 1/2" | 30.5 | Ø7 | 29 | 14 | 28 | 26 | 54 | 38 | 39 |
| **LQ1R52-M□** | **ø12** | | | | | | | | | | |
| **LQ1R53-M□** | **ø19** | 3/4" | 30 | | | | | | | 39 | |
| **LQ1R54-M□** | **ø12** | | | | | | | | | | |
| **LQ1R61-M□** | **ø25** | 3/4" | 36 | Ø8 | 39.5 | 18 | 36 | 36 | 69.5 | 45 | 49 |
| **LQ1R62-M□** | **ø19** | | | | | | | | | | |
| **LQ1R63-M□** | **ø25** | 1" | 35 | | | | | | | | |
| **LQ1R64-M□** | **ø19** | | | | | | | | | | |

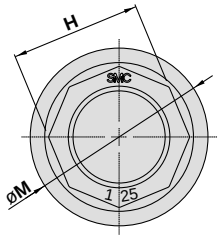
### Inch sizes

| Model | Applicable tubing O.D. | Connection threads R/NPT | A | B | E | F | G | H | L1 | L2 | M |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LQ1R1A-M□** | 1/8" | 1/8" | 12 | Ø2 | 10 | 4 | 8 | — | 18.5 | 15.5 | 11.5 |
| **LQ1R2A-M□** | 1/4" | 1/8" | 16 | Ø4 | 15 | 6 | 12 | 14 | 28 | 19.5 | 16.5 |
| **LQ1R2B-M□** | 3/16" | | | | | | | | | | |
| **LQ1R2C-M□** | 1/8" | | | | | | | | | | |
| **LQ1R2D-M□** | 1/4" | 1/4" | | | | | | | | 22 | |
| **LQ1R2E-M□** | 3/16" | | | | | | | | | | |
| **LQ1R2F-M□** | 1/8" | | | | | | | | | | |
| **LQ1R3A-M□** | 3/8" | 1/4" | 19 | Ø5 | 20 | 9 | 18 | 17 | 36.5 | 25 | 23 |
| **LQ1R3B-M□** | 1/4" | | | | | | | | | | |
| **LQ1R3C-M□** | 3/8" | 3/8" | 21 | | | | | | | 27 | |
| **LQ1R3D-M□** | 1/4" | | | | | | | | | | |
| **LQ1R4A-M□** | 1/2" | 3/8" | 23 | Ø6 | 24 | 9 | 18 | 21 | 43 | 29 | 28 |
| **LQ1R4B-M□** | 3/8" | | | | | | | | | | |
| **LQ1R4C-M□** | 1/2" | 1/2" | 24.5 | | | | | | | 32 | |
| **LQ1R4D-M□** | 3/8" | | | | | | | | | | |
| **LQ1R5A-M□** | 3/4" | 1/2" | 30.5 | Ø7 | 29 | 14 | 28 | 26 | 54 | 38 | 39 |
| **LQ1R5B-M□** | 1/2" | | | | | | | | | | |
| **LQ1R5C-M□** | 3/4" | 3/4" | 30 | | | | | | | 39 | |
| **LQ1R5D-M□** | 1/2" | | | | | | | | | | |
| **LQ1R6A-M□** | 1" | 3/4" | 36 | Ø8 | 39.5 | 18 | 36 | 36 | 69.5 | 45 | 49 |
| **LQ1R6B-M□** | 3/4" | | | | | | | | | | |
| **LQ1R6C-M□** | 1" | 1" | 35 | | | | | | | | |
| **LQ1R6D-M□** | 3/4" | | | | | | | | | | |

## Dimensions

### Female Run Tee: LQ1R-F




(E) shows the approximate dimension of the inserted tubing from the end of the nut.

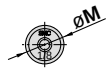
**Metric sizes**

| Model | Applicable tubing O.D. | Connection threads Rc/NPT | B | E | F | G | H | L1 | L2 | M | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LQ1R11-F□** | **ø4** | 1/8" | Ø2 | 10 | 4 | 8 | — | 18.5 | 16 | Ø11.5 | Ø18.5 |
| **LQ1R12-F□** | **ø3** | | | | | | | | | | |
| **LQ1R21-F□** | **ø6** | 1/8" | Ø4 | 15 | 6 | 12 | 14 | 28 | 19.5 | Ø16.5 | Ø18.5 |
| **LQ1R22-F□** | **ø4** | | | | | | | | | | |
| **LQ1R2C-F□** | **ø3** | | | | | | | | | | |
| **LQ1R23-F□** | **ø6** | 1/4" | | | | | | | 22 | | Ø21.5 |
| **LQ1R24-F□** | **ø4** | | | | | | | | | | |
| **LQ1R2F-F□** | **ø3** | | | | | | | | | | |
| **LQ1R31-F□** | **ø10** | 1/4" | Ø5 | 20 | 9 | 18 | 17 | 36.5 | 24 | Ø23 | Ø21.5 |
| **LQ1R32-F□** | **ø8** | | | | | | | | | | |
| **LQ1R33-F□** | **ø6** | | | | | | | | | | |
| **LQ1R34-F□** | **ø10** | 3/8" | | | | | | | 25.5 | | Ø25 |
| **LQ1R35-F□** | **ø8** | | | | | | | | | | |
| **LQ1R36-F□** | **ø6** | | | | | | | | | | |
| **LQ1R41-F□** | **ø12** | 3/8" | Ø6 | 24 | 9 | 18 | 21 | 43 | 25 | Ø28 | Ø25 |
| **LQ1R42-F□** | **ø10** | | | | | | | | | | |
| **LQ1R43-F□** | **ø12** | 1/2" | | | | | | | 31.5 | | Ø29.5 |
| **LQ1R44-F□** | **ø10** | | | | | | | | | | |
| **LQ1R51-F□** | **ø19** | 1/2" | Ø7 | 29 | 14 | 28 | 26 | 54 | 35.5 | Ø39 | Ø29.5 |
| **LQ1R52-F□** | **ø12** | | | | | | | | | | |
| **LQ1R53-F□** | **ø19** | 3/4" | | | | | | | 37 | | Ø36 |
| **LQ1R54-F□** | **ø12** | | | | | | | | | | |
| **LQ1R61-F□** | **ø25** | 3/4" | Ø8 | 39.5 | 18 | 36 | 36 | 69.5 | 42.5 | Ø49 | Ø36 |
| **LQ1R62-F□** | **ø19** | | | | | | | | | | |
| **LQ1R63-F□** | **ø25** | 1" | | | | | | | 46 | | Ø44.5 |
| **LQ1R64-F□** | **ø19** | | | | | | | | | | |

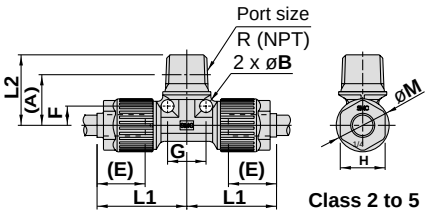
**Inch sizes**

| Model | Applicable tubing O.D. | Connection threads Rc/NPT | B | E | F | G | H | L1 | L2 | M | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LQ1R1A-F□** | 1/8" | 1/8" | Ø2 | 10 | 4 | 8 | — | 18.5 | 16 | Ø11.5 | Ø18.5 |
| **LQ1R2A-F□** | 1/4" | 1/8" | Ø4 | 15 | 6 | 12 | 14 | 28 | 19.5 | Ø16.5 | Ø18.5 |
| **LQ1R2B-F□** | 3/16" | | | | | | | | | | |
| **LQ1R2C-F□** | 1/8" | | | | | | | | | | |
| **LQ1R2D-F□** | 1/4" | 1/4" | | | | | | | 22 | | Ø21.5 |
| **LQ1R2E-F□** | 3/16" | | | | | | | | | | |
| **LQ1R2F-F□** | 1/8" | | | | | | | | | | |
| **LQ1R3A-F□** | 3/8" | 1/4" | Ø5 | 20 | 9 | 18 | 17 | 36.5 | 24 | Ø23 | Ø21.5 |
| **LQ1R3B-F□** | 1/4" | | | | | | | | | | |
| **LQ1R3C-F□** | 3/8" | 3/8" | | | | | | | 25.5 | | Ø25 |
| **LQ1R3D-F□** | 1/4" | | | | | | | | | | |
| **LQ1R4A-F□** | 1/2" | 3/8" | Ø6 | 24 | 9 | 18 | 21 | 43 | 25 | Ø28 | Ø25 |
| **LQ1R4B-F□** | 3/8" | | | | | | | | | | |
| **LQ1R4C-F□** | 1/2" | 1/2" | | | | | | | 31.5 | | Ø29.5 |
| **LQ1R4D-F□** | 3/8" | | | | | | | | | | |
| **LQ1R5A-F□** | 3/4" | 1/2" | Ø7 | 29 | 14 | 28 | 26 | 54 | 35.5 | Ø39 | Ø29.5 |
| **LQ1R5B-F□** | 1/2" | | | | | | | | | | |
| **LQ1R5C-F□** | 3/4" | 3/4" | | | | | | | 37 | | Ø36 |
| **LQ1R5D-F□** | 1/2" | | | | | | | | | | |
| **LQ1R6A-F□** | 1" | 3/4" | Ø8 | 39.5 | 18 | 36 | 36 | 69.5 | 42.5 | Ø49 | Ø36 |
| **LQ1R6B-F□** | 3/4" | | | | | | | | | | |
| **LQ1R6C-F□** | 1" | 1" | | | | | | | 46 | | Ø44.5 |
| **LQ1R6D-F□** | 3/4" | | | | | | | | | | |

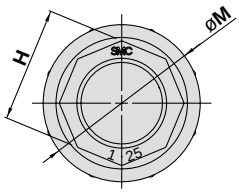
## Male Branch Tee: LQ1B-M




Class 1




Class 2 to 5




Class 6

(A) shows the reference dimension after connection.
(E) shows the approximate dimension of the inserted tubing from the end of the nut.

### Metric sizes

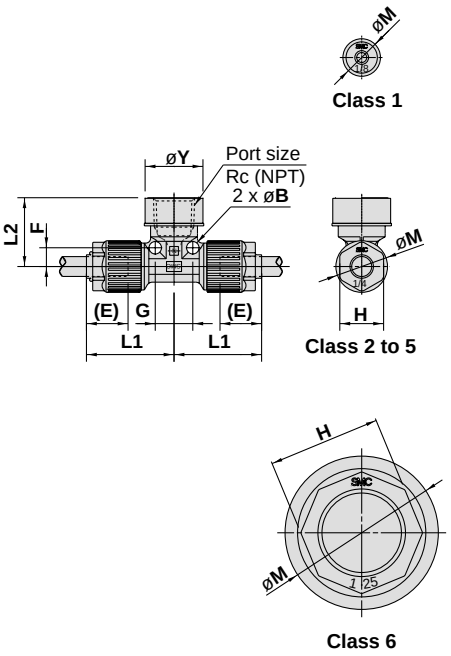
| Model | Applicable tubing O.D. | Connection threads R/NPT | A | B | E | F | G | H | L1 | L2 | M |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LQ1B11-M□** | **ø4** | 1/8" | 12 | Ø2 | 10 | 4 | 8 | — | 18.5 | 15.5 | 11.5 |
| **LQ1B12-M□** | **ø3** | | | | | | | | | | |
| **LQ1B21-M□** | **ø6** | 1/8" | 16 | Ø4 | 15 | 6 | 12 | 14 | 28 | 19.5 | 16.5 |
| **LQ1B22-M□** | **ø4** | | | | | | | | | | |
| **LQ1B2C-M□** | **ø3** | | | | | | | | | | |
| **LQ1B23-M□** | **ø6** | 1/4" | | | | | | | | 22 | |
| **LQ1B24-M□** | **ø4** | | | | | | | | | | |
| **LQ1B2F-M□** | **ø3** | | | | | | | | | | |
| **LQ1B31-M□** | **ø10** | 1/4" | 19 | Ø5 | 20 | 9 | 18 | 17 | 36.5 | 25 | 23 |
| **LQ1B32-M□** | **ø8** | | | | | | | | | | |
| **LQ1B33-M□** | **ø6** | | | | | | | | | | |
| **LQ1B34-M□** | **ø10** | 3/8" | 21 | | | | | | | 27 | |
| **LQ1B35-M□** | **ø8** | | | | | | | | | | |
| **LQ1B36-M□** | **ø6** | | | | | | | | | | |
| **LQ1B41-M□** | **ø12** | 3/8" | 23 | Ø6 | 24 | 9 | 18 | 21 | 43 | 29 | 28 |
| **LQ1B42-M□** | **ø10** | | | | | | | | | | |
| **LQ1B43-M□** | **ø12** | 1/2" | 24.5 | | | | | | | 32 | |
| **LQ1B44-M□** | **ø10** | | | | | | | | | | |
| **LQ1B51-M□** | **ø19** | 1/2" | 30.5 | Ø7 | 29 | 14 | 28 | 26 | 54 | 38 | 39 |
| **LQ1B52-M□** | **ø12** | | | | | | | | | | |
| **LQ1B53-M□** | **ø19** | 3/4" | 30 | | | | | | | 39 | |
| **LQ1B54-M□** | **ø12** | | | | | | | | | | |
| **LQ1B61-M□** | **ø25** | 3/4" | 36 | Ø8 | 39.5 | 18 | 36 | 36 | 69.5 | 45 | 49 |
| **LQ1B62-M□** | **ø19** | | | | | | | | | | |
| **LQ1B63-M□** | **ø25** | 1" | 35 | | | | | | | | |
| **LQ1B64-M□** | **ø19** | | | | | | | | | | |

### Inch sizes

| Model | Applicable tubing O.D. | Connection threads R/NPT | A | B | E | F | G | H | L1 | L2 | M |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LQ1B1A-M□** | 1/8" | 1/8" | 12 | Ø2 | 10 | 4 | 8 | — | 18.5 | 15.5 | 11.5 |
| **LQ1B2A-M□** | 1/4" | 1/8" | 16 | Ø4 | 15 | 6 | 12 | 14 | 28 | 19.5 | 16.5 |
| **LQ1B2B-M□** | 3/16" | | | | | | | | | | |
| **LQ1B2C-M□** | 1/8" | | | | | | | | | | |
| **LQ1B2D-M□** | 1/4" | 1/4" | | | | | | | | 22 | |
| **LQ1B2E-M□** | 3/16" | | | | | | | | | | |
| **LQ1B2F-M□** | 1/8" | | | | | | | | | | |
| **LQ1B3A-M□** | 3/8" | 1/4" | 19 | Ø5 | 20 | 9 | 18 | 17 | 36.5 | 25 | 23 |
| **LQ1B3B-M□** | 1/4" | | | | | | | | | | |
| **LQ1B3C-M□** | 3/8" | 3/8" | 21 | | | | | | | 27 | |
| **LQ1B3D-M□** | 1/4" | | | | | | | | | | |
| **LQ1B4A-M□** | 1/2" | 3/8" | 23 | Ø6 | 24 | 9 | 18 | 21 | 43 | 29 | 28 |
| **LQ1B4B-M□** | 3/8" | | | | | | | | | | |
| **LQ1B4C-M□** | 1/2" | 1/2" | 24.5 | | | | | | | 32 | |
| **LQ1B4D-M□** | 3/8" | | | | | | | | | | |
| **LQ1B5A-M□** | 3/4" | 1/2" | 30.5 | Ø7 | 29 | 14 | 28 | 26 | 54 | 38 | 39 |
| **LQ1B5B-M□** | 1/2" | | | | | | | | | | |
| **LQ1B5C-M□** | 3/4" | 3/4" | 30 | | | | | | | 39 | |
| **LQ1B5D-M□** | 1/2" | | | | | | | | | | |
| **LQ1B6A-M□** | 1" | 3/4" | 36 | Ø8 | 39.5 | 18 | 36 | 36 | 69.5 | 45 | 49 |
| **LQ1B6B-M□** | 3/4" | | | | | | | | | | |
| **LQ1B6C-M□** | 1" | 1" | 35 | | | | | | | | |
| **LQ1B6D-M□** | 3/4" | | | | | | | | | | |

## Dimensions

### Female Branch Tee: LQ1B-F




(E) shows the approximate dimension of the inserted tubing from the end of the nut.

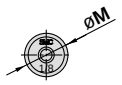
**Metric sizes**

| Model | Applicable tubing O.D. | Connection threads Rc/NPT | B | E | F | G | H | L1 | L2 | M | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LQ1B11-F□** | **ø4** | 1/8" | Ø2 | 10 | 4 | 8 | — | 18.5 | 16 | Ø11.5 | Ø18.5 |
| **LQ1B12-F□** | **ø3** | | | | | | | | | | |
| **LQ1B21-F□** | **ø6** | 1/8" | Ø4 | 15 | 6 | 12 | 14 | 28 | 19.5 | Ø16.5 | Ø18.5 |
| **LQ1B22-F□** | **ø4** | | | | | | | | | | |
| **LQ1B2C-F□** | **ø3** | | | | | | | | | | |
| **LQ1B23-F□** | **ø6** | 1/4" | | | | | | | 22 | | Ø21.5 |
| **LQ1B24-F□** | **ø4** | | | | | | | | | | |
| **LQ1B2F-F□** | **ø3** | | | | | | | | | | |
| **LQ1B31-F□** | **ø10** | 1/4" | Ø5 | 20 | 9 | 18 | 17 | 36.5 | 23.7 | Ø23 | Ø21.5 |
| **LQ1B32-F□** | **ø8** | | | | | | | | | | |
| **LQ1B33-F□** | **ø6** | | | | | | | | | | |
| **LQ1B34-F□** | **ø10** | 3/8" | | | | | | | 25.5 | | Ø25 |
| **LQ1B35-F□** | **ø8** | | | | | | | | | | |
| **LQ1B36-F□** | **ø6** | | | | | | | | | | |
| **LQ1B41-F□** | **ø12** | 3/8" | Ø6 | 24 | 9 | 18 | 21 | 43 | 25 | Ø28 | Ø25 |
| **LQ1B42-F□** | **ø10** | | | | | | | | | | |
| **LQ1B43-F□** | **ø12** | 1/2" | | | | | | | 31.5 | | Ø29.5 |
| **LQ1B44-F□** | **ø10** | | | | | | | | | | |
| **LQ1B51-F□** | **ø19** | 1/2" | Ø7 | 29 | 14 | 28 | 26 | 54 | 35.5 | Ø39 | Ø29.5 |
| **LQ1B52-F□** | **ø12** | | | | | | | | | | |
| **LQ1B53-F□** | **ø19** | 3/4" | | | | | | | 37 | | Ø36 |
| **LQ1B54-F□** | **ø12** | | | | | | | | | | |
| **LQ1B61-F□** | **ø25** | 3/4" | Ø8 | 39.5 | 18 | 36 | 36 | 69.5 | 42.5 | Ø49 | Ø36 |
| **LQ1B62-F□** | **ø19** | | | | | | | | | | |
| **LQ1B63-F□** | **ø25** | 1" | | | | | | | 46 | | Ø44.5 |
| **LQ1B64-F□** | **ø19** | | | | | | | | | | |

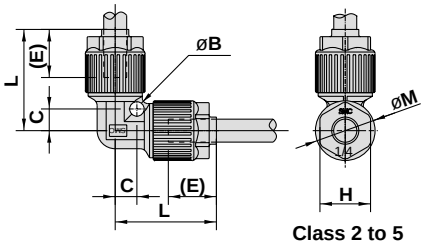
**Inch sizes**

| Model | Applicable tubing O.D. | Connection threads Rc/NPT | B | E | F | G | H | L1 | L2 | M | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LQ1B1A-F□** | 1/8" | 1/8" | Ø2 | 10 | 4 | 8 | — | 18.5 | 16 | Ø11.5 | Ø18.5 |
| **LQ1B2A-F□** | 1/4" | 1/8" | Ø4 | 15 | 6 | 12 | 14 | 28 | 19.5 | Ø16.5 | Ø18.5 |
| **LQ1B2B-F□** | 3/16" | | | | | | | | | | |
| **LQ1B2C-F□** | 1/8" | | | | | | | | | | |
| **LQ1B2D-F□** | 1/4" | 1/4" | | | | | | | 22 | | Ø21.5 |
| **LQ1B2E-F□** | 3/16" | | | | | | | | | | |
| **LQ1B2F-F□** | 1/8" | | | | | | | | | | |
| **LQ1B3A-F□** | 3/8" | 1/4" | Ø5 | 20 | 9 | 18 | 17 | 36.5 | 23.7 | Ø23 | Ø21.5 |
| **LQ1B3B-F□** | 1/4" | | | | | | | | | | |
| **LQ1B3C-F□** | 3/8" | 3/8" | | | | | | | 25.5 | | Ø25 |
| **LQ1B3D-F□** | 1/4" | | | | | | | | | | |
| **LQ1B4A-F□** | 1/2" | 3/8" | Ø6 | 24 | 9 | 18 | 21 | 43 | 25 | Ø28 | Ø25 |
| **LQ1B4B-F□** | 3/8" | | | | | | | | | | |
| **LQ1B4C-F□** | 1/2" | 1/2" | | | | | | | 31.5 | | Ø29.5 |
| **LQ1B4D-F□** | 3/8" | | | | | | | | | | |
| **LQ1B5A-F□** | 3/4" | 1/2" | Ø7 | 29 | 14 | 28 | 26 | 54 | 35.5 | Ø39 | Ø29.5 |
| **LQ1B5B-F□** | 1/2" | | | | | | | | | | |
| **LQ1B5C-F□** | 3/4" | 3/4" | | | | | | | 37 | | Ø36 |
| **LQ1B5D-F□** | 1/2" | | | | | | | | | | |
| **LQ1B6A-F□** | 1" | 3/4" | Ø8 | 39.5 | 18 | 36 | 36 | 69.5 | 42.5 | Ø49 | Ø36 |
| **LQ1B6B-F□** | 3/4" | | | | | | | | | | |
| **LQ1B6C-F□** | 1" | 1" | | | | | | | 46 | | Ø44.5 |
| **LQ1B6D-F□** | 3/4" | | | | | | | | | | |

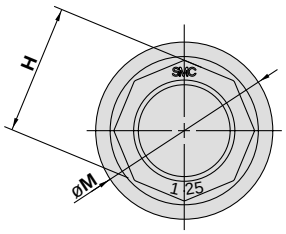
## Union Elbow: LQ1E




Class 1




Class 2 to 5




Class 6

(E) shows the approximate dimension of the inserted tubing from the end of the nut.

### Metric sizes

| Model | Applicable tubing O.D. | B | C | E | H | L | M |
|---|---|---|---|---|---|---|---|
| **LQ1E11□□** | **ø4** | ø2 | 4 | 10 | — | 18.5 | ø11.5 |
| **LQ1E12□□** | **ø3** | | | | | | |
| **LQ1E21□□** | **ø6** | ø4 | 6 | 15 | 14 | 28 | ø16.5 |
| **LQ1E22□□** | **ø4** | | | | | | |
| **LQ1E2C□□** | **ø3** | | | | | | |
| **LQ1E31□□** | **ø10** | ø5 | 9 | 20 | 17 | 36.5 | ø23 |
| **LQ1E32□□** | **ø8** | | | | | | |
| **LQ1E33□□** | **ø6** | | | | | | |
| **LQ1E41□□** | **ø12** | ø6 | 9 | 24 | 21 | 43 | ø28 |
| **LQ1E42□□** | **ø10** | | | | | | |
| **LQ1E51□□** | **ø19** | ø7 | 14 | 29 | 26 | 54 | ø39 |
| **LQ1E52□□** | **ø12** | | | | | | |
| **LQ1E61□□** | **ø25** | ø8 | 18 | 39.5 | 36 | 69.5 | ø49 |
| **LQ1E62□□** | **ø19** | | | | | | |

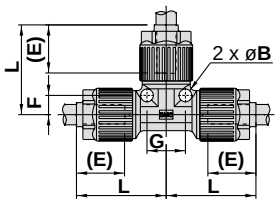
### Inch sizes

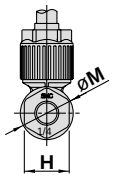
| Model | Applicable tubing O.D. | B | C | E | H | L | M |
|---|---|---|---|---|---|---|---|
| **LQ1E1A□□** | 1/8" | ø2 | 4 | 10 | — | 18.5 | ø11.5 |
| **LQ1E2A□□** | 1/4" | ø4 | 6 | 15 | 14 | 28 | ø16.5 |
| **LQ1E2B□□** | 3/16" | | | | | | |
| **LQ1E2C□□** | 1/8" | | | | | | |
| **LQ1E3A□□** | 3/8" | ø5 | 9 | 20 | 17 | 36.5 | ø23 |
| **LQ1E3B□□** | 1/4" | | | | | | |
| **LQ1E4A□□** | 1/2" | ø6 | 9 | 24 | 21 | 43 | ø28 |
| **LQ1E4B□□** | 3/8" | | | | | | |
| **LQ1E5A□□** | 3/4" | ø7 | 14 | 29 | 26 | 54 | ø39 |
| **LQ1E5B□□** | 1/2" | | | | | | |
| **LQ1E6A□□** | 1" | ø8 | 18 | 39.5 | 36 | 69.5 | ø49 |
| **LQ1E6B□□** | 3/4" | | | | | | |

## Dimensions

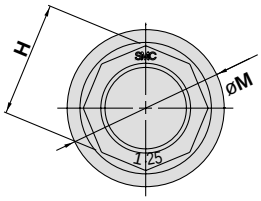
### Union Tee: LQ1T


Class 1




Class 2 to 5




Class 6

(E) shows the approximate dimension of the inserted tubing from the end of the nut.

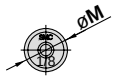
**Metric sizes**

| Model | Applicable tubing O.D. | B | E | F | G | H | L | M |
|---|---|---|---|---|---|---|---|---|
| **LQ1T11□□** | **ø4** | ø2 | 10 | 4 | 8 | — | 18.5 | 11.5 |
| **LQ1T12□□** | **ø3** | | | | | | | |
| **LQ1T21□□** | **ø6** | ø4 | 15 | 6 | 12 | 14 | 28 | 16.5 |
| **LQ1T22□□** | **ø4** | | | | | | | |
| **LQ1T2C□□** | **ø3** | | | | | | | |
| **LQ1T31□□** | **ø10** | ø5 | 20 | 9 | 18 | 17 | 36.5 | 23 |
| **LQ1T32□□** | **ø8** | | | | | | | |
| **LQ1T33□□** | **ø6** | | | | | | | |
| **LQ1T41□□** | **ø12** | ø6 | 24 | 9 | 18 | 21 | 43 | 28 |
| **LQ1T42□□** | **ø10** | | | | | | | |
| **LQ1T51□□** | **ø19** | ø7 | 29 | 14 | 28 | 26 | 54 | 39 |
| **LQ1T52□□** | **ø12** | | | | | | | |
| **LQ1T61□□** | **ø25** | ø8 | 39.5 | 18 | 36 | 36 | 69.5 | 49 |
| **LQ1T62□□** | **ø19** | | | | | | | |

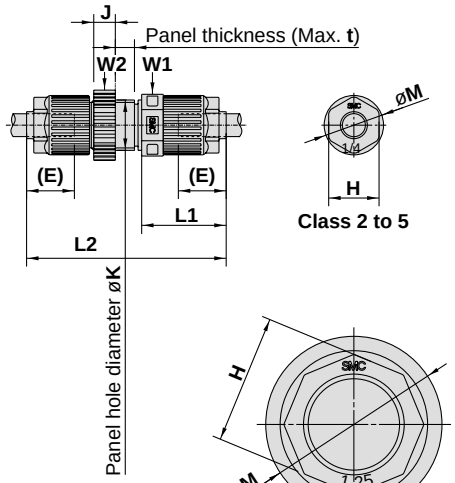
**Inch sizes**

| Model | Applicable tubing O.D. | B | E | F | G | H | L | M |
|---|---|---|---|---|---|---|---|---|
| **LQ1T1A□□** | 1/8" | ø2 | 10 | 4 | 8 | — | 18.5 | 11.5 |
| **LQ1T2A□□** | 1/4" | ø4 | 15 | 6 | 12 | 14 | 28 | 16.5 |
| **LQ1T2B□□** | 3/16" | | | | | | | |
| **LQ1T2C□□** | 1/8" | | | | | | | |
| **LQ1T3A□□** | 3/8" | ø5 | 20 | 9 | 18 | 17 | 36.5 | 23 |
| **LQ1T3B□□** | 1/4" | | | | | | | |
| **LQ1T4A□□** | 1/2" | ø6 | 24 | 9 | 18 | 21 | 43 | 28 |
| **LQ1T4B□□** | 3/8" | | | | | | | |
| **LQ1T5A□□** | 3/4" | ø7 | 29 | 14 | 28 | 26 | 54 | 39 |
| **LQ1T5B□□** | 1/2" | | | | | | | |
| **LQ1T6A□□** | 1" | ø8 | 39.5 | 18 | 36 | 36 | 69.5 | 49 |
| **LQ1T6B□□** | 3/4" | | | | | | | |

## Panel Mount Union: LQ1P




Class 1







Class 2 to 5




Class 6

(E) shows the approximate dimension of the inserted tubing from the end of the nut.
"W" is width across flats dimension.

### Metric sizes

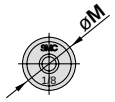
| Model | Applicable tubing O.D. | E | H | J | K | L1 | L2 | M | t | W1 | W2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LQ1P11□□** | **ø4** | 10 | — | 6 | 10.5 | 17 | 44 | ø11.5 | 8 | 11 | 13 |
| **LQ1P12□□** | **ø3** | | | | | | | | | | |
| **LQ1P21□□** | **ø6** | 15 | 14 | 6 | 14.5 | 23.5 | 55.5 | ø16.5 | 8 | 15 | 17 |
| **LQ1P22□□** | **ø4** | | | | | | | | | | |
| **LQ1P2C□□** | **ø3** | | | | | | | | | | |
| **LQ1P31□□** | **ø10** | 20 | 17 | 7 | 20.5 | 30 | 69 | ø23 | 8 | 21 | 24 |
| **LQ1P32□□** | **ø8** | | | | | | | | | | |
| **LQ1P33□□** | **ø6** | | | | | | | | | | |
| **LQ1P41□□** | **ø12** | 24 | 21 | 7 | 24.5 | 35 | 78.5 | ø28 | 8 | 26 | 28 |
| **LQ1P42□□** | **ø10** | | | | | | | | | | |
| **LQ1P51□□** | **ø19** | 29 | 26 | 9 | 36.5 | 43.5 | 100 | ø39 | 9 | 39 | 43 |
| **LQ1P52□□** | **ø12** | | | | | | | | | | |
| **LQ1P61□□** | **ø25** | 39.5 | 36 | 10 | 48.5 | 58.5 | 133 | ø49 | 10 | 51 | 55 |
| **LQ1P62□□** | **ø19** | | | | | | | | | | |

### Inch sizes

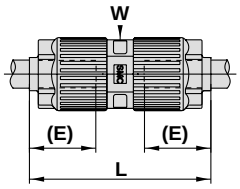
| Model | Applicable tubing O.D. | E | H | J | K | L1 | L2 | M | t | W1 | W2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LQ1P1A□□** | 1/8" | 10 | — | 6 | 10.5 | 17 | 44 | ø11.5 | 8 | 11 | 13 |
| **LQ1P2A□□** | 1/4" | 15 | 14 | 6 | 14.5 | 23.5 | 55.5 | ø16.5 | 8 | 15 | 17 |
| **LQ1P2B□□** | 3/16" | | | | | | | | | | |
| **LQ1P2C□□** | 1/8" | | | | | | | | | | |
| **LQ1P3A□□** | 3/8" | 20 | 17 | 7 | 20.5 | 30 | 69 | ø23 | 8 | 21 | 24 |
| **LQ1P3B□□** | 1/4" | | | | | | | | | | |
| **LQ1P4A□□** | 1/2" | 24 | 21 | 7 | 24.5 | 35 | 78.5 | ø28 | 8 | 26 | 28 |
| **LQ1P4B□□** | 3/8" | | | | | | | | | | |
| **LQ1P5A□□** | 3/4" | 29 | 26 | 9 | 36.5 | 43.5 | 100 | ø39 | 9 | 39 | 43 |
| **LQ1P5B□□** | 1/2" | | | | | | | | | | |
| **LQ1P6A□□** | 1" | 39.5 | 36 | 10 | 48.5 | 58.5 | 133 | ø49 | 10 | 51 | 55 |
| **LQ1P6B□□** | 3/4" | | | | | | | | | | |

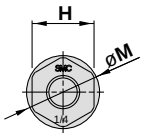
## Dimensions

### Union: LQ1U

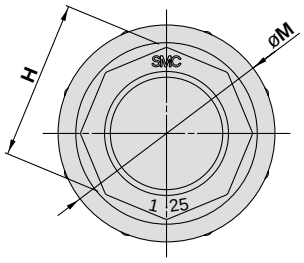



Class 1




Class 2 to 5




Class 6

(E) shows the approximate dimension of the inserted tubing from the end of the nut.
"W" is width across flats dimension.

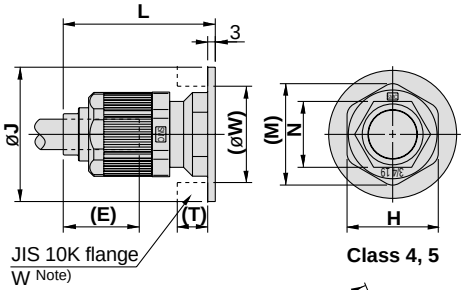
#### Metric sizes

| Model | Applicable tubing O.D. | E | H | L | M | W |
|---|---|---|---|---|---|---|
| **LQ1U11□□** | **ø4** | 10 | — | 29 | 11.5 | 10 |
| **LQ1U12□□** | **ø3** | | | | | |
| **LQ1U21□□** | **ø6** | 15 | 14 | 41 | 16.5 | 14 |
| **LQ1U22□□** | **ø4** | | | | | |
| **LQ1U2C□□** | **ø3** | | | | | |
| **LQ1U31□□** | **ø10** | 20 | 17 | 54 | 23 | 17 |
| **LQ1U32□□** | **ø8** | | | | | |
| **LQ1U33□□** | **ø6** | | | | | |
| **LQ1U41□□** | **ø12** | 24 | 21 | 63 | 28 | 21 |
| **LQ1U42□□** | **ø10** | | | | | |
| **LQ1U51□□** | **ø19** | 29 | 26 | 77 | 39 | 26 |
| **LQ1U52□□** | **ø12** | | | | | |
| **LQ1U61□□** | **ø25** | 39.5 | 36 | 102 | 49 | 36 |
| **LQ1U62□□** | **ø19** | | | | | |

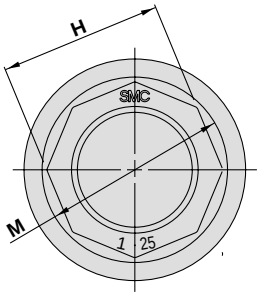
#### Inch sizes

| Model | Applicable tubing O.D. | E | H | L | M | W |
|---|---|---|---|---|---|---|
| **LQ1U1A□□** | 1/8" | 10 | — | 29 | 11.5 | 10 |
| **LQ1U2A□□** | 1/4" | 15 | 14 | 41 | 16.5 | 14 |
| **LQ1U2B□□** | 3/16" | | | | | |
| **LQ1U2C□□** | 1/8" | | | | | |
| **LQ1U3A□□** | 3/8" | 20 | 17 | 54 | 23 | 17 |
| **LQ1U3B□□** | 1/4" | | | | | |
| **LQ1U4A□□** | 1/2" | 24 | 21 | 63 | 28 | 21 |
| **LQ1U4B□□** | 3/8" | | | | | |
| **LQ1U5A□□** | 3/4" | 29 | 26 | 77 | 39 | 26 |
| **LQ1U5B□□** | 1/2" | | | | | |
| **LQ1U6A□□** | 1" | 39.5 | 36 | 102 | 49 | 36 |
| **LQ1U6B□□** | 3/4" | | | | | |

### Union Flange: LQ1F




Class 4, 5




Class 6

#### Metric sizes

| Model | Applicable tubing O.D. | E | H | J | L | N | M | W | (T) |
|---|---|---|---|---|---|---|---|---|---|
| **LQ1F41** | **ø12** | 28 | 30 | ø53 | 60 | 21 | 33.1 | ø34 | 12 |
| **LQ1F42** | **ø10** | | | | 58 | | | | |
| **LQ1F51** | **ø19** | 32 | 36 | ø58 | 65.2 | 26 | 40 | ø41 | 14 |
| **LQ1F52** | **ø12** | | | | 63.2 | | | | |
| **LQ1F61** | **ø25** | 39.5 | 36 | ø69 | 81.5 | — | 49 | ø51 | 14 |
| **LQ1F62** | **ø19** | | | | | | | | |

#### Inch sizes

| Model | Applicable tubing O.D. | E | H | J | L | N | M | W | (T) |
|---|---|---|---|---|---|---|---|---|---|
| **LQ1F4A** | 1/2" | 28 | 30 | ø53 | 60 | 21 | 33.1 | ø34 | 12 |
| **LQ1F4B** | 3/8" | | | | 58 | | | | |
| **LQ1F5A** | 3/4" | 32 | 36 | ø58 | 65.2 | 26 | 40 | ø41 | 14 |
| **LQ1F5B** | 1/2" | | | | 63.2 | | | | |
| **LQ1F6A** | 1" | 39.5 | 36 | ø69 | 81.5 | — | 49 | ø51 | 14 |
| **LQ1F6B** | 3/4" | | | | | | | | |

(E) shows the approximate dimension of the inserted tubing from the end of the nut.
(W) is the bore size of the JIS flange required for mounting. This flange is sold separately.
When ordering nuts as spare parts, size 4 and 5 are as shown below.
LQ1F4□: LQ-4N□□
LQ1F5□: LQ-5N□□

## Options

### Panel mounting nut

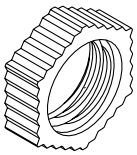
**LQN P 2 – □**

**Applicable fitting**

| Symbol | Class |
|---|---|
| **11** | 1 |
| **12** | 2 |
| **13** | 3 |
| **14** | 4 |
| **15** | 5 |
| **16** | 6 |

**Packaging**

| | | |
|---|---|---|
| **Nil** | Clean packaging | Class M3.5 |
| **1** | Standard packaging | Class M5.5 |



Used to secure a panel with a panel mount union.

### Nut insert bushing

**LQ 1 – 2 U 03 – □**

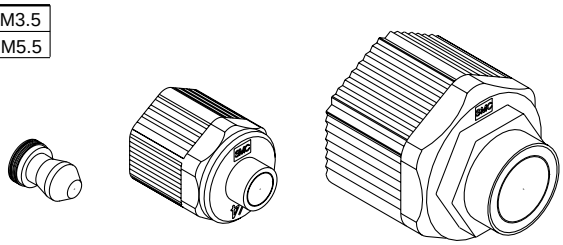
∗ The U type is recommended when changing tubing sizes.

**Packaging**

| | | |
|---|---|---|
| **Nil** | Clean packaging | Class M3.5 |
| **1** | Standard packaging | Class M5.5 |

**Applicable fitting**

| Symbol | Application |
|---|---|
| **1** | For LQ1 |



**Class**

| Symbol | Class |
|---|---|
| **1** | 1 |
| **2** | 2 |
| **3** | 3 |
| **4** | 4 |
| **5** | 5 |
| **6** | 6 |

**Type of parts**

| Symbol | Parts |
|---|---|
| **U** | Nut + Insert bushing |
| **B** | Insert bushing |
| **N** | Nut |

**Applicable tubing size**

| Symbol | Connection tubing size | Class 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| **Metric sizes** | | | | | | | |
| **03** | ø3 x ø2 | ○ | ○ | | | | |
| **04** | ø4 x ø3 | ○ | ○ | | | | |
| **06** | ø6 x ø4 | | ○ | ○ | | | |
| **08** | ø8 x ø6 | | | ○ | | | |
| **10** | ø10 x ø8 | | | ○ | ○ | | |
| **12** | ø12 x ø10 | | | | ○ | ○ | |
| **19** | ø19 x ø16 | | | | | ○ | ○ |
| **25** | ø25 x ø22.5 | | | | | | ○ |

| Symbol | Connection tubing size | Class 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| **Inch sizes** | | | | | | | |
| **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" | | | | | | ○ |

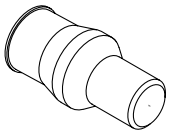
Note) In case of class 1, the tubing cannot be changed by reducing.

### Blanking plug

**LQ – 2 P 07 – □**

**Packaging**

| | | |
|---|---|---|
| **Nil** | Clean packaging | Class M3.5 |
| **1** | Standard packaging | Class M5.5 |



Used to block fittings which are not being used.

**Applicable fitting**

| Symbol LQ1 | Class |
|---|---|
| **11** | 1 |
| **12** | 2 |
| **13** | 3 |
| **14** | 4 |
| **15** | 5 |
| **16** | 6 |

**Applicable tubing size**

| Symbol | Connection tubing size | Class 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| **Metric sizes** | | | | | | | |
| **03** | ø3 x ø2 | ○ | ● | | | | |
| **04** | ø4 x ø3 | ○ | ● | | | | |
| **06** | ø6 x ø4 | | ○ | ● | | | |
| **08** | ø8 x ø6 | | | ● | | | |
| **10** | ø10 x ø8 | | | ○ | ● | | |
| **12** | ø12 x ø10 | | | | ○ | ● | |
| **19** | ø19 x ø16 | | | | | ○ | ● |
| **25** | ø25 x ø22.5 | | | | | | ○ |

○ Basic size ● With reducer

| Symbol | Connection tubing size | Class 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| **Inch sizes** | | | | | | | |
| **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

# *Series LQ1*
# Insertion Tool

## Fittings

### Changing tubing sizes

The tubing size can be changed within the same body class (body size) by replacing the nut and insert bushing. However, in case of class 1, the tubing cannot be changed by reducing.

| Body class | Tubing O.D. | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Metric sizes | | | | | | | | Inch sizes | | | | | | |
| | ø3 | ø4 | ø6 | ø8 | ø10 | ø12 | ø19 | ø25 | 1/8" | 3/16" | 1/4" | 3/8" | 1/2" | 3/4" | 1" |
| **1** | ○ | ○ | — | — | — | — | — | — | ○ | — | — | — | — | — | — |
| **2** | ● | ● | ○ | — | — | — | — | — | ● | ● | ○ | — | — | — | — |
| **3** | — | — | ● | ● | ○ | — | — | — | — | — | ● | ○ | — | — | — |
| **4** | — | — | — | — | ● | ○ | — | — | — | — | — | ● | ○ | — | — |
| **5** | — | — | — | — | — | ● | ○ | — | — | — | — | — | ● | ○ | — |
| **6** | — | — | — | — | — | — | ● | ○ | — | — | — | — | — | ● | ○ |

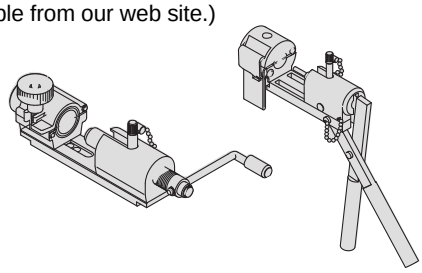
**Parts composition**

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

## ⚠ Caution

**1. Connect tubing with special tools**

Please refer to the LQ1, 2 series mounting method in “High Purity Fluoropolymer Fittings: HYPER FITTINGS®” (M-E05-1) for tubing connection and special tools. (Downloadable from our web site.)

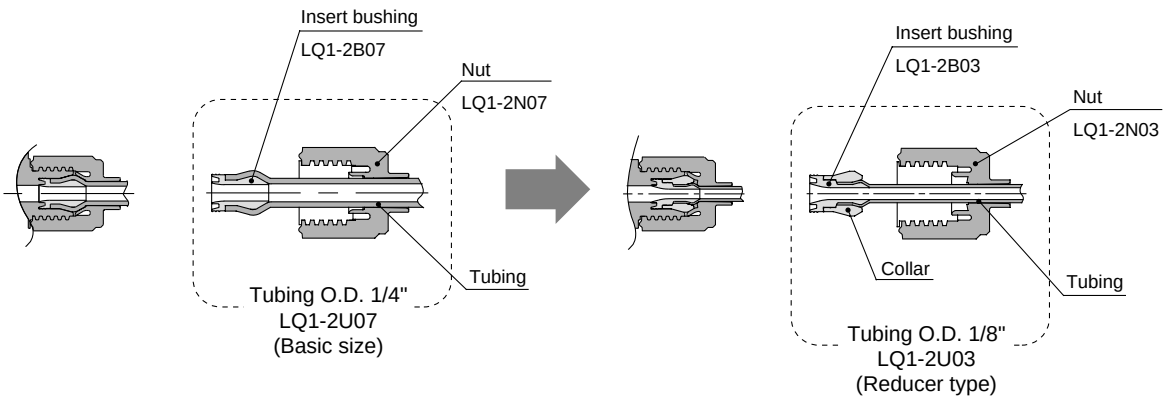


### Changing the tubing size

Example) Changing the tubing from an O.D. 1/4" to O.D. 1/8" in LQ1 body class 2.

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

Note) Tubing is sold separately.



# High Purity Fluoropolymer Needle Valve
# Series LVN



## How to Order

**LVN 2 0 – S 07 [ ]**

**Body class**

| Symbol | Body class | Orifice dia. |
|---|---|---|
| **2** | 2 | ø4.4 |
| **3** | 3 | ø8 |
| **4** | 4 | ø10 |

**LQ2 fittings**

**A port (IN)**
**Applicable tubing size**

| Symbol | Connecting tubing O.D. | Body class 2 | 3 | 4 |
|---|---|---|---|---|
| **Metric sizes** | | | | |
| **04** | ø4 | ● | | |
| **06** | ø6 | ○ | ● | |
| **08** | ø8 | | ● | |
| **10** | ø10 | | ○ | ● |
| **12** | ø12 | | | ○ |
| **Inch sizes** | | | | |
| **03** | 1/8 | ● | | |
| **05** | 3/16 | ● | | |
| **07** | 1/4 | ○ | ● | |
| **11** | 3/8 | | ○ | ● |
| **13** | 1/2 | | | ○ |

○ Basic size ● With reducer

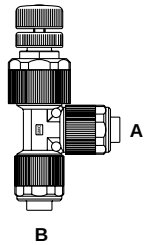
Note) Applicable fittings: LQ2

**Port B (OUT) different dia. size**

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

### Different diameter tubing order example

Different diameter tubing (with plug-in reducer) can be selected within the same body class.
(Example) Body class 3
A side: ø10 x ø8
B side: ø8 x ø6
Order as shown below.




**LVN30 – S 10 08**

**Different dia. tubing size (B side)**
**Applicable tubing size (A side)**

## Standard Specifications

| Model | | LVN20 | LVN30 | LVN40 |
|---|---|---|---|---|
| Tubing O.D. | Metric size | 4, 6 | 6, 8, 10 | 10, 12 |
| | Inch size | 1/8, 1/16, 1/4 | 1/4, 3/8 | 3/8, 1/2 |
| Orifice diameter | | ø4.4 | ø8 | ø10 |
| Flow characteristics | Av x $10^{-6}$m$^2$ | 12 | 33.6 | 52.8 |
| | Cv | 0.5 | 1.4 | 2.2 |
| Withstand pressure (MPa) | | 1 | | |
| Operating pressure (MPa) | | 0 to 0.5 | | |
| Fluid temperature (°C) | | 5 to 90 | | |
| Ambient temperature (°C) | | 0 to 60 | | |
| Mass (kg) | | 0.055 | 0.115 | 0.185 |

## Different Diameter Tubing Applicable with Reducer

Different diameter tubing can be selected (within a body class) by using a nut and insert bushing (reducer). Applicable fitting: LQ2

| Body class | Tubing O.D. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Metric sizes | | | | | Inch sizes | | | | |
| | 4 | 6 | 8 | 10 | 12 | 1/8 | 3/16 | 1/4 | 3/8 | 1/2 |
| 2 | ● | ○ | | | | ● | ● | ○ | | |
| 3 | | ● | ● | ○ | | | | ● | ○ | |
| 4 | | | | ● | ○ | | | | ● | ○ |

Note) Refer to page 608 for information on changing tubing sizes. ○ Basic size ● With reducer

## ⚠Specific Product Precautions

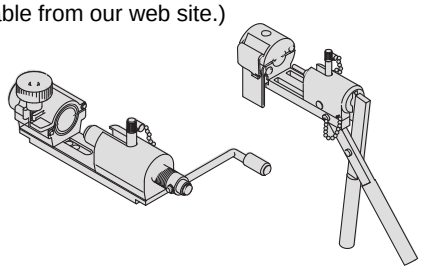
**Be sure to read before handlings. Refer to front matters 42 and 43 for Safety Instructions.**

### Piping

## ⚠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 web site.)



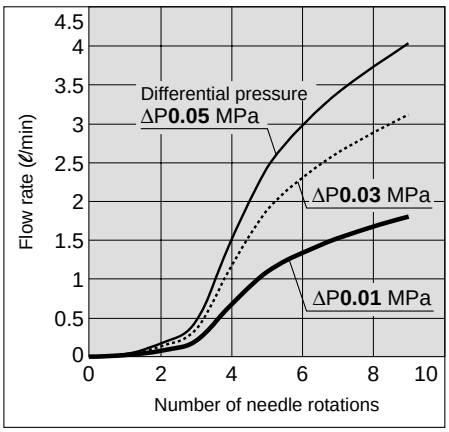
**2. Tighten the nut to the end surface of the body. As a guide, refer to the proper tightening torques shown below.**

**Tightening torque for piping**

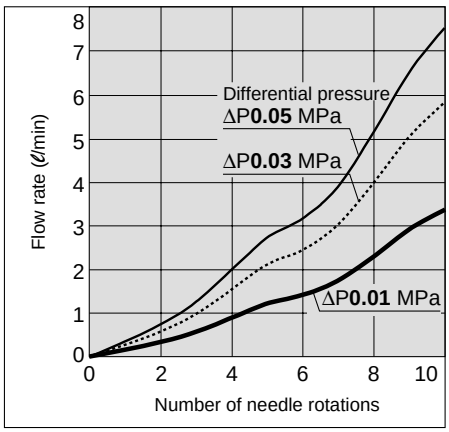
| Body class | Torque (N·m) |
|---|---|
| 2 | 1.5 to 2.0 |
| 3 | 3.0 to 3.5 |
| 4 | 7.5 to 9 |

## Flow Characteristics (Fluid: Water)

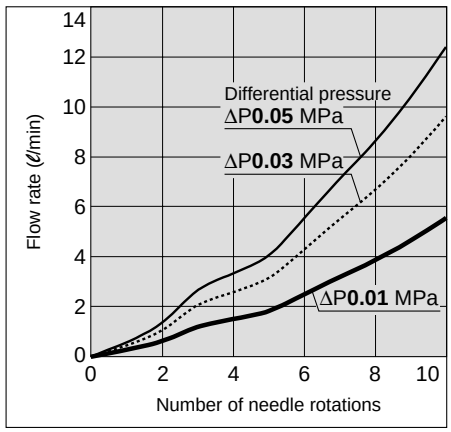
**LVN20**




**LVN30**

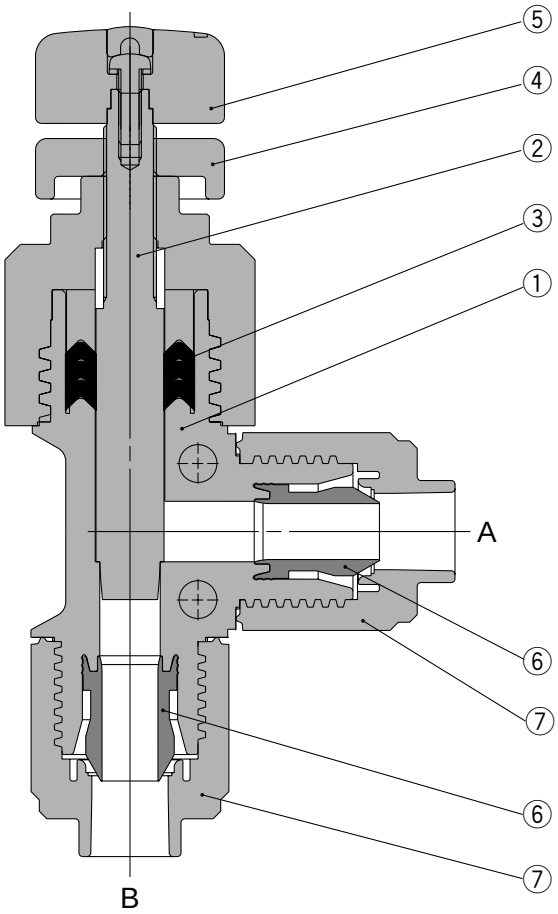



**LVN40**

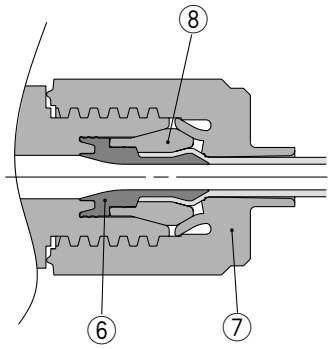





## Construction



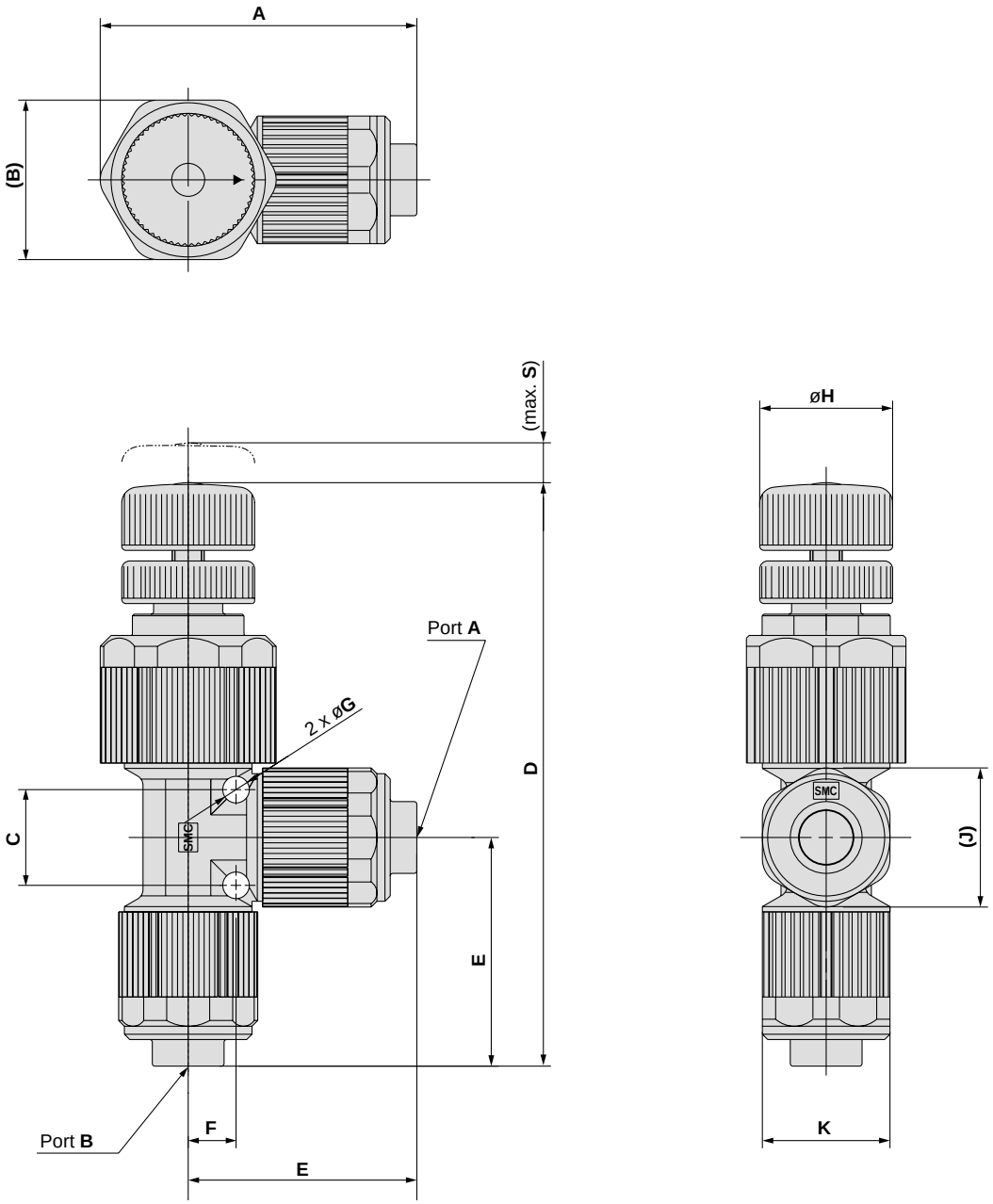

**With reducer**




**Part lists**

| No. | Description | Material |
|---|---|---|
| 1 | **Body** | PFA |
| 2 | **Needle** | PCTFE |
| 3 | **V seal** | PTFE |
| 4 | **Lock nut** | PVDF |
| 5 | **Adjustment handle** | PVDF |
| 6 | **Insert bushing** | PFA |
| 7 | **Nut** | PFA |
| 8 | **Collar** | PFA |

## Dimensions




| Model | A | B | C | D | E | F | G | H | J | K | S |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LVN20** | 48 | 24 | 12 | 88 | 34.5 | 6 | 4 | 14 | 20 | 18 | 2.4 |
| **LVN30** | 60 | 30 | 18 | 110 | 43 | 9 | 5 | 25 | 26 | 24 | 7.5 |
| **LVN40** | 72 | 36 | 22 | 124 | 52 | 11 | 6 | 25 | 33 | 30 | 8 |

# High Purity Fluoropolymer Tubing

# Series TL/TIL

**Material: Super PFA**

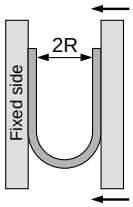
## Series and Specifications

| | | Metric sizes (Series TL) | | | | | | Inch sizes (Series TIL) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tubing model | | TL0403 | TL0604 | TL0806 | TL1008 | TL1210 | TL1916 | TIL01 | TILB01 | TIL05 | TIL07 | TIL11 | TIL13 | TIL19 | TIL25 |
| Nominal diameter | | – | – | – | – | – | – | 1/8" | 1/8" | 3/16" | 1/4" | 3/8" | 1/2" | 3/4" | 1" |
| Tubing size | | ø4 x ø3 | ø6 x ø4 | ø8 x ø6 | ø10 x ø8 | ø12 x ø10 | ø19 x ø16 | 1/8" x 0.086" | 1/8" x 1/16" | 3/16" x 1/8" | 1/4" x 5/32" | 3/8" x 1/4" | 1/2" x 3/8" | 3/4" x 5/8" | 1" x 7/8" |
| O.D. (mm) | Basic diameter | 4 | 6 | 8 | 10 | 12 | 19 | 3.18 | 3.18 | 4.75 | 6.35 | 9.53 | 12.7 | 19.05 | 25.4 |
| | Tolerance | ±0.1 | | | | +0.2 –0.1 | | ±0.1 | | | | | +0.2 –0.1 | | |
| Thickness (mm) | Basic diameter | 0.5 | 1 | | | | 1.5 | 0.5 | 0.8 | 0.8 | 1.2 | 1.6 | | | |
| | Tolerance | ±0.05 | ±0.1 | | | | ±0.15 | ±0.05 | ±0.08 | ±0.08 | ±0.12 | ±0.15 | | | |
| Bundle | 10 m | – | – | – | ● | ● | ● | – | – | – | – | ● | ● | – | – |
| | 20 m | ● | ● | ● | ● | ● | ● | ● | – | ● | ● | ● | ● | ● | ● |
| | 50 m | ● | ● | ● | ● | ● | ● | ● | – | ● | ● | ● | ● | ● | ● |
| | 100 m | ● | ● | ● | ● | ● | ● | ● | – | ● | ● | ● | ● | ● | – |
| | 50 Ft. (16 m) | – | – | – | – | – | – | ● | ● | ● | ● | ● | ● | ● | ● |
| | 100 Ft. (33 m) | – | – | – | – | – | – | ● | ● | ● | ● | ● | ● | ● | ● |
| Straight pipe | 2 m | ● | ● | ● | ● | ● | ● | ● | – | ● | ● | ● | ● | ● | ● |
| Color | | Translucent (color of material) | | | | | | | | | | | | | |
| Applicable fluid | | Please refer to the applicable fluid in page 614. | | | | | | | | | | | | | |
| Max. operating pressure (at 20°C) | Note 1) | 1 MPa | | 0.9 MPa | 0.7 MPa | 0.6 MPa | | 1 MPa | | | | | | 0.7 MPa | 0.5 MPa |
| Burst pressure (at 20°C) | | 4.9 MPa | 6.9 MPa | 4.7 MPa | 3.6 MPa | 2.9 MPa | 2.6 MPa | 6.4 MPa | 9.9 MPa | 6.7 MPa | 7.9 MPa | 6.7 MPa | 4.6 MPa | 2.8 MPa | 2.0 MPa |
| Min. bending radius (mm) | Note 2) | 20 | | 40 | 65 | 110 | 160 | 12 | 6 | 20 | | 30 | 60 | 160 | 290 |
| Max. operating temperature (Fixed use) | | 260°C | | | | | | | | | | | | | |
| Material | | Super PFA | | | | | | | | | | | | | |

Note 1) • The maximum operating pressure is the value at 20°C. For other temperatures, calculate from the burst pressure drop coefficient.
Furthermore, an abnormal temperature increase due to adiabatic compression can cause tubing to burst.To operate at a temperature other than 20°C, the operating pressure must be no more than the value calculated using the equation below: When the value (calculated using the formula below) exceeds 1 MPa, the Max. operating pressure is 1 MPa.
**(Max. operating pressure) = 1/4 x (burst pressure drop coefficient) x (burst pressure at 20°C)**
• When using a fluid in liquid form, the surge pressure must be no more than the maximum operating pressure.
A surge pressure higher than the maximum operating pressure can cause breakage of the fitting or bursting of the tubing.

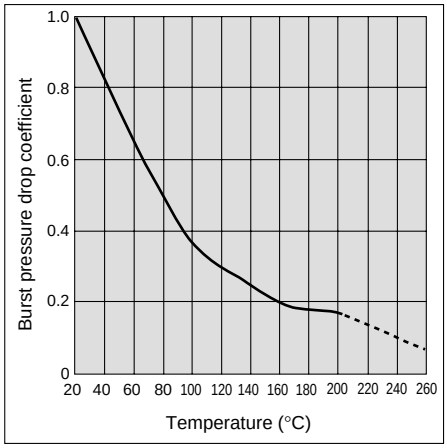
Note 2) The minimum bending radius is measured using the method shown in the figure at the right.

Note 3) It is connectable with LQ Series (3/4"size). As for other commercial items, there are some cases it is not able to connect due to tolerance of dimensions.




At a temperature of 20°C bend the tubing into a U shape. Then with one side fixed, gradually close the other side and measure 2R at the point where the tubing folds or flattens, etc.

## Burst pressure drop curve




## How to Order

**Metric sizes** TL0604 – 20

**Inch sizes** TIL01 – 20

Tubing Model

Length

**Applicable to both metric and inch size**

| Symbol | Type | Length |
|---|---|---|
| 10 | Roll | 10 m |
| 20 | | 20 m |
| 50 | | 50 m |
| 100 | | 100 m |
| 2S | Straight | 2 m |

**Applicable to inch size only**

| Symbol | Type | Length |
|---|---|---|
| 16 | Roll | 50 Ft. (16 m) |
| 33 | | 100 Ft. (33 m) |

Please refer to the "Series and Specifications" above, as the tubing length differs depending on each size.

Note 4) Figures shown in tables are representative values, not guaranteed values.

Note 4)

## Eluting fluorine ion amount (μg/g)

| Type | Fluorine ion |
|---|---|
| Eluting amount | 0.1 or less |

A 15 g piece of fluororesin tubing is cut off, washed in deionized water and immersed in 15 mℓ of 25% methyl alcohol extract at room temperature for 24 hours. Then the extract is diluted with deionized water to be subjected to a quantitative analysis of fluorine ions.

Note 4)

## Eluting metal ion amount (ng/cm²)

| Type | Al | Fe | Ni | Na | Ca |
|---|---|---|---|---|---|
| Eluting amount | 4.5 | 0.3 | 0.2 | 7.1 | 1.3 |

The interior of the fluororesin tubing is washed with super deionized water. Approximately 20g of super high purity hydrofluoric acid (48%) is measured and injected into the tubing. The interior wall of the tubing is immersed at normal temperature for one week with both ends of the tubing plugged. Then the extract was diluted with super deionized water to be subjected to a quantitative analysis on Al, Fe, Ni, Na and Ca by the stripping method.

# Applicable Fluids

## Material and fluid compatibility check list for high purity fluoropolymer fittings

| Chemical | | Compatibility |
|---|---|---|
| **Acetic acid** | 100% | ○ |
| **Acetone** | 100% | ○ Note 1) |
| **Ammonium fluoride** | 40% | ○ |
| **Ammonium hydroxide** | 30% | ○ |
| **Butyl acetate** | 100% | ○ |
| **Methylne chloride** | 100% | ○ |
| **Hydrochloric acid** | 38% | ○ |
| **Hydrofluoric acid** | 50% | ○ |
| **Hydrogen peroxide** | 60% | ○ |
| **Methanol** | 100% | ○ |
| **Methyl ethyl Ketone** | — | ○ |
| **Nitric acid** | 70% | ○ |
| **Phosphoric acid** | 86% | ○ |
| **Caustic potash** | 85% | ○ |
| **Sulfuric acid** | 100% | ○ |
| **Toluene** | — | ○ Note 1) |
| **Xylene** | — | ○ |
| **Sodium hydroxide** | 100% | ○ |
| **1.1.1-Trichloroethane** | 100% | ○ |
| **Rhosphorus pentachloride** | — | ○ |
| **Isobutyl alcohol** | — | ○ Note 1) |
| **Isopropyl alcohol** | — | ○ Note 1) |
| **Ozone** | — | ○ |
| **Ethyl acetate** | — | ○ Note 1) |
| **Deionized water** | — | ○ |
| **Nitrogen** | — | ○ |
| **Ultrapure water** | — | ○ |
| **Tmah** | — | ○ |

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.

Table symbol ○: can be used.

- Compatibility is indicated for fluid temperatures of 200°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.

# Precautions 1

**Be sure to read before handling.**
**Refer to front matters 42 and 43 for Safety Instructions.**

## Design and 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. Fluid**

Operate within the indicated fluid temperature range.

**3. Maintenance space**

Ensure the necessary space for maintenance and inspections.

**4. Fluid pressure range**

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

**5. Countermeasures for static electricity**

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

## Mounting

### ⚠ Warning

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

**2. Instruction manual**

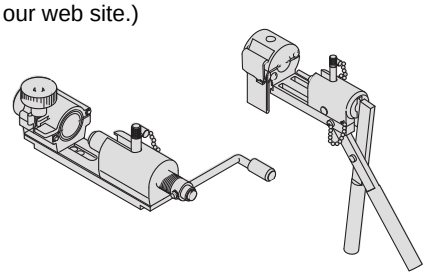
Mount and operate the product after reading the manual carefully and understanding its contents. Also keep the manual where it can be referred to as necessary.

## Piping

### ⚠ Caution

**1. 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 web site.)



**2. Tighten the nut until it touches the end surface of the body, and then tighten it an additional 1/8 turn. As a guide, refer to the proper tightening torques shown below.**

**Nut tightening torque for piping**

| Body class | Torque (N·m) | |
|---|---|---|
| | LQ1 | LVN |
| 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 | — |
| 6 | 5.5 to 6.0 | — |

Note) Body class 1 must be tightened manually.

**3. Use sealant tape for the piping of taper thread parts such as LQ1H and LQ1L.**

Tape the ridges tightly with the sealant tape, starting one ridge width left from thread end side. 3 to 4 sealant tapes are required.

**Taper thread mounting torque**

| Bore size | Torque (N·m) |
|---|---|
| 1/8 | 0.6 to 0.9 |
| 1/4 | 0.8 to 1.2 |
| 3/8 | 1.0 to 1.6 |
| 1/2 | 1.5 to 2.0 |
| 3/4 | 2.0 to 2.7 |
| 1 | 2.5 to 3.6 |

# Series LQ1, LVN, TL/TIL
# High Purity Fluoropolymer Fittings/ Needle Valve/Tubing
# Precautions 2

**Be sure to read before handling.**
**Refer to front matters 42 and 43 for Safety Instructions.**

## Operating Environment

### ⚠ Warning

1. **Do not use in locations having an explosive atmosphere.**
2. **Do not operate in locations where vibration or impact occurs.**
3. **In locations near heat sources, block off radiated heat.**

## Maintenance

### ⚠ Warning

1. **Perform maintenance in accordance with the procedures in the instruction manual.**

   Improper handling can cause damage.
2. **When removing or reinstalling fittings, remove any remaining chemicals and carefully replace them with deionized water or air, etc., before beginning work activities.**
3. **Tightening of taper threads for piping**

   Because the taper threads are made of resin, minute leakage may gradually occur due to stress relaxation. Perform periodic inspections, and if leakage is detected correct the problem by additional tightening. If additional tightening becomes ineffective, replace the fitting with a new product.
4. **Check the following during regular maintenance, and replace components as necessary.**

   a) Scratches, gouges, abrasion, corrosion
   b) Twisting, flattening or distortion of tubing
   c) Hardening, deterioration or softening of tubing
5. **Do not repair or patch the replaced tubing or fittings for reuse.**

## Operating Precautions

### ⚠ Warning

1. **Operate within the range of the maximum operating pressure.**

### ⚠ Caution

1. **After a long period of non-use, perform inspections before beginning operation.**
2. **Use sufficient care in the handling of series LQ clean packaging types when their packaging is opened.**
3. **For LVN Series, be careful not to apply any excessive force to the stroke end, which fully opens and closes, to avoid accidental damage or changes in flow characteristics.**

## Installation of Tubing

### ⚠ Caution

1. **Cut the end of the tubing at a right angle and pass it through the fitting nut. After placing the tubing in the holder, push it onto the insert bushing until it stops and clamp it with the knob.**
   **As a guide when tightening the tubing with the knob, maintain a uniform gap (approx. 2 mm) on both sides of the holder.**

   • When the tubing is curved, straighten it out before using it.

   • The tubing may slip if there is oil or dust, etc., on the holder. Remove the contamination using alcohol or another suitable cleaner.

## 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 | | | |
| | ø12 x ø10 | 12.0 | | | |
| | ø19 x ø16 | 19.0 | +0.3 –0.1 | 1.5 | ±0.15 |
| | 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 | | 1.6 | ±0.15 |
| | 1/2" x 3/8" | 12.7 | | | |
| | 3/4" x 5/8" | 19.0 | +0.3 –0.1 | | |
| | 1" x 7/8" | 25.4 | | | |