# Manually Operated Integral Fitting Type/Threaded Type Series LVH

## How to Order Valve (Single Type)

### Integral fitting type

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Body class</th>
<th>Orifice dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>ø4</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>ø6</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>ø10</td>
</tr>
</tbody>
</table>

### Threaded type

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Body class</th>
<th>Orifice dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>ø4</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>ø6</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>ø12</td>
</tr>
</tbody>
</table>

### Port size

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Port size</th>
<th>Body class</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>1/8</td>
<td>2</td>
</tr>
<tr>
<td>02</td>
<td>1/4</td>
<td>3</td>
</tr>
<tr>
<td>03</td>
<td>3/8</td>
<td>4</td>
</tr>
</tbody>
</table>

### Valve type

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Lever operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>Non-locking type (self-reset type)</td>
</tr>
<tr>
<td>L</td>
<td>Locking type</td>
</tr>
</tbody>
</table>

### Lever operation

- **Nil**: Non-locking type (self-reset type)
- **L**: Locking type

### Connecting tubing O.D.

- Metric sizes:
  - 03 ø3
  - 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

### Material

- **A**: Stainless steel (SUS) – PP
- **B**: PPS – PPS
- **C**: PFA – PFA

### Application

- Ports A & B same size
- Different diameter tubings can be selected within the same body class.

### Pilot port thread type

- **Nil**: Rc
- **N**: NPT

### Integral fitting type/Variations

<table>
<thead>
<tr>
<th>Model</th>
<th>LVH20</th>
<th>LVH30</th>
<th>LVH40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orifice diameter</td>
<td>ø4</td>
<td>ø8</td>
<td>ø10</td>
</tr>
<tr>
<td>Tubing O.D.</td>
<td>ø4, 6</td>
<td>ø8, 10</td>
<td>ø12</td>
</tr>
</tbody>
</table>

### Threaded type/Series variation

<table>
<thead>
<tr>
<th>Model</th>
<th>LVH20</th>
<th>LVH30</th>
<th>LVH40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orifice diameter</td>
<td>ø4</td>
<td>ø8</td>
<td>ø12</td>
</tr>
<tr>
<td>Type</td>
<td>1/8</td>
<td>1/4</td>
<td>3/8</td>
</tr>
<tr>
<td>Symbol</td>
<td>1/4</td>
<td>1/4</td>
<td>1/2</td>
</tr>
<tr>
<td>Basic type</td>
<td>N.C.</td>
<td>N.C.</td>
<td>N.C.</td>
</tr>
</tbody>
</table>

---

**Note:** Refer to “Variations” for port size and material combinations.
Standard Specifications/Threaded Type

- Connect tubing with special tools. Refer to the pamphlet “High-Purity Fluoro-polymer Fittings HYPER FITTING®/Series LQ1, 2 Work Procedure Instructions” (ME05-1) for connecting tubing and special tools. (Downloadable from our web site.)

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

<table>
<thead>
<tr>
<th>Body class</th>
<th>Torque (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1.5 to 2.0</td>
</tr>
<tr>
<td>3</td>
<td>3.0 to 3.5</td>
</tr>
<tr>
<td>4</td>
<td>7.5 to 9.0</td>
</tr>
</tbody>
</table>

Threaded type

- Avoid using metal fittings with a resin body (taper threads). This can cause damage to the valve body.

Specific Product Precautions

- Be sure to read before handling. Refer to front matters 42 and 43 for Safety Instructions, and pages 491 and 492 for High Purity Chemical Valve Precautions.

Caution

Integral fitting type

1. Connect tubing with special tools. Refer to the pamphlet “High-Purity Fluoropolymer Fittings HYPER FITTING®/Series LQ1, 2 Work Procedure Instructions” (ME05-1) 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.

Different Diameter Tubing Applicable with Reducer

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

- With reducer

Standard Specifications/Integral Fitting Type

<table>
<thead>
<tr>
<th>Model</th>
<th>LVH20</th>
<th>LVH30</th>
<th>LVH40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tubing O.D.</td>
<td>Metric size</td>
<td>Inch size</td>
<td>Orifice diameter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ø4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ø5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ø10</td>
</tr>
</tbody>
</table>

Different Diameter Tubing Applicable with Reducer

- With reducer

Standard Specifications/Threaded Type

<table>
<thead>
<tr>
<th>Model</th>
<th>LVH20</th>
<th>LVH30</th>
<th>LVH40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port size</td>
<td>1/8, 1/4</td>
<td>1/4, 3/8</td>
<td>3/8, 1/2</td>
</tr>
<tr>
<td>Orifice diameter</td>
<td>ø4</td>
<td>ø8</td>
<td>ø12</td>
</tr>
<tr>
<td>Flow characteristics</td>
<td>Av x 10⁻⁶m²</td>
<td>8.4</td>
<td>40.8</td>
</tr>
<tr>
<td>Cv</td>
<td>0.35</td>
<td>1.7</td>
<td>2.5</td>
</tr>
<tr>
<td>Withstand pressure (MPa)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating pressure (MPa)</td>
<td>0 to 0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back pressure (MPa)</td>
<td>0.3 or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve leakage (cm³/min)</td>
<td>0 (with water pressure)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>Toggle type (non-locking/locking)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid temperature (°C)</td>
<td>0 to 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature (°C)</td>
<td>0 to 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass (kg)</td>
<td>Stainless steel (SUS)</td>
<td>0.15</td>
<td>0.36</td>
</tr>
<tr>
<td></td>
<td>PPS</td>
<td>0.04</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>PFA</td>
<td>0.05</td>
<td>0.11</td>
</tr>
</tbody>
</table>

Note) Contact SMC if the valve is to be used with B → A flow.

Note) Refer to page 489 for information on changing tubing sizes.
**Construction**

**Integral fitting type**

**Threaded type**

**With reducer**

**Dimensions/Integral Fitting Type**

**Parts list**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Actuator section</td>
<td>PP</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Body</td>
<td>Stainless steel</td>
<td>Integral fitting type</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PPS</td>
<td>Threaded type</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PFA</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Diaphragm</td>
<td>PTFE</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>End plate</td>
<td>PPS</td>
<td>PFA body only</td>
</tr>
<tr>
<td>5</td>
<td>Insert bushing</td>
<td>PFA</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>Nut</td>
<td>PFA</td>
<td>—</td>
</tr>
<tr>
<td>7</td>
<td>Lever</td>
<td>PP</td>
<td>—</td>
</tr>
<tr>
<td>8</td>
<td>Collar</td>
<td>PFA</td>
<td>—</td>
</tr>
</tbody>
</table>

**Dimensions (mm)**

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H1</th>
<th>H2</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVH20</td>
<td>30</td>
<td>30</td>
<td>52</td>
<td>44</td>
<td>11</td>
<td>79</td>
<td>10</td>
<td>72.5</td>
<td>74</td>
<td>4</td>
<td>20</td>
<td>37</td>
<td>3.5</td>
<td>27</td>
</tr>
<tr>
<td>LVH30</td>
<td>36</td>
<td>47</td>
<td>81.5</td>
<td>56</td>
<td>16.5</td>
<td>106</td>
<td>19</td>
<td>111</td>
<td>113</td>
<td>7.5</td>
<td>34</td>
<td>46</td>
<td>5.5</td>
<td>37.5</td>
</tr>
<tr>
<td>LVH40</td>
<td>46</td>
<td>60</td>
<td>100</td>
<td>68</td>
<td>22.5</td>
<td>131</td>
<td>20.5</td>
<td>139</td>
<td>143</td>
<td>8</td>
<td>42</td>
<td>57</td>
<td>5.5</td>
<td>50</td>
</tr>
</tbody>
</table>

**Non-locking type**

**Locking type**

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**Notes:**
- Integral fitting type
- Threaded type
- With reducer
- PFA body only
- Manual operation
- Series LVH

**Explanation:**
- **Model:** LVH20, LVH30, LVH40
- **Dimensions:** (mm)
- **Material:** PP, PFA, PTFE, PPS, SS
- **Parts:** Actuator section, Body, Diaphragm, End plate, Insert bushing, Nut, Lever, Collar

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**Image Descriptions:**
- Diagrams showing the construction of the integral fitting type and threaded type, with parts labeled.
- Tables showing dimensional specifications for different models (LVH20, LVH30, LVH40).
- Notes on integral fitting type, threaded type, and with reducer options.

---

**Legend:**
- **A:** 
- **B:** 
- **C:** 
- **D:** 
- **E:** 
- **F:** 
- **G:** 
- **H1:** 
- **H2:** 
- **J:** 
- **K:** 
- **L:** 
- **M:** 
- **N:** 

---

**Figure Legends:**
- **A:** 
- **B:** 
- **C:** 
- **D:** 
- **E:** 
- **F:** 
- **G:** 
- **H1:** 
- **H2:** 
- **J:** 
- **K:** 
- **L:** 
- **M:** 
- **N:**

---

**Additional Information:**
- Series LVH
- Manually Operated
- Integral Fitting Type/Threaded Type
- Construction details
- Parts list
- Dimensions
- Model specifications
### Dimensions/Threaded Type

**Body material: Stainless steel**

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H1</th>
<th>H2</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVH20</td>
<td>30</td>
<td>33</td>
<td>54.5</td>
<td>—</td>
<td>10</td>
<td>10</td>
<td>75</td>
<td>76.5</td>
<td>—</td>
<td>22</td>
<td>22</td>
<td>—</td>
<td>27</td>
<td>Rc 1/8, 1/4, NPT 1/8, 1/4</td>
<td></td>
</tr>
<tr>
<td>LVH30</td>
<td>36</td>
<td>47</td>
<td>81</td>
<td>—</td>
<td>13</td>
<td>19</td>
<td>110.5</td>
<td>112.5</td>
<td>—</td>
<td>37</td>
<td>26</td>
<td>—</td>
<td>37</td>
<td>Rc 1/4, 3/8, NPT 1/4, 3/8</td>
<td></td>
</tr>
<tr>
<td>LVH40</td>
<td>46</td>
<td>60</td>
<td>99</td>
<td>—</td>
<td>16</td>
<td>20.5</td>
<td>138</td>
<td>142</td>
<td>—</td>
<td>47.5</td>
<td>33.5</td>
<td>—</td>
<td>50</td>
<td>Rc 3/8, 1/2, NPT 3/8, 1/2</td>
<td></td>
</tr>
</tbody>
</table>

**Body material: PFA**

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H1</th>
<th>H2</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVH20</td>
<td>30</td>
<td>36</td>
<td>55</td>
<td>44</td>
<td>11</td>
<td>—</td>
<td>10</td>
<td>75.5</td>
<td>77</td>
<td>4</td>
<td>20</td>
<td>37</td>
<td>3.5</td>
<td>27</td>
<td>Rc 1/4, NPT 1/4</td>
</tr>
<tr>
<td>LVH30</td>
<td>36</td>
<td>47</td>
<td>80</td>
<td>56</td>
<td>15</td>
<td>—</td>
<td>19</td>
<td>109.5</td>
<td>111.5</td>
<td>7.5</td>
<td>34</td>
<td>46</td>
<td>5.5</td>
<td>37</td>
<td>Rc 3/8, NPT 3/8</td>
</tr>
<tr>
<td>LVH40</td>
<td>46</td>
<td>60</td>
<td>99.5</td>
<td>68</td>
<td>22</td>
<td>—</td>
<td>20.5</td>
<td>138.5</td>
<td>142.5</td>
<td>8</td>
<td>42</td>
<td>57</td>
<td>5.5</td>
<td>50</td>
<td>Rc 1/2, NPT 1/2</td>
</tr>
</tbody>
</table>

**Body material: PPS**

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H1</th>
<th>H2</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVH20</td>
<td>30</td>
<td>36</td>
<td>58.5</td>
<td>44</td>
<td>14.5</td>
<td>—</td>
<td>10</td>
<td>79</td>
<td>80.5</td>
<td>4</td>
<td>20</td>
<td>37</td>
<td>3.5</td>
<td>27</td>
<td>Rc 1/4, NPT 1/4</td>
</tr>
<tr>
<td>LVH30</td>
<td>36</td>
<td>47</td>
<td>84</td>
<td>56</td>
<td>19</td>
<td>—</td>
<td>19</td>
<td>113.5</td>
<td>115.5</td>
<td>7.5</td>
<td>34</td>
<td>46</td>
<td>5.5</td>
<td>37</td>
<td>Rc 3/8, NPT 3/8</td>
</tr>
<tr>
<td>LVH40</td>
<td>46</td>
<td>60</td>
<td>99.5</td>
<td>68</td>
<td>22</td>
<td>—</td>
<td>20.5</td>
<td>138.5</td>
<td>142.5</td>
<td>8</td>
<td>42</td>
<td>57</td>
<td>5.5</td>
<td>50</td>
<td>Rc 1/2, NPT 1/2</td>
</tr>
</tbody>
</table>

### Dimensions (mm)

**Dimensions/Threaded Type**

- **Model**
  - LVH20
  - LVH30
  - LVH40

- **Body material**
  - Stainless steel (SUS)
  - PFA
  - PPS

- **Dimensions**
  - A: 30
  - B: 33
  - C: 54.5
  - D: —
  - E: 10
  - F: M5 x 0.8
  - G: 10
  - H1: 75
  - H2: 76.5
  - J: —
  - K: 22
  - L: 22
  - M: —
  - N: 27
  - P: Rc 1/8, 1/4, NPT 1/8, 1/4

**Body material: PFA**

- **Model**
  - LVH20
  - LVH30
  - LVH40

- **Dimensions**
  - A: 30
  - B: 36
  - C: 55
  - D: 44
  - E: 11
  - F: —
  - G: 10
  - H1: 75.5
  - H2: 77
  - J: 4
  - K: 20
  - L: 37
  - M: 3.5
  - N: 27
  - P: Rc 1/4, NPT 1/4

**Body material: PPS**

- **Model**
  - LVH20
  - LVH30
  - LVH40

- **Dimensions**
  - A: 30
  - B: 36
  - C: 58.5
  - D: 44
  - E: 14.5
  - F: —
  - G: 10
  - H1: 79
  - H2: 80.5
  - J: 4
  - K: 20
  - L: 37
  - M: 3.5
  - N: 27
  - P: Rc 1/4, NPT 1/4
Note 1) Contact SMC if the manifold will be used with vacuum and A → P flow.

**Manifold Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>LLH2A</th>
<th>LLH3A</th>
<th>LLH4A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manifold type</td>
<td>Stacking type</td>
<td>Common IN/Individual OUT</td>
<td></td>
</tr>
<tr>
<td>P (IN), A (OUT) type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve stations</td>
<td>2 to 5 stations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tubing size (port P)</td>
<td>3/8</td>
<td>1/2</td>
<td>3/4</td>
</tr>
<tr>
<td>Tubing size (port A)</td>
<td>1/4</td>
<td>3/8</td>
<td>1/2</td>
</tr>
</tbody>
</table>

**How to Order Manifold Base**

**How to Order Valve**
**Series LVH**

**How to Order Manifold Assembly (Example)**

Enter the part number of the valves to be mounted together with the manifold base part number.

- **Example**
  - LLH2A-03-SH ..... 1 set 1 set Manifold base part no.
  - LVH20A-S07 ..... 2 sets 2 sets Valve part no. (stations 1 & 2)
  - LVH20AL-S07 ..... 1 set 1 set Valve part no. (station 3)

Add the + symbol at the beginning of part numbers for valves, etc. to be mounted.

Enter together in order counting from station 1 on the left side, with the A (OUT) ports in front.

**Dimensions**

**LLH[A]- Stations**

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>G</th>
<th>H1</th>
<th>H2</th>
<th>K</th>
<th>N</th>
<th>U</th>
<th>V</th>
<th>W</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLH2A</td>
<td>46.5</td>
<td>31</td>
<td>65</td>
<td>67</td>
<td>19</td>
<td>10</td>
<td>85.5</td>
<td>87</td>
<td>18</td>
<td>27</td>
<td>19</td>
<td>34</td>
<td>M4</td>
<td>5.5</td>
</tr>
<tr>
<td>LLH3A</td>
<td>47</td>
<td>36.5</td>
<td>94.5</td>
<td>76</td>
<td>19</td>
<td>27.5</td>
<td>125.5</td>
<td>127.5</td>
<td>39</td>
<td>37</td>
<td>27.5</td>
<td>47</td>
<td>M5</td>
<td>6.5</td>
</tr>
<tr>
<td>LLH4A</td>
<td>60</td>
<td>47</td>
<td>115</td>
<td>95</td>
<td>33.5</td>
<td>20.5</td>
<td>154</td>
<td>158</td>
<td>50</td>
<td>50</td>
<td>33.5</td>
<td>56</td>
<td>M6</td>
<td>7.5</td>
</tr>
</tbody>
</table>

- **Pitch = B**
- **4 x Mounting hole for W**
- **2 x P port**
- **Non-locking type**
- **Locking type**

**Model**

- **PFA**
- **1/4**
- **3/8**
- **1/2**

<table>
<thead>
<tr>
<th>Model</th>
<th>Symbol</th>
<th>Station</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVH20</td>
<td>N.C.</td>
<td>62</td>
<td>93</td>
<td>124</td>
<td>155</td>
<td></td>
</tr>
<tr>
<td>LVH30</td>
<td></td>
<td>75</td>
<td>106</td>
<td>137</td>
<td>168</td>
<td></td>
</tr>
<tr>
<td>LVH40</td>
<td></td>
<td>146</td>
<td>177</td>
<td>208</td>
<td>239</td>
<td></td>
</tr>
<tr>
<td>LLH2A</td>
<td></td>
<td>73</td>
<td>109.5</td>
<td>146</td>
<td>182.5</td>
<td></td>
</tr>
<tr>
<td>LLH3A</td>
<td></td>
<td>84</td>
<td>120.5</td>
<td>157</td>
<td>193.5</td>
<td></td>
</tr>
<tr>
<td>LLH4A</td>
<td></td>
<td>183</td>
<td>219.5</td>
<td>256</td>
<td>292.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>94</td>
<td>141</td>
<td>188</td>
<td>235</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>109.5</td>
<td>156</td>
<td>203</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>219</td>
<td>266</td>
<td>313</td>
<td>360</td>
<td></td>
</tr>
</tbody>
</table>

**Dimensions (mm)**

**Non-locking Locking**

- **Stations are counted from station 1 on the left side, with the A (OUT) ports in front.**

- **Threaded type manifold/Variations**

- **Manifold material**
  - **PFA**
- **Type**
  - **Symbol**
  - **N.C.**
  - **Non-locking**
  - **Locking**
- **Orifice diameter**
  - **Value**
  - **ø4**
  - **ø8**
  - **ø10**

**How to Order Manifold Assembly**

Enter the part number of the valves to be mounted together with the manifold base part number.

- **Example**
  - LLH2A-03-SH ..... 1 set 1 set Manifold base part no.
  - LVH20A-S07 ..... 2 sets 2 sets Valve part no. (stations 1 & 2)
  - LVH20AL-S07 ..... 1 set 1 set Valve part no. (station 3)

Add the + symbol at the beginning of part numbers for valves, etc. to be mounted.

Enter together in order counting from station 1 on the left side, with the A (OUT) ports in front.
**Series LVH/Threaded Type Manifolds**

### Manifold Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>LLH2A</th>
<th>LLH3A</th>
<th>LLH4A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manifold type</td>
<td>Stacking type</td>
<td>Common IN/Individual OUT</td>
<td></td>
</tr>
<tr>
<td>P (IN), A (OUT) type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve stations</td>
<td>2 to 5 stations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port size (port P)</td>
<td>1/4</td>
<td>3/8</td>
<td>1/2</td>
</tr>
<tr>
<td>Port size (port A)</td>
<td>1/4</td>
<td>3/8</td>
<td>1/2</td>
</tr>
</tbody>
</table>

Note 1) Contact SMC if the manifold will be used with vacuum and flow A → P.

### How to Order Manifold Base

**LLH 2 A - 05 - 02 - C**

- **Body class**
  - Symbol: 2
  - Body class: 2
  - Symbol: 3
  - Body class: 3
  - Symbol: 4
  - Body class: 4

- **Base type**
  - A: Stacking type

- **Manifold stations**
  - 02: 2 stations
  - 05: 5 stations

- **Thread type**
  - Symbol: Nil
  - Thread type: Rc
  - Symbol: N
  - Thread type: NPT

- **Port size (port P)**
  - Symbol: 02
  - Port size: 1/4
  - Body class: 2
  - Symbol: 03
  - Port size: 3/8
  - Body class: 3
  - Symbol: 04
  - Port size: 1/2
  - Body class: 4

### How to Order Valve

**LVH 2 0 A - 02 - C**

- **Body class**
  - Symbol: 2
  - Body class: 2
  - Symbol: 3
  - Body class: 3
  - Symbol: 4
  - Body class: 4

- **Valve type**
  - 0: N.C.

- **Body type**
  - A: Stacking type for manifold

- **Lever operation**
  - Symbol: Nil
  - Lever operation: Non-locking type (self-reset type)
  - Symbol: L
  - Lever operation: Locking type

- **Material**
  - Symbol: C
  - Body: PFA
  - Actuator section:
    - End plate: PP
    - Diaphragm: PTFE

- **Thread type**
  - Symbol: Nil
  - Thread type: Rc
  - Symbol: N
  - Thread type: NPT

- **Port size (port A)**
  - Symbol: 02
  - Port size: 1/4
  - Body class: 2
  - Symbol: 03
  - Port size: 3/8
  - Body class: 3
  - Symbol: 04
  - Port size: 1/2
  - Body class: 4
**How to Order Manifold Assembly (Example)**
Enter the part number of the valves to be mounted together with the manifold base part number.

<Example>
LLH2A-03-02-C ..... 1 set 1 set Manifold base part no.
LVH20A-02-C ..... 2 sets Valve part no. (stations 1 & 2)
LVH20AL-02-C ..... 1 set 1 set Valve part no. (station 3)

Add the * symbol at the beginning of part numbers for valves, etc. to be mounted.
Enter together in order counting from station 1 on the left side, with the A (OUT) ports in front.

**Dimensions**

**LLHA- Stations -□□□-C**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Type</th>
<th>Orifice diameter</th>
<th>Valve type</th>
<th>Model</th>
<th>Port size</th>
<th>Manifolds</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>1/4</td>
<td>NPT1/4</td>
<td>LVH20</td>
<td>1/4</td>
<td>PFA</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>1/2</td>
<td>NPT1/2</td>
<td>LVH40</td>
<td>1/2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Station</th>
<th>(mm)</th>
<th>(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>LLH2A</td>
<td>62</td>
<td>93</td>
</tr>
<tr>
<td>LLH3A</td>
<td>75</td>
<td>106</td>
</tr>
<tr>
<td>LLH4A</td>
<td>118</td>
<td>149</td>
</tr>
</tbody>
</table>

**Dimensions**

<table>
<thead>
<tr>
<th>Model</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLH2A</td>
<td>118</td>
<td>149</td>
<td>180</td>
<td>211</td>
</tr>
<tr>
<td>LLH3A</td>
<td>74</td>
<td>111</td>
<td>148</td>
<td>185</td>
</tr>
<tr>
<td>LLH4A</td>
<td>94</td>
<td>141</td>
<td>188</td>
<td>235</td>
</tr>
</tbody>
</table>

### Threaded type manifold/ Variations

- **Model**
  - LVH20
  - LVH30
  - LVH40

- **Port size**
  - 1/4
  - 3/8
  - 1/2

- **Orifice diameter**
  - ø4
  - ø8
  - ø12

- **Valve type**
  - N.C.

- **Non-locking**
  - Locking

**How to Order Manifold Assembly (Example)**
Enter the part number of the valves to be mounted together with the manifold base part number.

<Example>
LLH2A-03-02-C ..... 1 set 1 set Manifold base part no.
LVH20A-02-C ..... 2 sets Valve part no. (stations 1 & 2)
LVH20AL-02-C ..... 1 set 1 set Valve part no. (station 3)

Add the * symbol at the beginning of part numbers for valves, etc. to be mounted.
Enter together in order counting from station 1 on the left side, with the A (OUT) ports in front.


### Fittings

#### Changing tubing sizes

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

<table>
<thead>
<tr>
<th>Body class</th>
<th>Tubing O.D.</th>
<th>Metric sizes</th>
<th>Inch sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>●</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>3</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

#### Changing the tubing size

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

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

Note) Tubing is sold separately.

#### How to order fitting parts

---

**LQ 2 U 03**

**Type of fitting**

- **Symbol**: Nil, LQ2, LQ1
- **Applicable fitting**: LQ2

**Body class**

- **Symbol**: 2, 3, 4, 5, 6
- **Body class**: 2, 3, 4, 5, 6
- **Applicable fitting**: LQ2, LQ1

**Type of part**

- **Symbol**: U, B, N
- **Type of part**: Insert bushing & nut, Insert bushing, Nut

**Tubing size**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Tubing O.D.</th>
<th>Body class</th>
<th>Applicable fitting</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>1/8”, ø3</td>
<td>2</td>
<td>LO2</td>
</tr>
<tr>
<td>04</td>
<td>ø4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>3/16”</td>
<td>3</td>
<td>LO2</td>
</tr>
<tr>
<td>06</td>
<td>ø6</td>
<td>4</td>
<td>LO2</td>
</tr>
<tr>
<td>07</td>
<td>1/4”</td>
<td>5</td>
<td>LO2</td>
</tr>
<tr>
<td>08</td>
<td>ø8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>5/32”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>ø10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>ø12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1/4”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>1/2”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>3/8”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>1/2”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>5/16”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>3/16”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>1/4”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>1/2”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>5/8”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>3/4”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>7/16”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>11/32”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>3/16”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>1”</td>
<td>6</td>
<td>LO1</td>
</tr>
</tbody>
</table>

* Type U is recommended when changing tubing sizes.

**Caution**

1. Connect tubing with special tools.

Refer to the pamphlet “High-Purity Fluoro-polymer Fittings HYPER FITTING®/Series LO1, 2 Work Procedure Instructions” (M-E05-1) for connecting tubing and special tools. (Downloadable from our web site.)

---

Fittings and Special Tools

---

489
## Applicable Fluids

### Material and fluid compatibility check list for air and manually operated high purity valves

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Body material</th>
<th>Diaphragm material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stainless steel SUS316</td>
<td>Fluoro resin PFA</td>
</tr>
<tr>
<td>Acetone</td>
<td>○ (Note 1)</td>
<td>○</td>
</tr>
<tr>
<td>Ammonium hydroxide</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Isobutyl alcohol</td>
<td>○ (Note 1)</td>
<td>○</td>
</tr>
<tr>
<td>Isopropyl alcohol</td>
<td>○ (Note 1)</td>
<td>○</td>
</tr>
<tr>
<td>Hydrochloric acid</td>
<td>×</td>
<td>○</td>
</tr>
<tr>
<td>Ozone (dry)</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Hydrogen peroxide</td>
<td>× (Note 1)</td>
<td>○</td>
</tr>
<tr>
<td>Ethyl acetate</td>
<td>○ (Note 1)</td>
<td>○</td>
</tr>
<tr>
<td>Butyl acetate</td>
<td>○ (Note 1)</td>
<td>○</td>
</tr>
<tr>
<td>Nitric acid (except fuming nitric acid)</td>
<td>×</td>
<td>○</td>
</tr>
<tr>
<td>DI water</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Nitrogen gas</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Super pure water</td>
<td>×</td>
<td>○</td>
</tr>
<tr>
<td>Toluene</td>
<td>○ (Note 1)</td>
<td>○</td>
</tr>
<tr>
<td>Hydrofluoric acid</td>
<td>×</td>
<td>○</td>
</tr>
<tr>
<td>Sulfuric acid (except fuming sulfuric acid)</td>
<td>×</td>
<td>○</td>
</tr>
<tr>
<td>Phosphoric acid</td>
<td>×</td>
<td>○</td>
</tr>
</tbody>
</table>

- The material and fluid compatibility check list provides reference values as a guide only.
- Note 1) Use a stainless steel body, as static electricity may be generated.
- Note 2) Use caution as permeation may occur and any permeated fluid could effect other material parts.
- 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.

Table symbols:
- ○: Can be used
- ○ (Note 1): Can be used in certain conditions
- ×: Cannot be used
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 features page 490. Contact SMC regarding fluids other than those in the check list.

3. **Maintenance space**
   Ensure the necessary space for maintenance and inspections.

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

5. **Ambient environment**
   Operate 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. **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. **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 when making connections to the pilot port.**
   **Operating port tightening torque**
   - Operating port: Torque (N·m)
     - M5: 1/6 turn with a tightening tool after first tightening by hand
     - Rc, NPT 1/8: 0.8 to 1.0

3. **Use of metal fittings**
   Do not use metal fittings for piping on taper threads made of resin, as this may cause damage to the threads.

   **LVA PPS body ported tightening torque for fittings.**
   - Size | Breaking torque (N·m) | Tightening torque (N·m) | Guideline for tightening torque (Number of turns)
   - LVA20 | 2 to 3 | 0.5 to 1 | 2 to 3 turns
   - LVA30 | 6 to 8 | 2 to 3 | 3 to 4 turns
   - LVA40 | 11 to 14 | 5 to 7 | 3 to 4 turns
   - LVA50 | 18 to 20 | 8 to 10 | 3 to 4 turns

   * Guideline for tightening torque
   Number of turns when the fitting is screwed into the body with 2 to 3 windings of sealant tape applied to threaded portion of the piping.
   The value may differ for types other than sealant type.

4. **Use pilot ports and sensor (breathing) ports as indicated below.**
   - | PA Port | PB Port | Sensor (breathing) port |
   - N.C. Pressure | Breathing | Breathing |
   - N.O. Breathing | Pressure | Breathing |
   - Double acting Pressure | Pressure | Breathing |

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

5. **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.)
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.

Operating Environment

⚠️ Warning
1. Do not use in a location having an explosive atmosphere.
2. Do not operate in locations where vibration or impact occurs.
3. Do not use in locations where radiated heat will be received from nearby heat sources.

Maintenance

⚠️ Warning
1. Maintenance should be performed in accordance with the procedures in the instruction manual.
   Incorrect handling can cause damage or malfunction of machinery and equipment, etc.
2. Before removing equipment or compressed air supply/exhaust devices, shut off the air and power supplies, and exhaust compressed air from the system.
   Further, when restarting equipment after remounting or replacement, first confirm safety and then check the equipment for normal operation.
3. Perform work after removing residual chemicals and carefully replacing them with DI water or air, etc.
4. Do not disassemble the product. Products which have been disassembled cannot be guaranteed.
   If disassembly is necessary, contact SMC.
5. In order to obtain optimum performance from valves, perform periodic inspections to confirm that there are no leaks from valves or fittings, etc.

⚠️ Caution
1. Removal of drainage
   Flush drainage from filters regularly.

Precautions on Usage

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

⚠️ Caution
1. When the diaphragm is made of PTFE
   Please note that when the product is shipped from the factory, gases such as N₂ and air may leak from the valve at a rate of 1cm³/min (when pressurized).
2. When operated at a very low flow rate, the series LV with flow rate adjustment may vibrate, etc. depending on the operating conditions. Therefore, operate it after careful examination of the flow rate, pressure and piping conditions.
3. In the series LV, 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 for the series LV with flow rate adjustment, open gradually starting from the fully closed condition.
   Opening is accomplished by turning the adjustment knob counter clockwise. Additionally, do not apply any unreasonable force to the adjustment knob when nearing a fully opened or closed state. This may result in deformation of the orifice sheet surface or damage to the threaded part of the adjustment knob. It is in the fully closed condition when the product is shipped from the factory.
5. After a long period of nonuse, perform a test run before beginning regular operation.
6. Since the LVC is packaged in a clean room use sufficient care in handling when opened.
7. Take extra care when setting the operating direction and when handling the lever of series LVH.