This instruction manual contains safety information. Please read this manual carefully to ensure safe and correct use of the product. This manual should be kept readily accessible for reference.
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Preface

Thank you very much for purchasing the P series Super 300 Type Pillar Fitting. This instruction manual describes the structure, specifications, and installation, inspection and maintenance procedures of the product. Please read this manual carefully to ensure safe and efficient use of the product.

Safety Notices

The following lists safety notices which must be observed to ensure safe and proper use of the product and prevent personal injury and/or property damage. Because these safety notices contain important information, be sure to read and observe them.

In this manual, safety notices are divided into “Danger”, “Warning” and “Caution” according to the hazard level.

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>⚠️ DANGER</td>
<td>A danger notice with this symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious personal injury.</td>
</tr>
<tr>
<td>⚠️ WARNING</td>
<td>A warning notice with this symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious personal injury.</td>
</tr>
<tr>
<td>⚠️ CAUTION</td>
<td>A caution notice with this symbol indicates a potentially hazardous situation which, if not avoided, may result in personal injury and/or property damage.</td>
</tr>
</tbody>
</table>

This symbol indicates prohibition.

This symbol conveys mandatory action or provides an instruction.

- Liquid leakage
  - Be sure to follow instructions in this manual when installing, retightening, reinstalling the fitting. Poor installation or retightening may cause the liquid to leak or the fitting to uncouple from tubing.
  - Do not retighten the fitting while tubing is in high-temperature or pressurized conditions. Doing so may deform or damage the fitting, resulting in a spout of the liquid. Before retightening the fitting, be sure to lower the temperature to 30 °C (86 °F) or less and reduce the pressure to 0 MPaG (0 psiG).
  - The fitting is made of resin. Exercise great care to avoid bending or tensile stress to the fitting when or after tightening it. Doing so may deform or damage the fitting, resulting in liquid leakage.
  - Do not use the fitting beyond the working range specified in this manual. Doing so may cause the liquid to leak or the fitting to uncouple from tubing.

- Installation work
  - Never use the P series Super 300 Type Pillar fitting in combination with other fittings. Doing so may cause the liquid to leak or the fitting to uncouple from tubing.
  - When the liquid temperature is 70 °C (158 °F) or higher, protect the fitting and tubing with a cover or other suitable means. Otherwise, a burn may result.
  - Exercise great care to avoid a burn during the tube flaring process. The tube flaring process involves preheating of tubing.
  - Maintain good ventilation during the tube flaring process. Preheating of tubing can generate toxic gases.

- Disposal
  - Do not dispose of the fitting with a liquid residue remaining in it. Be sure to wash a liquid residue inside the fitting and then dispose of the fitting as combustible waste. Disposal of the fitting without washing a liquid residue may be hazardous.
  - Do not incinerate fitting parts. Incineration of fluoro-resin parts will generate toxic smoke.

After installing the fitting, keep this manual readily accessible for future reference.
1 Structure and Specifications of P series Super 300 Type Pillar Fitting

1-1 Structure
- The P series Super 300 Type Pillar Fitting consists of a body, sleeve, union nut and gauge ring (see Fig. 1). However, the fittings for the tubes of nominal sizes 3, 4, and W1 are not provided with a gauge ring.

---

**Fig. 1 - Structure of P series Super 300 Type Pillar Fitting**

### Table 1 - Tube size for Super 300 Type Pillow Fitting P Series

<table>
<thead>
<tr>
<th>Millimeter size</th>
<th>Nominal</th>
<th>O.D. x I.D.</th>
<th>3 × 2</th>
<th>4 × 3</th>
<th>6 × 4</th>
<th>8 × 6</th>
<th>10 × 8</th>
<th>12 × 10</th>
<th>19 × 15.8</th>
<th>25 × 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch size</td>
<td>Nominal</td>
<td>W1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>O.D. x I.D.</td>
<td>3.18 × 2.18</td>
<td>6.35 × 3.95</td>
<td>9.53 × 6.33</td>
<td>12.7 × 9.5</td>
<td>19.15 × 15.8</td>
<td>25.4 × 22.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inch size</td>
<td>Nominal</td>
<td>W2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Thin wall)</td>
<td>O.D. x I.D.</td>
<td>6.35 × 4.35</td>
<td>9.53 × 7.53</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:
- **Body**: in common use with Super Type Pillow Fitting
- **Nut**: in common use with Super Type Pillow Fitting
- **Sleeve**: dedicated for P Series Super 300 Type Pillow Fitting

---
1-2 Specifications

- Applicable tube material: PTFE, PFA
- Max. working temperature: 200 °C (392 °F)
- Max. working pressure: 0.7 MPaG (101.5 psiG)

When the liquid temperature is 60 °C (140 °F) or higher, the max. working pressure decreases by 0.032 MPaG (4.64 psiG) every 10 °C (18 °F) increase in liquid temperature. See Fig. 2 below.

- Permissible ambient temperature: -15 to +60 °C (5 to 140 °F)

![Fig. 2 - Specifications of P Series Super 300 Type Pillar Fitting](image)

1-3 Handling precautions

- Use the Super 300 Type Pillar Fitting for liquids only.
- To cut the tube, insert or tighten the sleeve, use the insertion tool, scrap the fitting carefully read in advance Chapters 2, 3, 4, and 5.
- When using a solvent to clean the components, dry them well before use or installation.
2 Cutting of Tube and Insertion of Sleeve

2-1 Cutting a tube

- The standard cut length means the length between bodies (Fig. 4) plus the additional length. However, if this value is smaller than the shortest length between bodies shown in Table 2, the sleeve cannot be inserted.
- When the tube is to be anchored at its both ends (i.e. the fittings installed on the both ends of the tube are to be fixed to a wall or the like), cut the tube to the standard cut length exactly or with a margin of approx. 1% of the length. (Tube length = Standard cut length \times 1.01)
- When the tube is used in high temperature conditions, the margin should be approx. 3%. (Tube length = Standard tube length \times 1.03)
- If the tube is shorter than the standard cut length, tensile force may be applied to the tube, resulting in leakage of the liquid.
- The tube should be cut vertically wherever practical.

![Diagram](image)

**P Series Super 300 Type**
For nominal tube size: 6 - 25, W2 - W8

**P Series Super 300 Type**
For nominal tube size: 3, 4, W1

*(Standard cut length) = (Length between fitting bodies) + (Additional length) \times 2*

Equation 1 - Standard cut length

![Diagram](image)

**Table 2 - Minimum cut length of tubes**

<table>
<thead>
<tr>
<th>Nominal tube size</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>19</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millimeter size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inch size</td>
<td>W1</td>
<td>-</td>
<td>W2</td>
<td>W2Y</td>
<td>-</td>
<td>W3</td>
<td>W3Y</td>
<td>W4</td>
</tr>
<tr>
<td>Minimum length</td>
<td>11</td>
<td>11</td>
<td>18</td>
<td>19</td>
<td>22</td>
<td>27</td>
<td>31</td>
<td>38</td>
</tr>
<tr>
<td>between fitting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bodies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional length</td>
<td>5</td>
<td>6.5</td>
<td>8</td>
<td>8.5</td>
<td>10</td>
<td>11.5</td>
<td>15.5</td>
<td>19</td>
</tr>
<tr>
<td>Minimum cut length</td>
<td>21</td>
<td>24</td>
<td>34</td>
<td>36</td>
<td>42</td>
<td>50</td>
<td>62</td>
<td>76</td>
</tr>
</tbody>
</table>

*: However, if this value is smaller than the shortest length between bodies shown in Table 2, the sleeve cannot be inserted.
Notes:
- Before inserting, pass the union nut through the tube while taking care of the orientation of the union nut (see Fig. 3).
- Cutting the tube to a length shorter than the minimum cut length will disable the Pillar fittings to be correctly connected to the tube.
- When the tube is to be anchored at its both ends, cut the tube to the standard cut length with a margin of approx. 1% of the length. (Tube length = Standard cut length x 1.01)
- When the tube is used in high temperature conditions, the margin in cut length should be approx. 3%. (Tube length = Standard cut length x 1.03)

2-2 Inserting the sleeve into the tube
- Insert the sleeve of the P series Super 300 Type Pillar Fitting into the tube according to Table 3. For details on how to insert the sleeve into the tube using insertion tools, refer to Chapter 4.

<table>
<thead>
<tr>
<th>Insertion method</th>
<th>Tool type</th>
<th>Nominal tube size</th>
<th>Reference page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room temperature insertion</td>
<td>JT-A4</td>
<td>(3) - (8)</td>
<td>P-14</td>
</tr>
<tr>
<td>Room temperature insertion</td>
<td>JT-C3</td>
<td>(8) - (12)</td>
<td>P-16</td>
</tr>
<tr>
<td>Room temperature insertion (Hand-held type tool)</td>
<td>JT-SA</td>
<td>(12) - (19)</td>
<td>P-18</td>
</tr>
<tr>
<td>Heat insertion</td>
<td>PT-FH</td>
<td>(19) - (25)</td>
<td>P-22</td>
</tr>
<tr>
<td>Flare insertion</td>
<td>PT-H</td>
<td>(19) - (25)</td>
<td>P-25</td>
</tr>
</tbody>
</table>

Note: Type JT-A4 can also be used for room temperature insertion of \(10\times8\), \(9.53\times6.33\), \(9.53\times7.53\) mm tube.

- Insert the sleeve to the tube by either room temperature insertion or flare insertion method.
- Stop inserting the sleeve into the tube when the tube reaches the tube stop of the sleeve (see Fig. 5).
- Excessive force may deform the tube.

2-3 Cautions in inserting the sleeve into the tube
- Exercise care to prevent oil from adhering to the tube and sleeve.
- If oil is adhered to the tube or sleeve, wash it away with a solvent and then dry the tube or sleeve well before insertion.
- Exercise care to avoid entering dust or foreign matters between the tube and sleeve.
- A gap could remain between the tube and the tube stop of the sleeve when the sleeve is inserted into the tube.
In such a case, insert the sleeve into the tube until the gap is smaller than a half of the straight section on the sleeve. The gap to this
The recommended gaps are shown in Table 4 (see Fig. 6).

<table>
<thead>
<tr>
<th>Millimeter size</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>19</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch size</td>
<td>W1</td>
<td>-</td>
<td>W2, W2Y</td>
<td>-</td>
<td>W3, W3Y</td>
<td>W4</td>
<td>W6</td>
<td>W8</td>
</tr>
<tr>
<td>Recommended gap after insertion (mm)</td>
<td>1 or less</td>
<td>1 or less</td>
<td>1.2 or less</td>
<td>1.3 or less</td>
<td>1.5 or less</td>
<td>2.5 or less</td>
<td>2.8 or less</td>
<td>3.5 or less</td>
</tr>
</tbody>
</table>
3 Tightening (Nominal tube size: 6 - 25, W2 - W8)

3-1 Structure and function of gauge ring (Nominal tube size: 6 - 25, W2 - W8)
- The P Series Super 300 Type Pillar Fitting is provided with a gauge ring to facilitate controlling the tightening range and limit, thereby ensuring safe and proper tightening (see Fig. 7).

- At initial tightening, the boss at the end of the union nut makes contact with the blade of the gauge ring, allowing you to find from the feel and click sound that the initial tightening has been completed.

- When the tightening limit of the fitting is reached, the base will stop rotating and restrict the rotation of the union nut.

Note: The gauge ring is only applicable for the tubes of nominal sizes 6 to 25 and W2 to W8. For the tubes of nominal sizes 3, 4, and W1, see Section 4.

3-2 Initial tightening (Nominal tube size: 6 - 25, W2 - W8)
- Insert the tube into which the sleeve has been inserted, into the main unit and then tighten it until the boss on the union nut makes contact with the gauge ring and pulls the blade. Crunching sound should be heard (see Fig. 8).
- The use of the dedicated spanner allows you to more efficiently tighten the union nut (see Fig. 9 and Table 5).

<table>
<thead>
<tr>
<th>Millimeter size</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>19</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch size</td>
<td>W2, W2Y</td>
<td>-</td>
<td>W3, W3Y</td>
<td>W4</td>
<td>W6</td>
<td>W8</td>
</tr>
<tr>
<td>Size marking</td>
<td>6-W2</td>
<td>8</td>
<td>10-W3</td>
<td>12-W4</td>
<td>19-W6</td>
<td>25-W8</td>
</tr>
</tbody>
</table>

Fig. 7 - Shapes of gauge rings

Fig. 8 - Initial tightening

Fig. 9 - Spanner for tightening the union nut
Note: On the longer thread of the panel mount union, the gap cannot be used as a criterion for tightness. In this case, measure the clearance between the bossed leading end of the union nut and the half nut to control tightening (see Equation 2, Fig. 10, and Table 6).

\[ (*\text{Gap after tightening}) = \times - (\text{Thickness of panel}) \]

3-3 Installing the cap sleeve (Nominal tube size: 6 - 25, W2 - W8)

- Insert the cap sleeve into the fitting body and tighten the union nut.
- Hand-tighten the union nut and then turn the nut a half turn with a wrench (see Fig. 11 and Table 7).

<table>
<thead>
<tr>
<th>Cap sleeve Type</th>
<th>Nominal tube size</th>
<th>Tightening control method for cap sleeve</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-CS-6A</td>
<td>6 W2, W2Y</td>
<td>Hand-tightening + 1/2 turn</td>
</tr>
<tr>
<td>P-CS-8A</td>
<td>8 -</td>
<td>Hand-tightening + 1/2 turn</td>
</tr>
<tr>
<td>P-CS-10A</td>
<td>10 W3, W3Y</td>
<td>Hand-tightening + 1/2 turn</td>
</tr>
<tr>
<td>P-CS-12A</td>
<td>12 W4</td>
<td>Hand-tightening + 1/2 turn</td>
</tr>
<tr>
<td>P-CS-19A</td>
<td>19 W6</td>
<td>Hand-tightening + 1/2 turn</td>
</tr>
<tr>
<td>P-CS-25A</td>
<td>25 W8</td>
<td>Hand-tightening + 1/2 turn</td>
</tr>
</tbody>
</table>

Note: When the cap sleeve is tightened, the boss at the end of the union nut will not make contact with the blade of the gauge ring (no crunching sound will be heard).
Removing and reinstallation (Nominal tube size: 6 - 25, W2 - W8)

- To remove the installed fitting, loosen the union nut and then separate it from the main body. Manually hold the tube and the main body, circularly move the tube, and then separate the sleeve from the main body.
- When reusing the removed fitting, do not disconnect the sleeve from the tube when removing the fitting.
- To install the removed fitting, insert the sleeve into the main body and then tighten until the gauge ring clicks again. Even if the gauge ring clicks (in the position where the boss at the end of the union nut makes contact with the blade), further hand-tighten the unit nut so far as hand tightening is possible.

![Diagram of fitting removal and installation](Fig. 12 - How to remove P series Super 300 Type Pillar Fitting (6 - 25, W2 - W8))

**Notes:**
- In removing the fitting, circularly move the tube like first drawing small circles and then gradually drawing larger circles (see Fig. 12).
  If you greatly twist the tube to left or right or if you circularly moves the tube like suddenly drawing large circles, then the sleeve may remain on the main body, hindering you from retightening the tube.
- In reinstalling, do not damage the removed parts.
- Removal and reusing are acceptable up to 10 times. If this number of reusing times is exceeded, replace the fitting. If the tightening limit is reached regardless of the number of reusing times, replace the fitting immediately.

3-5 Measures against liquid leakage (Nominal tube size: 6 - 25, W2 - W8)

- If the union nut needs to be retightened due to liquid leakage from the fitting, lower the temperature of the liquid to 30 °C (86 °F) or less and reduce the pressure to 0 MPaG (0 psiG); then retighten the union nut by turning it one quarter-turn with a wrench. After retightening the union nut, check to be sure that the liquid no longer leaks from the fitting.
- Note that, once liquid leakage occurs, the liquid may remain in the nut, resulting in the liquid exuding from the fitting for a while even after retightening the union nut.

### Safety Notices

<table>
<thead>
<tr>
<th>CAUTION</th>
<th>The fitting is made of resin. Exercise great care to avoid bending or tensile stress to the fitting when or after tightening it. Doing so may deform or damage the fitting, causing the liquid to leak or the fitting to uncouple from tubing.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Do not retighten the fitting while tubing is in high-temperature or pressurized conditions. Doing so may deform or damage the fitting, resulting in a spout of the liquid. Before retightening the fitting, be sure to lower the temperature to 30 °C (86 °F) or less and reduce the pressure to 0 MPaG (0 psiG).</td>
</tr>
<tr>
<td></td>
<td>Be sure to follow instructions in this manual when installing, retightening, reinstalling the fitting. Poor installation or retightening may cause the liquid to leak or the fitting to uncouple from tubing.</td>
</tr>
</tbody>
</table>
4 Tightening (Nominal tube size: 3, 4, W1)

4-1 Cautions in tightening the union nut (Nominal tube size: 3, 4, W1)

- The gap between the union nut and the fitting body serves as a criterion for proper tightening of the union nut. (Gap specified for tightening control)
- The gap specified for tightening control has the upper and lower limits. Even if fittings have the same nominal size, they are classified into the A-type and the B-type according to their shapes.

1) Upper limit: Represents the max. gap needed for the fitting to work well.

2) Lower limit: Represents the min. gap. When the gap is smaller than the lower limit, the fitting (with its union nut and sleeve) needs to be replaced.

3) Type A: Applies to injection-molded fittings of straight type and machined PTFE fittings (see Fig. 13).

4) Type B: Applies to injection-molded fittings of elbow and Tee type (see Fig. 13).

![Fig. 13 - Gaps as criterion for tightness check (3, 4, W1)](image)

| Table 8 - Fittings controlled with the B-type side of the gap gauge |
|-------------------|-------------------|-------------------|
| Fitting shape     | Elbow             | Tee               |
| Fitting only (Note 1) | P-UE-3B | P-UT-3B |
|                   | P-UE-4B | P-UT-4B |
|                   | P-RUE 4-3B | P-RUT 4-3-4B |
| Combination of fitting and taper thread (Note 1, 2) | P-ME 3-1B | P-MBT 3-1B |
|                   | P-ME 3-2B | P-MBT 3-2B |
|                   | P-ME 4-1B | P-MBT 4-1B |
|                   | P-ME 4-2B | P-MBT 4-2B |

Note 1: This is applicable even if “3” is changed to “W1” in the above table.
Note 2: This is applicable even if “1” or “2” representing the taper thread size is changed to “N1” or “N2”, respectively.

Note: To check the gap, use gap gauges (feeler gauges) as shown in Section 4-2.
4-2 Checking the tightness of the union nut (Nominal tube size: 3, 4, W1)

- To check the tightness of the union nut, use gap gauges shown in Table 9. Using the gray part of gap gauges permits you to check the gap for upper limit. The red part of gap gauges is for checking the gap for lower limit. Determine whether or not a gap gauge can be inserted in the gap, as shown in Fig. 14.

  (1) Checking the gap for upper limit:
  As shown in Fig. 14, try to insert the gray part of the gap gauge in the gap between the fitting body and the union nut to make sure the gray part cannot be inserted. If the gray part can be inserted, tighten the union nut until the gauge cannot be inserted in the gap.

  (2) Checking the gap for lower limit:
  Try to insert the red part of the gap gauge in the same manner to make sure the red part can be inserted. If the red part cannot be inserted in the gap, the fitting has already exceeded its service life. Replace the fitting immediately.

![Fig. 14 - How to use gap gauge (3, 4, W1)](image)

Table 9 - Gap gauge type (3, 4, W1)

<table>
<thead>
<tr>
<th>Gap gauge type</th>
<th>Nominal tube size</th>
<th>Millimeter size</th>
<th>Inch size</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSG-3(W1)</td>
<td></td>
<td>3</td>
<td>W1</td>
</tr>
<tr>
<td>SSG-4</td>
<td></td>
<td>4</td>
<td>-</td>
</tr>
</tbody>
</table>

Notes:
- Gap gauges are not supplied. They are available from Nippon Pillar Packing.
- The gap gauges (for nominal tube size: 3, 4, and W1) are the same as those for the Super Type Pillar Fittings.

4-3 Initial tightening (Nominal tube size: 3, 4, W1)

- Insert the tube with the inserted sleeve into the body of the fitting and then always tighten the union nut until the gap between the union nut and the body becomes smaller than the upper limit.

Notes:
- It is recommended that you retighten the union nut 24 hours or more after initial tightening. This is because a decrease in tightening torque due to a creep mostly occurs within 24 hours. If the fitting is exposed to thermal cycles, it is also recommended that you retighten the union nut in a cold state after one thermal cycle is completed.
- On the longer thread of the panel mount union, the gap cannot be used as a criterion for tightness. In this case, tighten the union nut firmly by hand. For a special size tube where the gap cannot be used as a criterion for tightness, tighten the union nut in the same manner.
4-4 Installing the cap sleeve (Nominal tube size: 3, 4, W1)

- Insert the cap sleeve into the fitting body and hand-tighten the union nut until it no longer turns (see Fig. 15 and Table 10).

![Fig. 15 - Installing the cap sleeve (3, 4, W1)](image)

<table>
<thead>
<tr>
<th>Cap sleeve type</th>
<th>Nominal tube size</th>
<th>Tightening control method for cap sleeve</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-CS-3A</td>
<td>3 W1</td>
<td>Hand-tighten the union nut</td>
</tr>
<tr>
<td>P-CS-4A</td>
<td>4 -</td>
<td>Hand-tighten the union nut</td>
</tr>
</tbody>
</table>

Caution:
- Be sure to install the cap sleeve according to the above instructions. Using a gap gage when installing the cap sleeve could result in loose installation or over tightening, causing damage or leakage.

Note:
- The cap sleeves P-CS-3A and P-CS-4A are the same as the cap sleeve CS-3A and CS-4A for the Super Type Pillar Fittings.

4-5 Removing and reinstallation (Nominal tube size: 3, 4, W1)

- Loosen the union nut to remove the fitting.
- When removing the fitting and reinstalling it, do not uncouple the sleeve from the tube. Handle the tube and the sleeve as an unit.
- When reinstall the fitting, **tighten the union nut until the gap between the union nut and the fitting body reaches the upper limit, and furthermore, turn the union nut a half-turn**.
- The fitting resists **ten times** of reinstallation. If the gap between the union nut and the fitting body becomes smaller than the lower limit, however, the fitting needs to be replaced even though it has not yet been reinstalled ten times.

Caution:
- Do not damage the tube/sleeve and sealing surfaces of the fitting body when reinstalling the fitting. Doing so may result in liquid leakage from the fitting.

4-6 Measures against liquid leakage

- If the union nut needs to be retightened due to liquid leakage from the fitting, lower the temperature of the liquid to 30 °C (86 °F) or less and reduce the pressure to 0 MPaG (0 psiG); then **retighten the union nut by turning it one quarter-turn with a wrench**. After retightening the union nut, check to be sure that the liquid no longer leaks from the fitting.
- Note that, once liquid leakage occurs, the liquid may remain in the nut, resulting in the liquid exuding from the fitting for a while even after retightening the union nut.

<table>
<thead>
<tr>
<th>Safety Notices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAUTION</strong> The fitting is made of resin. Exercise great care to avoid bending or tensile stress to the fitting when or after tightening it. Doing so may deform or damage the fitting, causing the liquid to leak or the fitting to uncouple from tubing.</td>
</tr>
<tr>
<td><strong>Do not retighten the fitting while tubing is in high-temperature or pressurized conditions.</strong> Doing so may deform or damage the fitting, resulting in a spout of the liquid. Before retightening the fitting, be sure to lower the temperature to 30 °C (86 °F) or less and reduce the pressure to 0 MPaG (0 psiG).</td>
</tr>
<tr>
<td><strong>Be sure to follow instructions in this manual when installing, retightening, reinstalling the fitting.</strong> Poor installation or retightening may cause the liquid to leak or the fitting to uncouple from tubing.</td>
</tr>
</tbody>
</table>
5 How to Use Insertion Tools

5-1 Using room temperature insertion tool JT-A4 (Nominal tube size: 10 - 25, W3 - W8)

1. Setting the sleeve
   - Install to insertion tool JT-A4 the sleeve holder and then the sleeve as shown in Fig. 17 for the state before the diameter has been expanded.
   - After setting the sleeve, push the diameter expansion ring into the sleeve until it clicks in place (see Fig. 17 for the state after the diameter has been expanded and Table 12 for applicable parts).

2. Clamping the tube
   - Loosen insertion unit locking handle and lock the insertion unit at its shortest locking length (see Fig. 18 and Table 11).
   - Fit the tube holder onto the tube having the union nut in place.
   - Lock the tube with the clamp at the shortest locking length for the tube, which is shown in Table 11 (see Fig. 18 and Table 11).

3. Inserting the sleeve into the tube
   - Turn the lever counterclockwise to insert the sleeve into the tube (see Fig. 19).
   - Stop turning the grip when the tube end reaches the tube stop of the sleeve (see Fig. 5 and Fig. 6).
   - Turn the lever clockwise as viewed from you. The sleeve holder will move back and the diameter expansion ring will be unlocked. Now the inserted tube sleeve can be removed from the sleeve holder (see Fig. 20).

Caution:
- Stop turning the lever when the tube end reaches the tube stop of the sleeve. Otherwise, damage to the tube, sleeve and/or sleeve holder may result.
4. How to insert sleeves into a short tube
   If the required tube length is too short to insert sleeves into it in the manner described above, proceed as follows.
   • Insert the sleeve into one end of the tube as described above steps 1 to 3 (see Fig. 5 and Fig. 6).
   • Open the clamp and remove the tube.
   • After inserting the sleeve into one end of the tube, cut the tube using Table 2 for reference before inserting the other end.
   • Loosen the insertion unit locking handle, position the insertion unit so as to allow the arrangement shown in Fig. 21, and then retighten the locking handle to secure the unit (refer to Table 12 for applicable parts).
   • Put the union nuts on the tube, set the inserted sleeve in sleeve holder for short tube, and then fix the sleeve holder to the clamp.
   • Insert the other end as described in 1 to 3 (see Fig. 5 and Fig. 6).

   ![Fig. 21 - Parts arrangement (10 - 25, W3 - W8)](image)

   Table 12 - Parts for JT-A4 (10 - 25, W3 - W8)

<table>
<thead>
<tr>
<th>Millimeter size</th>
<th>Nominal tube size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Sleeve holder</td>
<td>P-SHP-AK10</td>
</tr>
<tr>
<td>Tube holder</td>
<td>J-TH-A10</td>
</tr>
<tr>
<td>Sleeve holder for short tube</td>
<td>P-SH-A10S2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inch size</th>
<th>Nominal tube size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>W3</td>
</tr>
<tr>
<td>Sleeve holder</td>
<td>P-SHP-AKW3</td>
</tr>
<tr>
<td>Tube holder</td>
<td>J-TH-AW3</td>
</tr>
<tr>
<td>Sleeve holder for short tube</td>
<td>P-SH-AW3S2</td>
</tr>
</tbody>
</table>

Notes:
   • The P-SHP-AK** sleeve holder is provided with a diameter expansion ring at its end. If the diameter expansion ring becomes less secured, place an order for the diameter expansion ring only.

   • Insertion tool JT-A4 is an improvement of JT-A3.

   • The sleeve holder for Super 300 Type Pillar Fitting P Series has dual grooves on its flange (see Fig. 22).
5-2 Using room temperature insertion tool JT-C3 (Nominal tube size: 6, 8, W2, W2Y, W3Y)

1. Setting the sleeve
   - Install to insertion tool JT-C3 the sleeve holder and then the sleeve as shown in Fig. 24 for the state before the diameter has been expanded.
   - After the sleeve has been set, push the diameter expansion ring toward the sleeve until it clicks (see Fig. 24 for the state after the diameter has been expanded and Table 14 for the applicable parts).

2. Clamping the tube
   - Select a suitable tube holder according to Table 14 and fix it to the JT-C3.
   - Loosen the knob located at the bottom of the tube holder and then lock the tube holder at its shortest locking length.
   - Open the clamp and install the tube with union nut passing through it in the tube holder so that the minimum tube length as shown in Table 13 is ensured (see Fig. 25).

<table>
<thead>
<tr>
<th>Nominal tube size</th>
<th>Millimeter size</th>
<th>Inch size</th>
<th>Shortest locking length for tube</th>
<th>Shortest locking length for tube holder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6</td>
<td>8</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>W2</td>
<td>W2Y</td>
<td>W3Y</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25</td>
</tr>
</tbody>
</table>

3. Inserting the sleeve into the tube
   - Grip the lever, and the sleeve will be inserted into the tube (see Fig. 26).
   - When the tube end reaches the tube stop of the sleeve, release the levers (see Fig. 5 and Fig. 6).
   - When the lever is released, the sleeve holder will move back and the diameter expansion ring will be unlocked. Now the inserted tube sleeve can be removed from the sleeve holder (see Fig. 27).

Caution:
   - Releasing the lever when the tube end reaches the tube stop of the sleeve. Otherwise, damage to the tube, sleeve and/or sleeve holder may result.
4. How to insert sleeves into a short tube

If the required tube length is too short to insert sleeves into it in the manner described above, proceed as follows.

- Insert the sleeve into one end of the tube as described above steps 1 to 3.
- Open the clamp and remove the tube.
- After inserting the sleeve into one end of the tube, cut the tube using Table 2 for reference before inserting the other end.
- Loosen the knob located at the bottom of the tube holder, position the tube holder so as to allow the arrangement shown in Fig. 28, and then retighten the knob to secure the unit.
- Put the union nuts on the tube, set the inserted sleeve in sleeve holder for short tube, and then fix the sleeve holder to the φ 6 portion of the tube holder (see Fig. 28 and refer to Table 14 for applicable parts).
- Insert the other end as described in 1 to 3 (see Fig. 5 and Fig. 6).

![Fig. 28 - Parts arrangement (6, 8, W2, W2Y, W3Y)](image)

![Table 14 - Parts for JT-C3 (6, 8, W2, W2Y, W3Y)](table)

### Notes:

- The P-SHP-CK** sleeve holder is provided with a diameter expansion ring at its end. If the diameter expansion ring becomes less secured, place an order for the diameter expansion ring only.

- Insertion tool JT-C3 is an improvement of JT-C2.

- The sleeve holder for Super 300 Type Pillar Fitting P Series has dual grooves on its flange (see Fig. 29).
5. Replacing the Base Plate

If the base plate for the J-BP-C (standard type) is too long, it may be replaced with the J-BP-CS (short type) (see Fig. 30 and Fig. 31).

- Remove the clamp by turning the knob located below the clamp.
- Remove the set bolt located below the insertion unit and then replace the base plate.
- Put the clamp back in place. Now the procedure has been completed.

Caution:
- No short pipe can be worked with the J-BP-CS (short type). To use a short pipe, replace the J-BP-CS with the J-BP-C (standard type).
5-3 Using room temperature insertion tool JT-C3 (Nominal tube size: 10,W3)

1. Setting the sleeve

- Install to insertion tool JT-C3 the sleeve holder and then
  the sleeve as shown in Fig. 33 for the state before the
  diameter has been expanded.
- After the sleeve has been set, push the diameter expansion
  ring toward the sleeve until it clicks (see Fig. 33 for the
  state after the diameter has been expanded and Table 15 for
  the applicable parts).

2. Clamping the tube

- Select a suitable tube holder according to Table 15 and fix it to the
  JT-C3.
- Loosen the knob located at the bottom of the tube holder and then
  lock the tube holder at its shortest locking length.
- Open the clamp and install the tube with union nut passing through
  it in the tube holder so that the minimum tube length as shown in
  Table 16 is ensured (see Fig. 34).

<table>
<thead>
<tr>
<th>Table 15 - Shortest locking length for tube 10,W3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal tube size</td>
</tr>
<tr>
<td>Millimeter size</td>
</tr>
<tr>
<td>Inch size</td>
</tr>
<tr>
<td>Shortest locking length for tube</td>
</tr>
<tr>
<td>Shortest locking length for tube holder</td>
</tr>
</tbody>
</table>

3. Inserting the sleeve into the tube

- Grip the lever, and the sleeve will be inserted into the tube (Fig.
  35).
- When the tube end reaches the tube stop of the sleeve, release the
  levers (see Fig. 5 and Fig. 6).
- When the lever is released, the sleeve holder will move back and
  the diameter expansion ring will be unlocked. Now the inserted
  tube sleeve can be removed from the sleeve holder (see Fig. 36).

Caution:

- Releasing the lever when the tube end reaches the tube stop of the sleeve. Otherwise, damage to
  the tube, sleeve and/or sleeve holder may result.
4. How to insert sleeves into a short tube

If the required tube length is too short to insert sleeves into it in the manner described above, proceed as follows.

• Insert the sleeve into one end of the tube as described above steps 1 to 3.
• Open the clamp and remove the tube.
• After inserting the sleeve into one end of the tube, cut the tube using Table 2 for reference before inserting the other end.
• Loosen the knob located at the bottom of the tube holder, position the tube holder so as to allow the arrangement shown in Fig. 37, and then retighten the knob to secure the unit.
• Put the union nuts on the tube, set the inserted sleeve in sleeve holder for short tube, and then fix the sleeve holder to the φ6 portion of the tube holder (see Fig. 37 and refer to Table 16 for applicable parts).
• Insert the other end as described in 1 to 3 (see Fig. 5 and Fig.6).

![Diagram](Fig. 37 - Parts arrangement (10,W3))

<table>
<thead>
<tr>
<th>Nominal size of tube</th>
<th>10</th>
<th>W3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleeve holder</td>
<td>P-SHP-AK10</td>
<td>P-SHP-AKW3</td>
</tr>
<tr>
<td>Tube holder</td>
<td>J-TH-C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>J-TH-SB10</td>
<td>J-TH-SBW3</td>
</tr>
<tr>
<td>Sleeve holder for short tube</td>
<td>P-SH-C10S2</td>
<td>P-SH-CW3S2</td>
</tr>
</tbody>
</table>

Notes:

• The P-SHP-CK** sleeve holder is provided with a diameter expansion ring at its end. If the diameter expansion ring becomes less secured, place an order for the diameter expansion ring only.

• Insertion tool JT-C3 is an improvement of JT-C2.

• The sleeve holder for Super 300 Type Pillar Fitting P Series has dual grooves on its flange (see Fig. 39).
5. Replacing the Base Plate

If the base plate for the J-BP-C (standard type) is too long, it may be replaced with the J-BP-CS (short type) (see Fig. 40 and Fig. 41).
- Remove the clamp by turning the knob located below the clamp.
- Remove the set bolt located below the insertion unit and then replaced the base plate.
- Put the clamp back in place. Now the procedure has been completed.

Caution:
- No short pipe can be worked with the J-BP-CS (short type). To use a short pipe, replace the J-BP-CS with the J-BP-C (standard type).
5-4 Using room temperature insertion tool JT-C3 (Nominal tube size: 3, 4, W1)

1. Setting the sleeve
   - Install to insertion tool JT-C3 the sleeve holder and then the sleeve as shown in Fig. 43 for the state before the flare part has been set.
   - After fitting the sleeve, lock the flare part at the leading end of the sleeve holder (see Fig. 43 for the state after the flare part has been set and Table 18 for the applicable parts).

2. Clamping the tube
   - Select a suitable tube holder according to Table 18 and fix it to the JT-C3.
   - Loosen the knob located at the bottom of the tube holder and then lock the tube holder at its shortest locking length.
   - Open the clamp and install the tube with union nut passing through it in the tube holder so that the minimum tube length as shown in Table 17 is ensured (see Fig. 44).  

3. Inserting the sleeve into the tube
   - Squeeze the lever to expand the diameter of the tube end with the flare part. Repeat this step several times (see Fig. 45).
   - After the diameter has been expanded, remove the flare part.

Notes:
   - If the flare part is moved forward after the diameter has been expanded, the tube may be buckled. Upon the completion of diameter expansion, stop moving forward the flare part.
   - If the flare part is difficult to remove, turn it. This will allow you to remove the flare part easily.

4. Inserting the sleeve into the tube
   - Grip the lever, and the sleeve will be inserted into the tube (see Fig. 46).
   - When the tube end reaches the tube stop of the sleeve, release the lever (see Fig. 5 and Fig. 6).
   - When you release the lever, the sleeve holder will move back allowing you to remove the inserted tube sleeve.

Table 17 - Shortest locking length for tube

<table>
<thead>
<tr>
<th>Nominal tube size</th>
<th>Millimeter size</th>
<th>Inch size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>W1</td>
<td></td>
</tr>
<tr>
<td>Shortest locking length for tube</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Shortest locking length for tube holder</td>
<td>58</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 42 - Parts designation of JT-C3

Fig. 43 - Setting the sleeve

Fig. 44 - Shortest locking length

Fig. 45 - Expansion of tube diameter

Fig. 46 - Inserting the sleeve
Caution:
- Releasing the lever when the tube end reaches the tube stop of the sleeve. Otherwise, damage to the tube, sleeve and/or sleeve holder may result.

5. How to insert sleeves into a short tube
If the required tube length is too short to insert sleeves into it in the manner described above, proceed as follows.
- Insert the sleeve into one end of the tube as described above steps 1 to 4.
- Open the clamp and remove the tube.
- After inserting the sleeve into one end of the tube, cut the tube using Table 2 for reference before inserting the other end.
- Loosen the knob located at the bottom of the tube holder, position the tube holder so as to allow the arrangement shown in Fig. 47, and then retighten the locking knob to secure the unit.
- Put the union nuts on the tube, set the inserted sleeve in sleeve holder for short tube, and then fix the sleeve holder to the \( \phi 6 \) portion of the tube holder (see Fig. 47 and refer to Table 18 for applicable parts).
- Insert the other end as described in 1 to 4 (see Fig. 5 and Fig. 6).

![Fig. 47 - Parts arrangement (3, 4, W1)](image)

Table 18 - Parts for JT-C3 (3, 4, W1)

<table>
<thead>
<tr>
<th>Nominal tube size</th>
<th>3</th>
<th>4</th>
<th>W1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleeve holder</td>
<td>P-SH-CK3</td>
<td>P-SH-CK4</td>
<td>P-SH-CKW1</td>
</tr>
<tr>
<td>Tube holder</td>
<td>J-TH-C1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- The P-SH-CK** sleeve holder is provided with a flare part ring at its end.
- Insertion tool JT-C3 is an improvement of JT-C2.
- The sleeve holder for Super 300 Type Pillar Fitting P Series has dual grooves on its flange (see Fig. 48).

![Fig. 48 - Sleeve holder](image)
5. Replacing the Base Plate

If the base plate for the J-BP-C (standard type) is too long, it may be replaced with the J-BP-CS (short type) (see Fig. 49 and Fig. 50).

- Remove the clamp by turning the knob located below the clamp.
- Remove the set bolt located below the insertion unit and then replaced the base plate.
- Put the clamp back in place. Now the procedure has been completed.

Caution:
- No short pipe can be worked with the J-BP-CS (short type). To use a short pipe, replace the J-BP-CS with the J-BP-C (standard type).
5-5 Using hand-held type room temperature insertion tool JT-SA (Nominal tube size: 19, 25, W6, W8)

1. Setting the sleeve
- Install to insertion tool JT-SA the sleeve holder and then the sleeve as shown in Fig. 52 for the state before the diameter has been expanded.
- After the sleeve has been set, push the diameter expansion ring toward the sleeve until it clicks (see Fig. 52 for the state after the diameter has been expanded and Table 20 for the applicable parts).

2. Clamping the tube
- Fit the tube holder onto the tube having the union nut in place.
- Lock the tube with the clamp at the shortest locking length shown in Table 19 or more (see Fig. 53).

<table>
<thead>
<tr>
<th>Table 19 - Tube locking length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal tube size</td>
</tr>
<tr>
<td>Millimeter size</td>
</tr>
<tr>
<td>Inch size</td>
</tr>
<tr>
<td>Tube locking length</td>
</tr>
</tbody>
</table>

3. Inserting the sleeve into the tube
- Turn the grip clockwise to insert the sleeve into the tube (see Fig. 54).
- Stop turning the grip when the tube end reaches the tube stop of the sleeve (see Fig. 5 and Fig. 6).
- Turning the grip counterclockwise will move the sleeve holder backward and unlock the diameter expansion ring. Now the inserted tube sleeve can be removed from the sleeve holder (see Fig. 55).

Caution:
- Stop turning the grip clockwise when the tube end reaches the tube stop of the sleeve. Otherwise, damage to the tube, sleeve and/or sleeve holder may result.
Notes:

- The P-SHP-SAK** sleeve holder is provided with a diameter expansion ring at its end. If the diameter expansion ring becomes less secured, place an order for the diameter expansion ring only.

- Insertion tool JT-SA is an improvement of ST-SA for Super Type Pillar Fittings and can be used to insert “P series” Super 300 Type Pillar Fittings. If the sleeve holder is modified as shown in Table 20, ST-SA can still be applied for Super Type Pillar Fittings.

- The sleeve holder for Super 300 Type Pillar Fitting P Series has dual grooves on its flange (see Fig. 56).

<table>
<thead>
<tr>
<th>Nominal tube size</th>
<th>Millimeter size</th>
<th>Inch size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19</td>
<td>W6</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>W8</td>
</tr>
<tr>
<td>Sleeve holder</td>
<td>P-SHP-SAK19(W6)</td>
<td>P-SHP-SAK25(W8)</td>
</tr>
<tr>
<td>Tube holder</td>
<td>J-TH-A19</td>
<td>—</td>
</tr>
</tbody>
</table>

Table 20 - Parts for JT-SA

Fig. 56 - Sleeve holder
5-6 Using hand-held type room temperature insertion tool JT-SB (Nominal tube size: 6 - 12, W2 - W4)

1. Setting the sleeve
   - Install to insertion tool JT-SB the sleeve holder and then the sleeve as shown in Fig. 58 for the state before the diameter has been expanded.
   - After the sleeve has been set, push the diameter expansion ring toward the sleeve until it clicks (see Fig. 58 for the state after the diameter has been expanded and Table 22 for the applicable parts).

2. Clamping the tube
   - Fit the tube holder onto the tube having the union nut in place.
   - Lock the tube with the clamp at the shortest locking length shown in Table 21 or more (Fig. 59).

<table>
<thead>
<tr>
<th>Nominal tube size</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch size</td>
<td>W2, W2Y</td>
<td>-</td>
<td>W3, W3Y</td>
<td>W4</td>
</tr>
<tr>
<td>Tube locking length</td>
<td>20</td>
<td>23</td>
<td>25</td>
<td>30</td>
</tr>
</tbody>
</table>

3. Inserting the sleeve into the tube
   - Turn the grip clockwise to insert the sleeve into the tube (see Fig. 60).
   - Stop turning the grip when the tube end reaches the tube stop of the sleeve (see Fig. 5 and Fig. 6).
   - Turning the grip counterclockwise will move the sleeve holder backward and unlock the diameter expansion ring. Now the inserted tube sleeve can be removed from the sleeve holder (Fig. 61).

Caution:
   - Stop turning the grip clockwise when the tube end reaches the tube stop of the sleeve. Otherwise, damage to the tube, sleeve and/or sleeve holder may result.
Notes:

- The P-SHP-SBK** sleeve holder is provided with a diameter expansion ring at its end. If the diameter expansion ring becomes less secured, place an order for the diameter expansion ring only.

- Insertion tool JT-SB is an improvement of ST-SB for Super Type Pillar Fittings and can be used to insert "P series" Super 300 Type Pillar Fittings. If the sleeve holder is modified as shown in Table 22, ST-SB can still be applied for Super Type Pillar Fittings.

- The sleeve holder for Super 300 Type Pillar Fitting P Series has dual grooves on its flange (see Fig. 62).

<table>
<thead>
<tr>
<th>Millimeter size</th>
<th>Nominal tube size</th>
<th>W2</th>
<th>W2Y</th>
<th>W3</th>
<th>W3Y</th>
<th>W4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleeve holder</td>
<td>P-SHP-SBK6(W2)</td>
<td>P-SHP-SBK8</td>
<td>P-SHP-SBK10</td>
<td>P-SHP-SBK12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tube holder</td>
<td>J-TH-SB6</td>
<td>J-TH-SB8</td>
<td>J-TH-SB10</td>
<td>J-TH-SB12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inch size</th>
<th>Nominal tube size</th>
<th>W2</th>
<th>W2Y</th>
<th>W3</th>
<th>W3Y</th>
<th>W4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleeve holder</td>
<td>P-SHP-SBK6(W2)</td>
<td>P-SHP-SBKW2Y</td>
<td>P-SHP-SBKW3</td>
<td>P-SHP-SBKW3Y</td>
<td>P-SHP-SBKW4</td>
<td></td>
</tr>
<tr>
<td>Tube holder</td>
<td>J-TH-SBW2</td>
<td>J-TH-SBW3</td>
<td>J-TH-SBW4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5-7 Using hand-held type room temperature insertion tool JT-SB (Nominal tube size: 3, 4, W1)

1. Setting the sleeve
   - Install to insertion tool JT-SB the sleeve holder and then the sleeve as shown in Fig. 64 for the state before the diameter has been expanded.
   - After the sleeve has been set in place, lock the flare part at the end of the sleeve holder (see Fig. 64 for the state after fitting the flare part; and Table 24 for the applicable parts).

2. Clamping the tube
   - Select a suitable tube holder according to Table 24 and fix it to the JT-SB.
   - Open the clamp and lock the tube having the union nut in place to the tube holder at the shortest locking length shown in Table 23 or more (Fig. 65).

3. Expanding the tube diameter
   - Turn the grip clockwise to advance the screw and expand the tube end with the flare part. Repeat this step several times (Fig. 66).
   - After the diameter has been expanded, remove the flare part.

Notes:
- If the flare part is moved forward after the diameter has been expanded, the tube may be buckled. Upon the completion of diameter expansion, stop moving forward the flare part.
- If the flare part is difficult to remove, turn it. This will allow you to remove the flare part easily.

3. Inserting the sleeve into the tube
   - Turn the grip clockwise to insert the sleeve into the tube (see Fig. 67).
   - Stop turning the grip when the tube end reaches the tube stop of the sleeve (see Fig. 5. and Fig. 6).
   - Turning the grip counterclockwise will move the sleeve holder backward, allowing you to remove the inserted tube sleeve easily.
Caution:
- Stop turning the grip clockwise when the tube end reaches the tube stop of the sleeve. Otherwise, damage to the tube, sleeve and/or sleeve holder may result.

<table>
<thead>
<tr>
<th>Nominal tube size</th>
<th>3</th>
<th>4</th>
<th>W1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleeve holder</td>
<td>P-SH-SBK3</td>
<td>P-SH-SBK4</td>
<td>P-SH-SBKW1</td>
</tr>
<tr>
<td>Tube holder</td>
<td>J-TH-SB3</td>
<td>J-TH-SB4</td>
<td>J-TH-SBW1</td>
</tr>
</tbody>
</table>

Notes:
- The P-SH-SBK** sleeve holder is provided with a flare part ring at its end.
- Insertion tool JT-SB is an improvement of ST-SB for Super Type Pillar Fittings and can be used to insert “P series” Super 300 Type Pillar Fittings. If the sleeve holder is modified as shown in Table 24, ST-SB can still be applied for Super Type Pillar Fittings.
- The sleeve holder for Super 300 Type Pillar Fitting P Series has dual grooves on its flange (see Fig.68).
5-8 Using heat insertion tools PT-FH and PT-H (Nominal tube size: 6 - 25, W2 - W8)

- Devices required for heat insertion include an appropriate base (or grip), sleeve holder, flaring tool and a heat gun. (The sleeve holder and flaring tool for the S-300 have their flanges grooved.)

1. Preheating the tube

   - Using a heat gun, preheat the tube end portion of approx. 15 mm in length as evenly as possible while rotating it (see Fig. 71). (As a guideline, preheat the tube end portion for 10 to 15 seconds when the outlet temperature of hot air is set to approx. 450 °C (842 °F). Pay attention not to melt the tube.)

2. Flaring the tube end

   - Immediately after preheating, insert the heated tube into the flaring tool until it stops at the base as shown in Fig. 72, and hold the tube for approx. 10 seconds to cool it down.

3. Inserting the sleeve into the tube

   - Remove the tube from the flaring tool, and insert the tube onto the sleeve as shown in Fig. 73.

4. Heating the tube after insertion

   - Remove the tube from the sleeve holder and, using a heat gun, heat the portion marked with an asterisk (*) in Fig. 74, in order to ensure close contact of the tube with the sleeve.
Safety Notices

**Exercise great care to avoid a burn during the tube flaring process.**
The tube flaring process involves preheating of tubing.

**CAUTION**
**Maintain good ventilation during the tube flaring process.**
Preheating of tubing could generate toxic gases.

---

### Table 25 - Parts for heat insertion tool (6 - 25, W2 - W8)

<table>
<thead>
<tr>
<th>Millimeter size</th>
<th>Nominal tube size</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>19</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flaring tool</td>
<td>P-FH-6</td>
<td>P-FH-8</td>
<td>P-FH-10</td>
<td>P-FH-12</td>
<td>P-FH-19(W6)</td>
<td>P-FH-25(W8)</td>
<td></td>
</tr>
<tr>
<td>Base</td>
<td>SB-H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Grip)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat gun</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>JH-H</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inch size</th>
<th>Nominal tube size</th>
<th>W2</th>
<th>W2Y</th>
<th>W3</th>
<th>W3Y</th>
<th>W4</th>
<th>W8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleeve holder</td>
<td>P-SH-H6(W2)</td>
<td>P-SH-HW2Y</td>
<td>P-SH-HW3</td>
<td>P-SH-HW3Y</td>
<td>P-SH-HW4</td>
<td>P-SH-H25(W8)</td>
<td></td>
</tr>
<tr>
<td>Base</td>
<td>SB-H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grip</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(SG-H)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat gun</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>JH-H</td>
<td></td>
</tr>
</tbody>
</table>
5-9 Using flare insertion tools PT-FH and PT-H (nominal tube size: 3, 4, W1)

- Flaring the tube requires the base (or grip), sleeve holder, flaring tool, and tube holder (the sleeve holder and flare tool for the Super 300 Type Pillar Fitting have their flanges grooved).

**Note:** No heat gun is used to flare tubes of nominal sizes 3, 4, and W1.

---

1. **Clamping the tube**
   - Lock the tube to the tube holder referring to the dimension of Table 17 (see Fig. 77).

2. **Flaring the tube end**
   - Insert the tube into the flaring tool to flare it.
   - Inserting the tube several times will complete flaring it (see Fig. 78).

3. **Inserting the sleeve into the tube**
   - Insert the sleeve set onto the sleeve holder into the tube. This completes the insertion of the sleeve (see Fig. 79 and Fig. 80).

---

### Table 26 - Parts for flare insertion tool (3, 4, and W1)

<table>
<thead>
<tr>
<th>Nominal tube size</th>
<th>3</th>
<th>4</th>
<th>W1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleeve holder</td>
<td>P-SH-H3</td>
<td>P-SH-H4</td>
<td>J-SH-HW1</td>
</tr>
<tr>
<td>Flaring tool</td>
<td>P-FH-3</td>
<td>P-FH-4</td>
<td>J-FH-W1</td>
</tr>
<tr>
<td>Base</td>
<td>SB-H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Grip)</td>
<td>(SG-H)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tube holder</td>
<td>J-TH-C1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

![Fig. 75 - Parts used for flaring](image)

![Fig. 76 - Preparation for flaring](image)

![Fig. 77 - Clamping the tube](image)

![Fig. 78 - Flaring the tube](image)

![Fig. 79 - Inserting the sleeve](image)

![Fig. 80 - Completely inserted sleeve](image)
5-10 Outer dimensions of insertion tools

- Fig. 81 to Fig. 85 show the external dimensions of the insertion units.

Fig. 1. Outer dimensions of JT-A4

Fig. 82. Outer dimensions of JT-C3

Fig. 2. Outer dimensions of J-BP-C and J-BP-CS
Fig. 84. Outer dimensions of JT-SA, JT-SB

Fig. 85 - Outer dimensions of PT-FH and PT-H
Disposal Precautions

- When disposing of fittings or tubes:
- Be sure to wash the remaining liquid inside fittings or tubes and then dispose of them as incombustible waste.

Safety Notices

<table>
<thead>
<tr>
<th>Safety Notice</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAUTION</strong></td>
<td>Do not dispose of the fitting with a liquid residue remaining in it. Be sure to wash a liquid residue inside the fitting and then dispose of the fitting as incombustible waste. Disposal of the fitting without washing a liquid residue may be hazardous.</td>
</tr>
</tbody>
</table>

Do not incinerate fitting parts. Incineration of fluoro-resin parts will generate toxic smoke.

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