

SUPER 300 TYPE PILLAR FITTING
P SERIES
FOR 1-1/4" AND 1-1/2"

INSTRUCTION MANUAL

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.

PILLAR Nippon Pillar Packing Co., Ltd.

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Preface



Thank you very much for purchasing the P series Super 300 Type Pillar Fitting (for 1-1/4", 1-1/2"). 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.

 DANGER	A danger notice with this symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious personal injury.
 WARNING	A warning notice with this symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious personal injury.
 CAUTION	A caution notice with this symbol indicates a potentially hazardous situation which, if not avoided, may result in personal injury and/or property damage.

	This symbol indicates prohibition.
	This symbol conveys mandatory action or provides an instruction.

 WARNING	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.	
 CAUTION	Installation work	Never use the P series Super 300 Type Pillar fitting (for 1-1/4", 1-1/2") 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.	
	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 incombustible 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 (for 1-1/4", 1-1/2")

1-1 Structure

- The P series Super 300 Type Pillar Fitting (for 1-1/4", 1-1/2") consists of a body, sleeve, union nut and gauge ring.

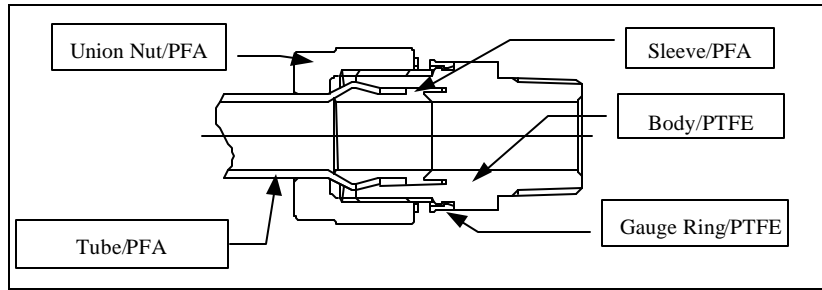


Figure 1. Structure of P series Super 300 Type Pillar Fitting (for 1-1/4", 1-1/2")

1-2 Specifications

- Applicable tube material : PFA,
- Applicable tube size : Table 1

Table 1. Applicable tube size

	O.D.(mm)× I.D.(mm)	Wall thickness (mm)	Tolerance	
			O.D.(mm)	Wall thickness (mm)
1-1/4"	f 31.8× f 28.0	1.9	± 0.25	± 0.15
1-1/2"	f 38.1× f 33.7	2.2		

- Max. working temperature : 200 °C (392°F)
- Max. working pressure : 0.7 MPaG (101.5psiG)
When the liquid temperature is 60°C (140°F or higher, the max. working pressure decreases by 0.032 MPaG (4.64psiG) every 10°C (18°F) increase in liquid temperature. See Figure 2 below.
- Permissible ambient temperature : -15 ? to +60? (5°F~ 140°F)

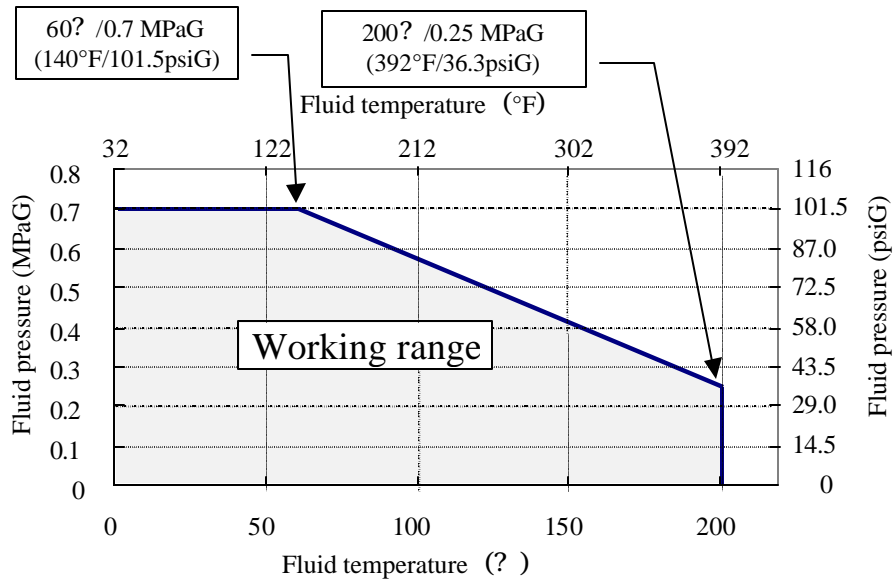


Figure 2. Specifications of P series Super 300 Type Pillar Fitting for 1-1/4", 1-1/2"

1-3 Handling precautions

- Use the P series Super 300 Type Pillar Fitting (for 1-1/4" and 1-1/2") for liquids only.
- To cut the tube, insert or tighten the sleeve, use or scrap the insertion tool, 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

1. Fully release the levers for the tube cutter (PTC-2) until the blade is opened.
2. As illustrated in Fig. 3, set a tube onto the tube cutter, grip the levers, and move forward the blade until it contacts with the outer surface of the tube.
3. Turn the tube while gripping the levers, so that the blade cuts into the tube. As illustrated in Fig. 4, ensure that the tube is turned until the blade reaches the inner surface of the tube.
4. As illustrated in Fig. 5, cut the tube by squeezing the levers until the blade closes completely.

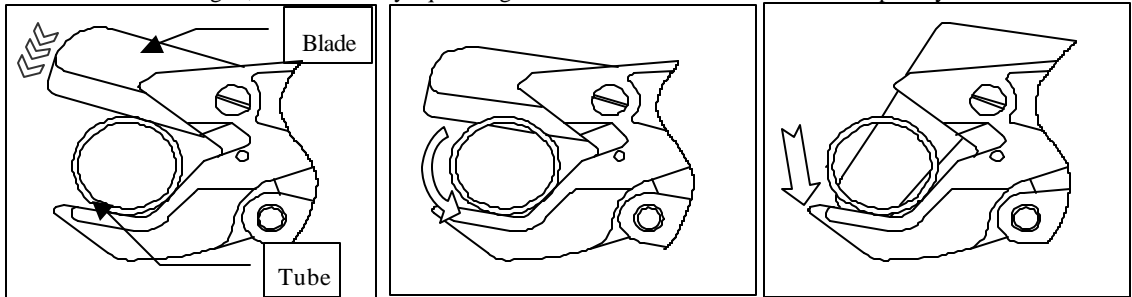


Fig. 3 Step 1 for cutting the tube

Fig. 4 Step 2 for cutting the tube

Fig. 5 Step 3 for cutting the tube

- 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 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 should be approx. 3%. (Tube length = Standard tube length x 1.03)
- If the tube is shorter than the standard cut length specified in Table 2, tensile force may be applied to the tube, resulting in leakage of the liquid.
- The tube should be cut vertically wherever practical.

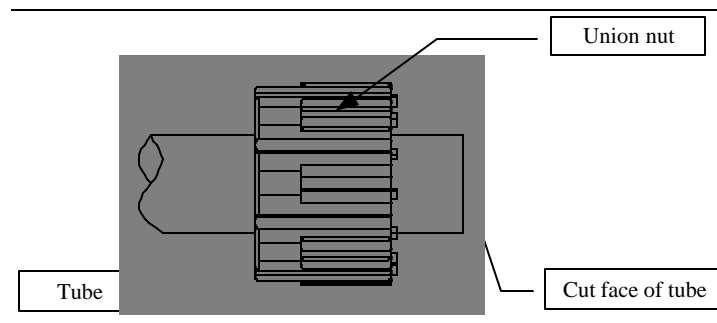


Figure 6. Direction of the union nut on the tube

Note: The union nut is direction sensitive (refer to Figure 6).

- The standard cut length means the length between bodies (Figure 7) plus the additional length .
- Choose the cut length according to the instructions shown above.

$$\text{Standard cut length} = \text{Length between fitting bodies} + \text{Additional length}$$

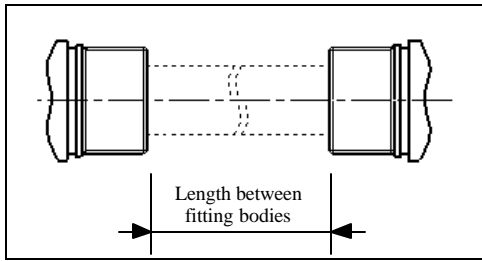


Figure 7 . Length between fitting bodies

Table 2. Standard cut length of tubes

	For 1-1/4"	For 1-1/2"
Tube size, OD × ID (mm)	f 31.8 × f 28.0	f 38.1 × f 33.7
Minimum length between fitting bodies (mm)	49	51
Additional length (mm)	56	61
Minimum cut length (mm)	105	112

Notes:

- **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 × 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 × 1.03)**

2-2 Inserting the sleeve into the tube

- Use the insertion tool shown in Table 3 to insert the sleeve of the P series Super 300 Type Pillar Fitting (for 1-1/4" and 1-1/2") into the tube.
For details on how to insert the sleeve into the tube using insertion tool, refer to Chapter 4.

Table 3. Applicable insertion tool

Tool type	Tube size OD × ID (mm)	Reference page
PT-E1	f 31.8 × f 28.0, f 38.1 × f 33.7	8

- Insert the sleeve into the tube using the above insertion tool.
- Stop inserting the sleeve into the tube when the tube reaches the tube stop of the sleeve. (Figure 8)
- Excessive force may deform the tube.

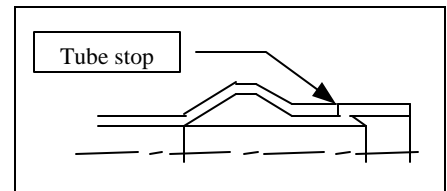


Figure 8. Completion of insertion

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. (Figure 9, Table 4)
The gap to this extent will cause no trouble.

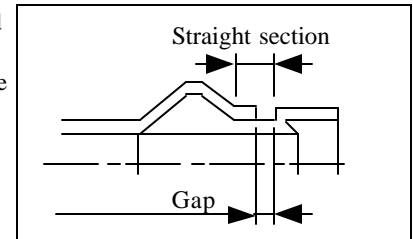


Figure 9. Sleeve straight section

Table 4. Recommended gap after insertion

	For 1-1/4"	For 1-1/2"
Tube size, OD × ID (mm)	f 31.8 × f 28.0	f 38.1 × f 33.7
Recommended gap after insertion (mm)	6.1 (max.)	7.2 (max.)

3 Tightening

3-1 Wrench exclusively for tightening

- To tighten the P series Super 300 Pillar Fitting (for 1-1/4" or 1-1/2"), use the dedicated wrench (see Table 5).

Table 5 Dedicated wrenches

	For 1-1/4"	For 1-1/2"
Tube size O.D.(mm) × I.D.(mm)	f 31.8 × f 28.0	f 38.1 × f 33.7
Dedicated wrench	P-SN-32	P-SN-38

3-2 Structure and function of gauge ring

- The P Series Super 300 Type Pillar Fitting (for 1-1/4", 1-1/2") is provided with a gauge ring to facilitate controlling the tightening range and limit, thereby ensuring safe and proper tightening (Figure 10).
- 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.

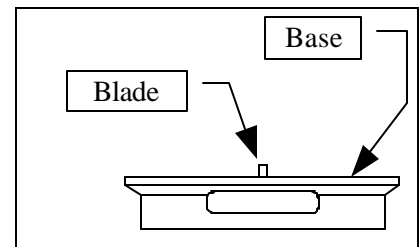


Fig. 10 Shape of gauge ring

3-3 Initial tightening

- Insert the tube into which the sleeve has been press-fit, 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 (Figure 8).

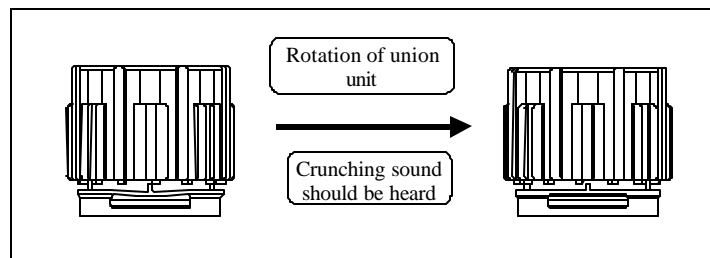


Figure 11. Initial tightening

3-4 Installing the cap sleeve

- 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.

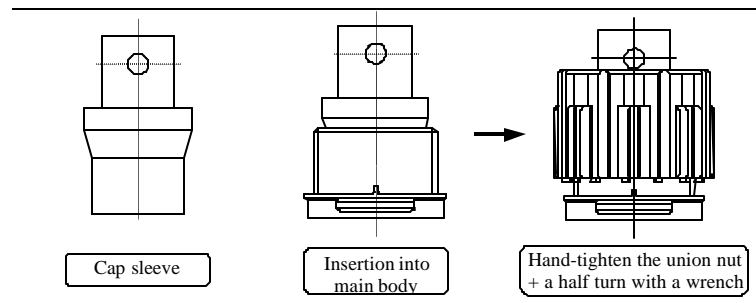


Figure 12. Installing the cap sleeve

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).

3-5 Removing and reinstallation

- 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.

Note: In removing the fitting, circularly move the tube like first drawing small circles and then gradually drawing larger circles (Figure 10). If you greatly twist the tube to left or right or if you circularly moves the tube like suddenly drawing large circles, then only the sleeve may remain on the main body, hindering you from retightening the tube.

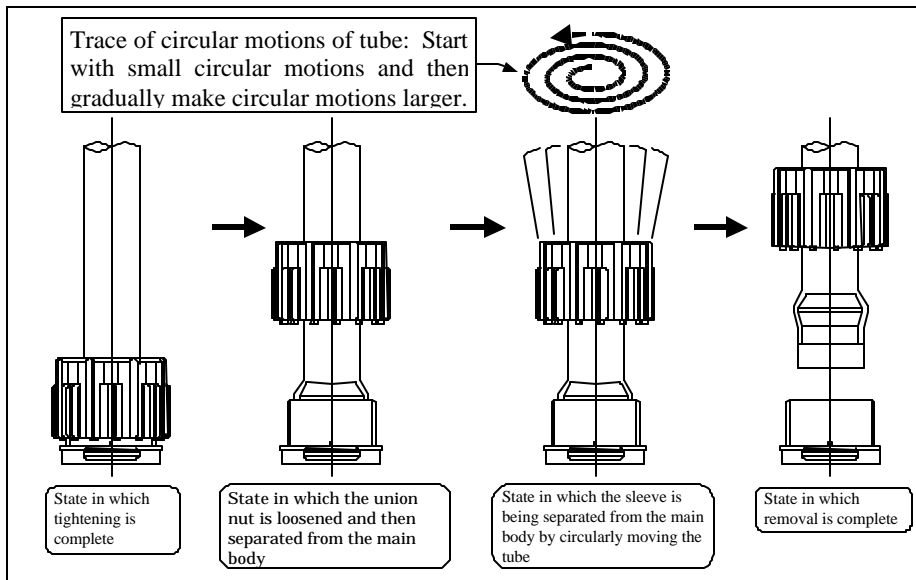


Figure 13. How to remove P series Super 300 Type Pillar Fitting (for 1-1/4", 1-1/2")

When reusing the removed fitting:





- Do not disconnect the inserted 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.

Notes:

- 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.

3-6 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 (0psiG) ; 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		
 CAUTION	<p>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.</p>	
	<p>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).</p>	
	<p>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.</p>	

4 How to Use Insertion Tools

4-1 Using the PT-E1

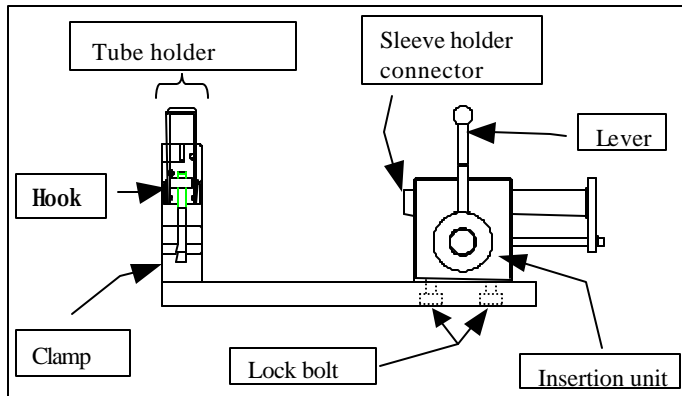


Fig. 14 Parts designation of PT-E1

1. Setting the sleeve

- Connect the sleeve holder to insertion tool PT-E1 and then set the sleeve on the holder.
- After setting the sleeve, connect the flare part to the sleeve holder from the front (see Fig. 15; for applicable parts, see Table 7).

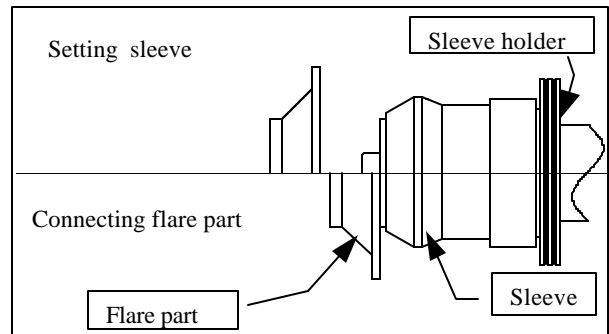


Fig. 15 Setting sleeve/flare part

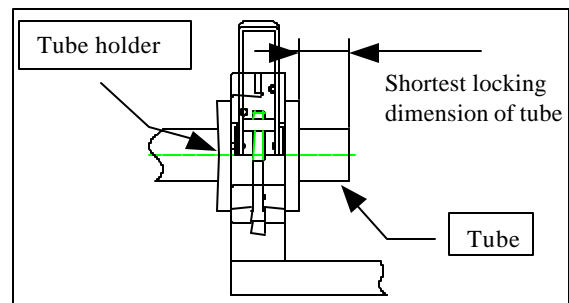


Fig. 16 Shortest dimension to retain the tube

2. Fixing the tube

- Loosen the locking bolt at the lower part of the insertion unit to make the insertion unit free to move.
- Open the clamp by unhooking the tube holding part. Set the tube holder (see Table 7 for applicable tube holders) and insert the tube.
- Using the clamp, lock the tube with the union nut passing through it, so that at least the shortest locking dimension of the tube shown in Table 6 is met (Fig. 16).
- Lock the insertion unit in the position where there is clearance of approx. 3 to 4 mm between the tube end and the flare part (see Fig. 17).

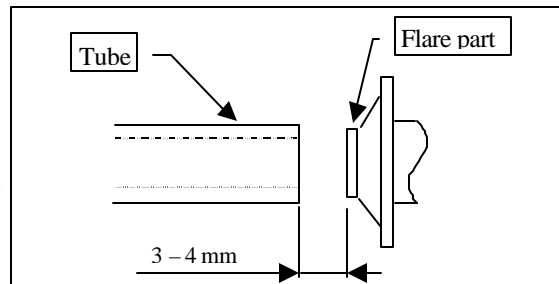


Fig. 17 Position to lock the insertion unit

Table 6. Shortest locking dimension of tube

	For 1-1/4"	For 1-1/2"
Tube size O.D.(mm) × I.D.(mm)	f 31.8 × f 28.0	f 38.1 × f 33.7
Shortest locking dimension of tube	37	40

3. Inserting the sleeve into the tube

- Move the lever forward to flare the tube (see Fig. 18).
- Remove the flare part from the sleeve holder and then move the lever forward again until the tube is inserted to the stop (see Fig. 19).

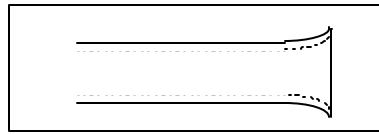


Fig. 18 Tube after being flared

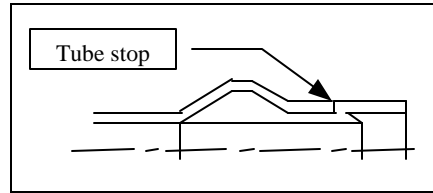


Fig. 19. Completion of press-fitting

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. Back the lever when the tube is inserted in place.

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. (Tips: Previously cut the tube to slightly longer length, insert the sleeve into one end of the tube, and then cut the tube to the necessary length.)
- After inserting the sleeve into one end of the tube, open the clamp to remove the tube.
- Loosen the lock bolt at the bottom of the insertion unit, and lock the insertion unit so that the piping is formed as illustrated in Fig. 20.
- Pass the union nut through the tube. Set the inserted sleeve onto the sleeve holder for a short tube and retain the sleeve holder to the tube holder.
- Move the lever forward. After the tube has been flared, remove the flare part and move forward the lever again. Now insertion has been completed.

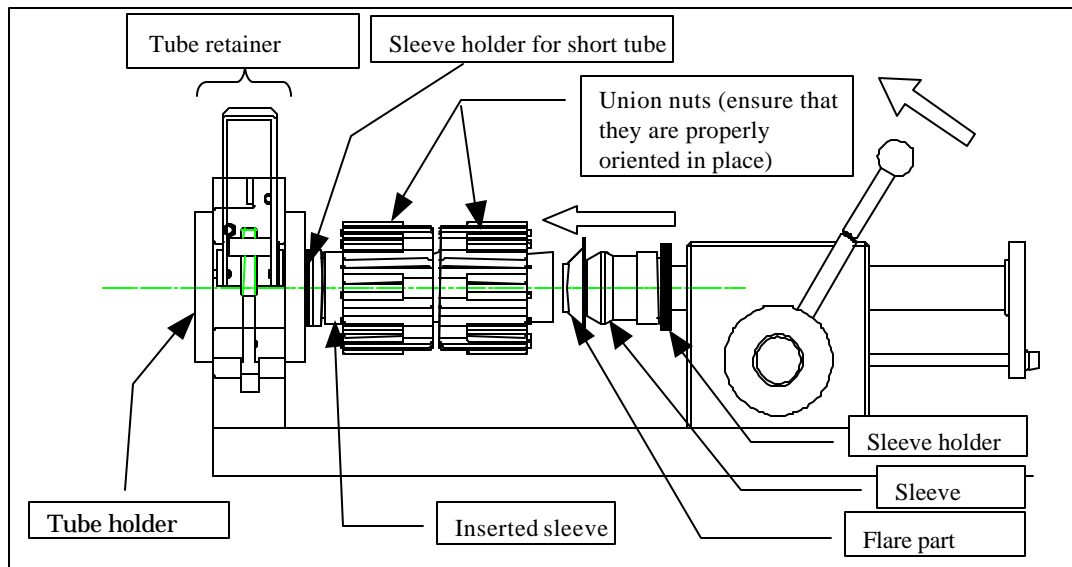


Fig. 20 Parts arrangement

Table 7. Tube and sleeve holders for PT-E 1

Tube size O.D.(mm) × I.D.(mm)	For 1-1/4"	For 1-1/2"
	f 31.8 × f 28.0	f 38.1 × f 33.7
Sleeve holder	P-SH-EKW10	P-SH-EKW12
Tube holder	P-TH-EW10	P-TH-EW12
Sleeve holder for short tubes	P-SH-EW10S	P-SH-EW12S

4-2 Outer dimensions of insertion tool

Figure 21 shows the external dimensions of the insertion tool of PT-E1.

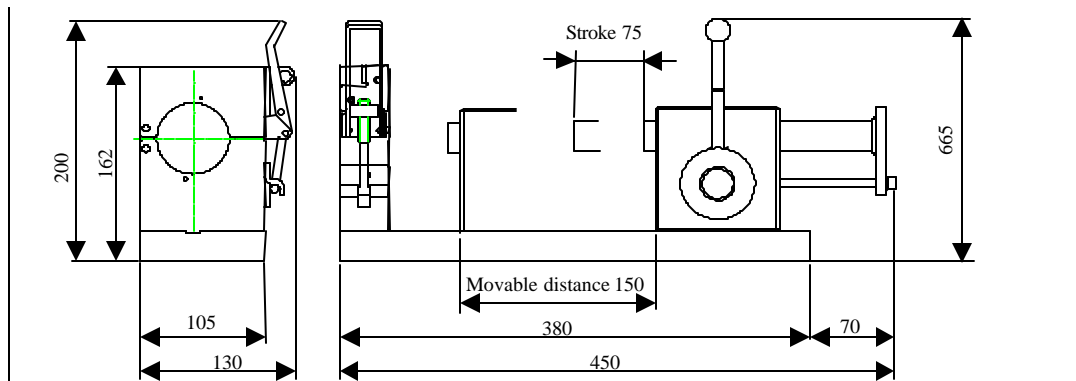





Fig. 21 External dimensions of PT-E1

5 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		
 CAUTION	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.	
	Do not incinerate fitting parts. Incineration of fluoro-resin parts will generate toxic smoke.	

6 Office Locations

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