

Sleeve Insertion Tool JT-SA-KA

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 日本ピラー工業株式会社

Table of Contents

Preface and Safety Notices	2
1. Inserting sleeve into $\phi 19$ - 25/W6 - W8 standard tubes.....	3
2. Inserting sleeve into $\phi 6$ - 12/W2 - W4 standard tubes.....	5
3. Inserting sleeve into 0.25" x 0.12" color tube and $\phi 3/\phi 4$ /W1 standard tubes	7
4. Tightening (Nominal tube size: 6 - 25, W2 - W8, Color tube)	9
5. Tightening (Nominal tube size: 3, 4, W1).....	11
6. Dimensional tolerance of applicable tubes	14
7. Disposal Precautions	15
8. Office Locations	15




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.

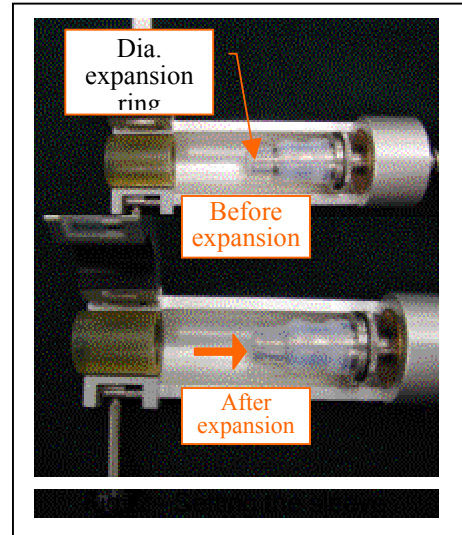
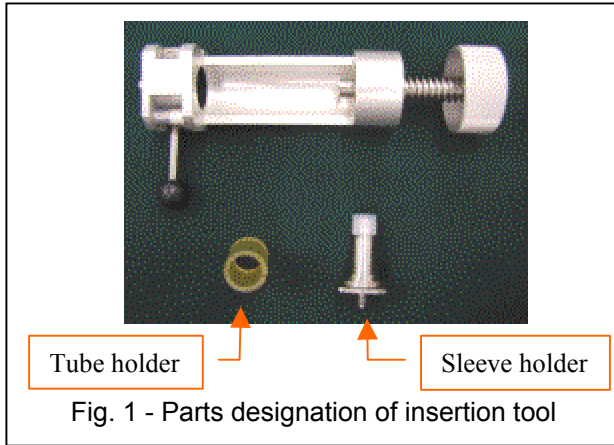
 DANGER	A danger notice with this symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious personal injury.
 WARNING	A warning notice with this symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious personal 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 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.	
	Disposal	Maintain good ventilation during the tube flaring process. Preheating of tubing could generate toxic gases.	
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. Inserting sleeve into $\phi 19 - 25/W6 - W8$ standard tubes



1. Setting the sleeve

- Install the sleeve holder to the insertion tool JT-SA- KA and then set the sleeve as shown in Fig. 2 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. 2 for the state after the diameter has been expanded and Table 1 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 2 or more (see Fig. 3).

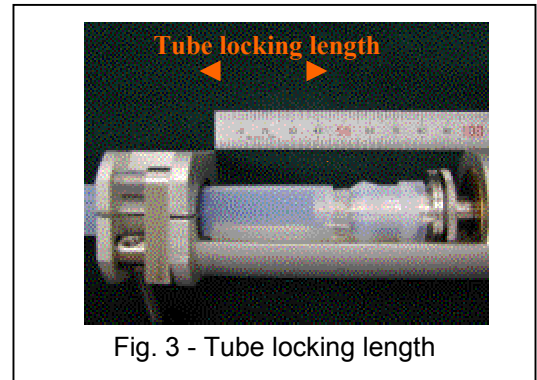
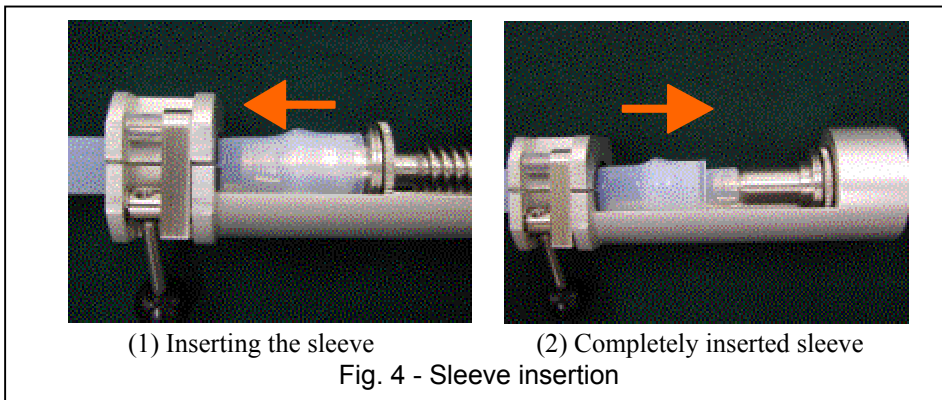


Table 2 - Tube locking length

Millimeter size	Nominal tube size	
	19	25
Inch size	W6	W8
Tube locking length	35	41

3. Inserting the sleeve

- Turn the grip clockwise to insert the sleeve into the tube (see Fig. 4 (1)).
- Stop turning the grip when the tube end reaches the tube stop of the sleeve (see Fig.4 (1)).
- 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. 4 (2)).



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

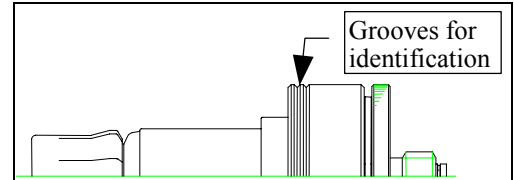
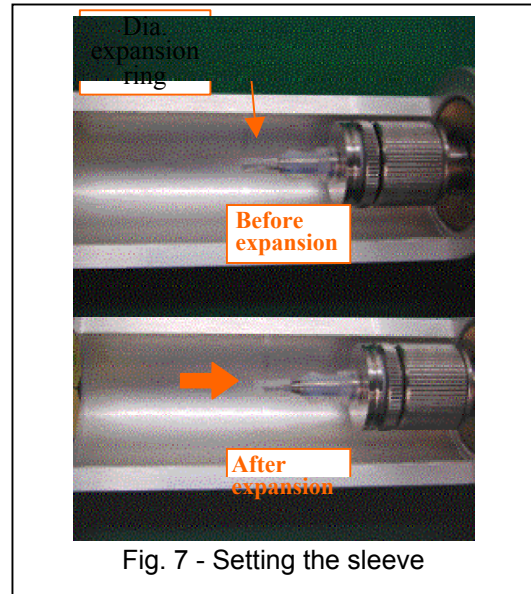
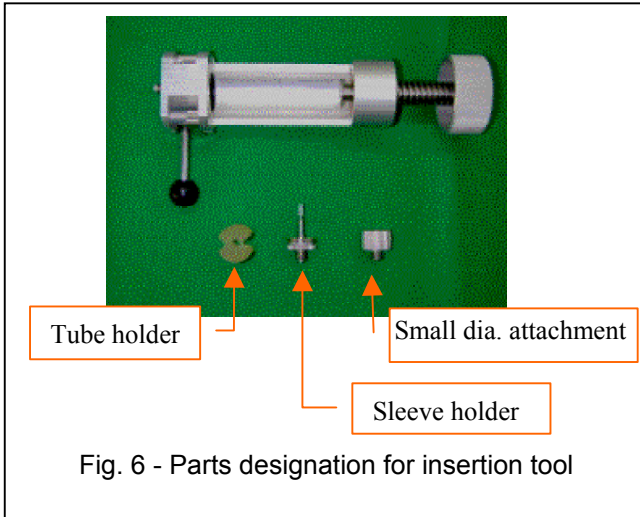


Fig. 5 - Sleeve holder

Table 1 - JT-SA-KA parts list

	Nominal tube size	
Millimeter size	19	25
Inch size	W6	W8
Sleeve holder	P-SHP-SAK19(W6)	P-SHP-SAK25(W8)
Dia. expansion ring	P-KR-A19(W6)	P-KR-A25
Tube holder	J-TH-A19	—

2. Inserting sleeve into $\phi 6 - 12/W2 - W4$ standard tubes



1. Setting the sleeve

- Install the sleeve holder and the attachment to the insertion tool JT-SA-KA and then set the sleeve as shown in Fig. 7 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. 7 for the state after the diameter has been expanded and Table 3 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 4 or more (see Fig. 8).

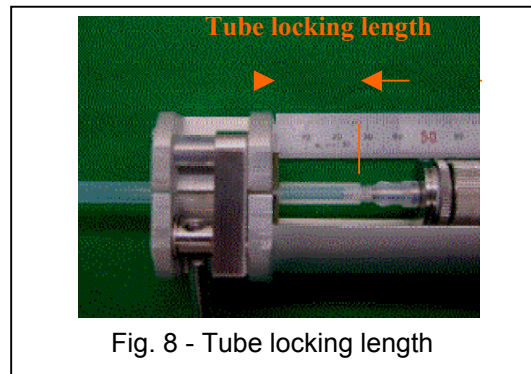
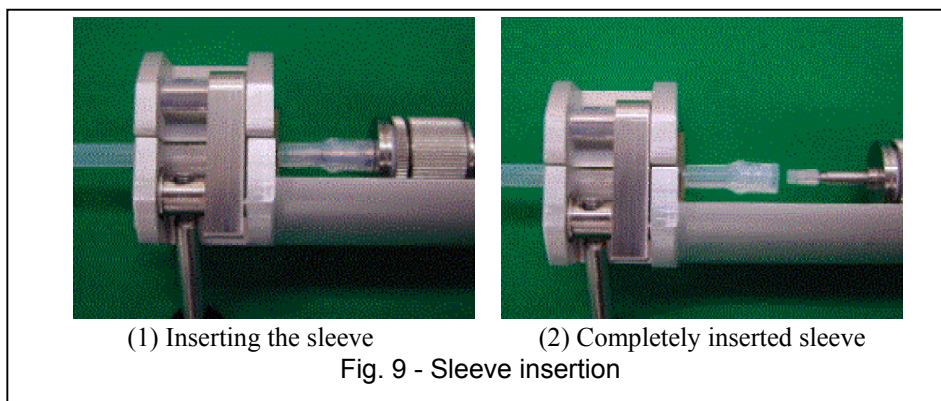


Table 4 - Tube locking length

	Nominal tube size			
Millimeter size	6	8	10	12
Inch size	W2 W2Y	-	W3 W3Y	W4
Tube locking length	20	23	25	30

3. Inserting the sleeve

- Turn the grip clockwise to insert the sleeve into the tube (see Fig. 9 (1)).
- Stop turning the grip when the tube end reaches the tube stop of the sleeve (see Fig.9 (1)).
- 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. 9 (2)).



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.
- The sleeve holder for Super 300 Type Pillar Fitting P Series has dual grooves on its flange (see Fig. 10).

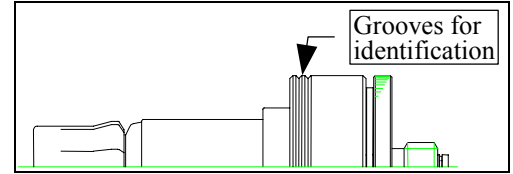


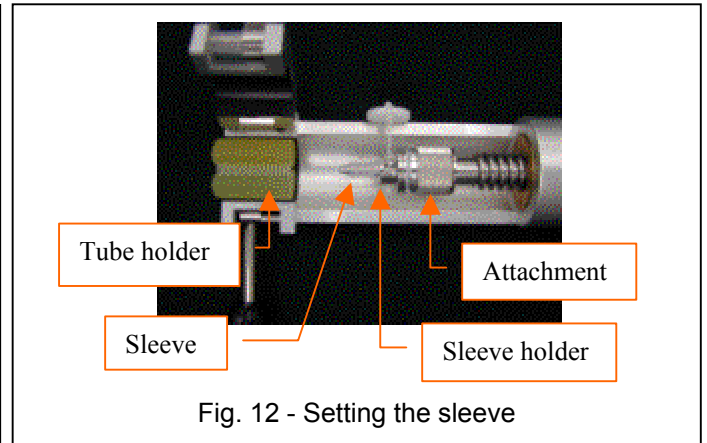
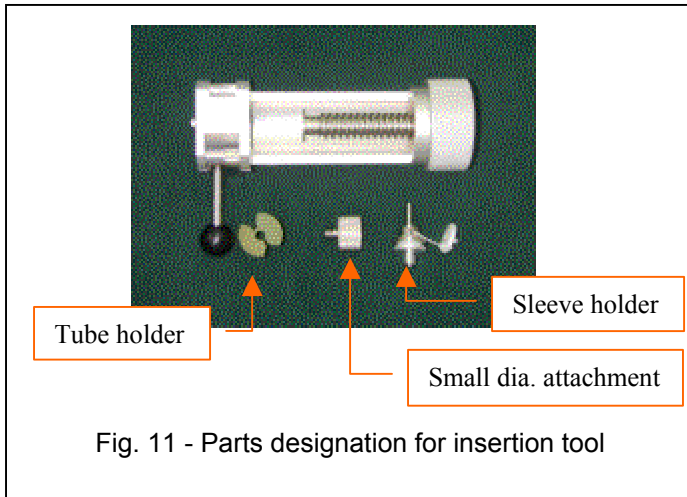
Fig. 10 - Sleeve holder

Table 3 - JT-SA-KA parts list (6 - 12, W2 - W4)

Millimeter size	Nominal tube size			
	6	8	10	12
Sleeve holder	P-SHP-SBK6(W2)	P-SHP-SBK8	P-SHP-SBK10	P-SHP-SBK12
Dia. expansion ring	P-KR-C6(W2)	P-KR-C8	P-KR-A10	P-KR-A12
Tube holder	J-TH-SB6	J-TH-SB8	J-TH-SB10	J-TH-SB12
Attachment	SA-SB-AT			

Inch size	Nominal tube size				
	W2	W2Y	W3	W3Y	W4
Sleeve holder	P-SHP-SBK6(W2)	P-SHP-SBKW2Y	P-SHP-SBKW3	P-SHP-SBKW3Y	P-SHP-SBKW4
Dia. expansion ring	P-KR-C6(W2)	P-KR-CW2Y	P-KR-AW3	P-KR-AW3Y	P-KR-AW4
Tube holder	J-TH-SBW2		J-TH-SBW3		J-TH-SBW4
Attachment	SA-SB-AT				

3. Inserting sleeve into 0.25" x 0.12" color tube and $\phi 3/\phi 4/W1$ standard tubes

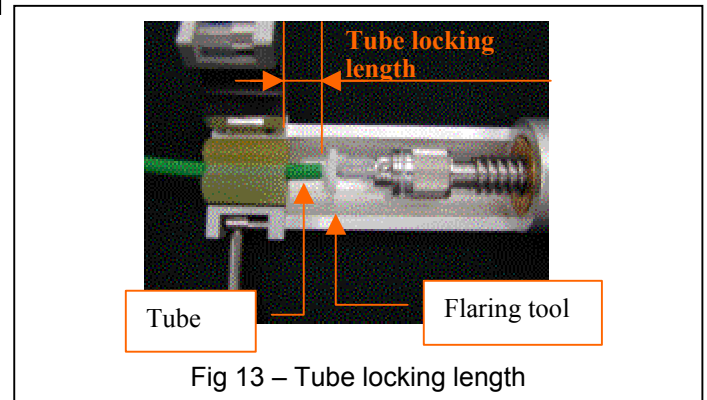


1. Setting the sleeve

- Install the sleeve holder and the attachment to the insertion tool JT-SA-KA, and then set the sleeve (see Fig. 12 for the state before fitting the flaring tool; and Table 5 for the applicable parts).

2. Clamping the tube and setting the flaring tool

- Install to insertion tool JT-SA-KA the tube holder.
- 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 6 or more (see Fig. 13).
- Install the flaring tool to the tip of the sleeve holder (see Fig. 13).

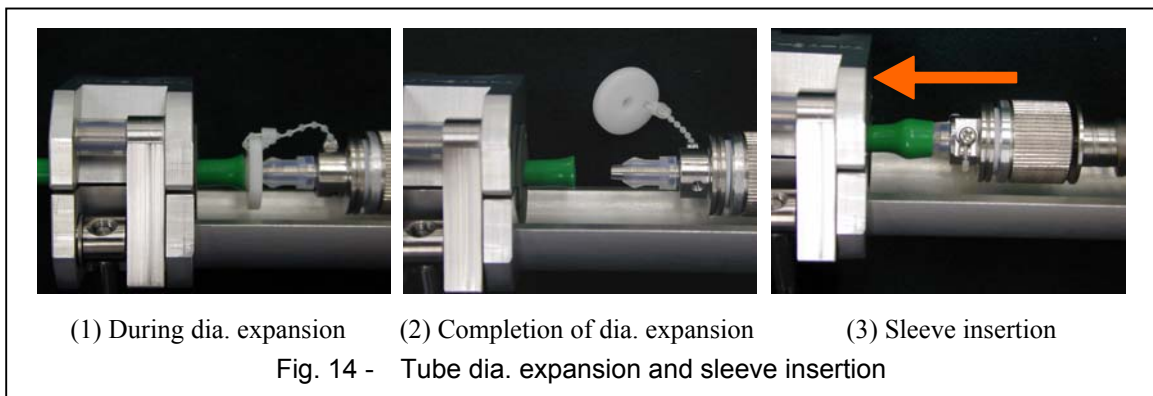


3. Expanding the tube diameter and inserting the sleeve

- Turn the grip clockwise to advance the screw and expand the tube end with the flaring tool. Repeat this step several times (see Fig. 14 (1)).
- After the diameter has been expanded, remove the flaring tool (see Fig. 14 (2)).
- Turn the grip clockwise to insert the sleeve into the tube (see Fig. 14 (3)).
- Stop turning the grip when the tube end reaches the tube stop of the sleeve (see Fig. 14 (3)).
- Turning the grip counterclockwise will move the sleeve holder backward, allowing you to remove the inserted tube sleeve easily.

Fig. 6 - Tube locking length

	Nominal tube size		
	Millimeter size	3	4
Inch size	W1	-	Color tube (0.25"×0.12")
Tube locking length	11	12	20



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:

- If the flaring tool is moved forward after the diameter has been expanded, the tube may be buckled. Upon the completion of diameter expansion, stop moving forward the flaring tool.
- If the flaring tool is difficult to remove, turn it. This will allow you to remove the flaring tool easily.
- The P-SH-SBK** sleeve holder is provided with a flaring tool at its end.
- The sleeve holder for Super 300 Type Pillar Fitting P Series (excluding for color tubes) has dual grooves on its flange (see Fig. 68).

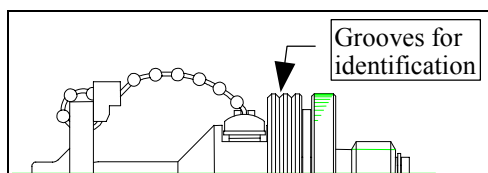


Fig. 15 - Sleeve holder

Table 5 - JT-SB parts list (3, 4, W1, Color tube)

	Nominal tube size			
	3	4	W1	Color tube (0.25"×0.12")
Sleeve holder	P-SH-SBK3	P-SH-SBK4	P-SH-SBKW1	J-SH-SKA6(W2)
Tube holder	J-TH-SB3	J-TH-SB4	J-TH-SBW1	J-TH-SBW2
Attachment	SA-SB-AT			

4. Tightening (Nominal tube size: 6 - 25, W2 - W8, Color tube)

4-1. Structure and function of gauge ring (Nominal tube size: 6 - 25, W2 - W8, Color tube)

- 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. 16).

- **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.

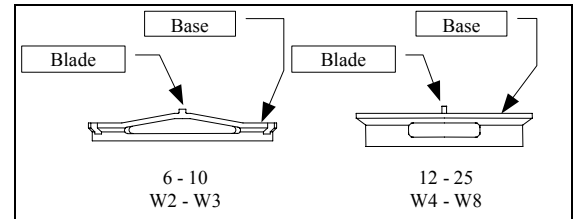


Fig. 16 - Shapes of gauge rings

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.

4-2. 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. 22).
- The use of the dedicated spanner allows you to more efficiently tighten the union nut (see Fig. 23 and Table 9).

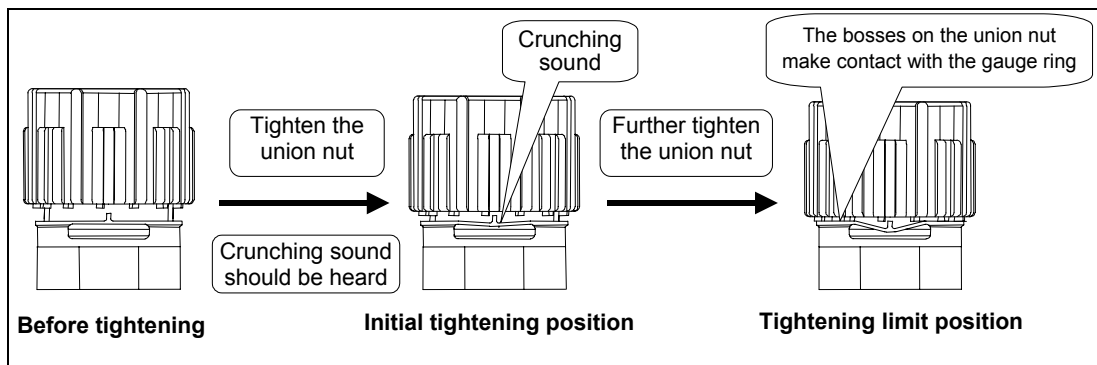


Fig. 17 - Initial tightening

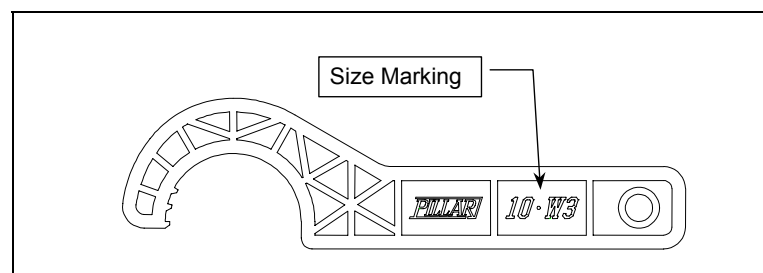


Fig. 18 – Spanner for tightening the union nut

Table 7 - Spanner type

	Nominal tube size					
Millimeter size	6	8	10	12	19	25
Inch size	W2, W2Y	-	W3, W3Y	W4	W6	W8
Spanner type	J-SN-6	J-SN-8	J-SN-10	J-SN-12	J-SN-19	J-SN-25
Size marking	6-W2	8	10-W3	12-W4	19-W6	25-W8

* Use type J-SN-6 spanner for color tube.

4-3. Removing and reinstallation (Nominal tube size: 6 - 25, W2 - W8, Color tube)

- 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 union nut so far as hand tightening is possible.**

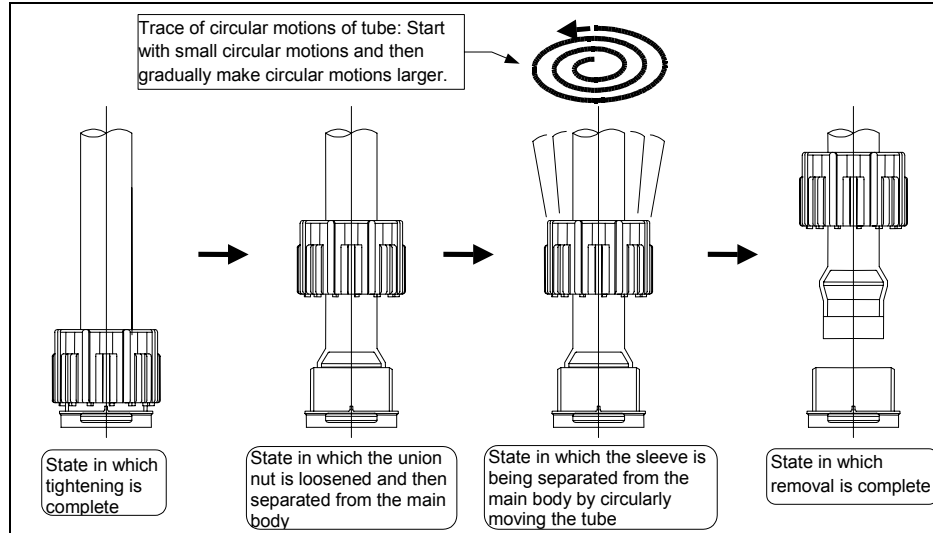






Fig. 19 - How to remove P series Super 300 Type Pillar Fitting (6 - 25, W2 - W8, Color tube)

Notes:

- In removing the fitting, circularly move the tube like first drawing small circles and then gradually drawing larger circles (see Fig. 10). 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.

4-4. Measures against liquid leakage (Nominal tube size: 6 - 25, W2 - W8, Color tube)

- 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		
 CAUTION	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.	
	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).	
	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.	

5. Tightening (Nominal tube size: 3, 4, W1)

**** Due to extremely small geometry, 3, 4mm and W1 (1/8") fittings do not employ the integral gauge-
ring design used on all larger Super 300 fittings.**

5-1. Cautions in tightening the union nut (Nominal tube size: 3, 4, W1, Color tube)

- 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) A Type Applies to straight type (other than the fittings shown in table 8) injection-molded fittings and machined PTFE fittings (see Fig. 20).
 - 4) B Type Applies to injection-molded fittings of elbow and Tee type (see Fig. 20).

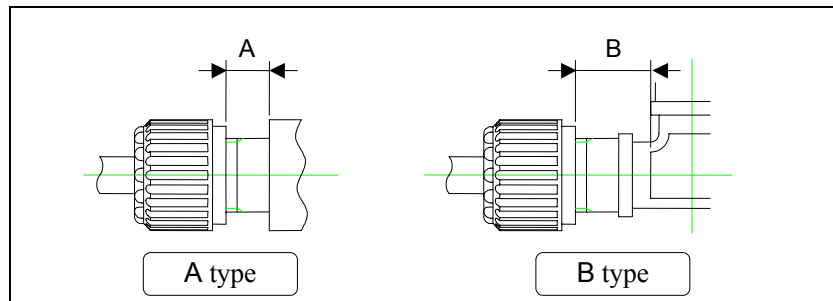


Fig. 20 - Gaps as criterion for tightness check (3, 4, W1)

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-UE-4B P-RUE 4-3B	P-UT-3B P-UT-4B P-RUT 4-3-4B P-RUT 3-4-3B
Combination of fitting and taper thread (Notes 1, 2)	P-ME 3-1B P-ME 3-2B P-ME 4-1B P-ME 4-2B	P-MBT 3-1B P-MBT 3-2B P-MBT 4-1B 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 5-2.

5-2. 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. 21.

(1) Checking the gap for upper limit:

As shown in Fig. 8, 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.

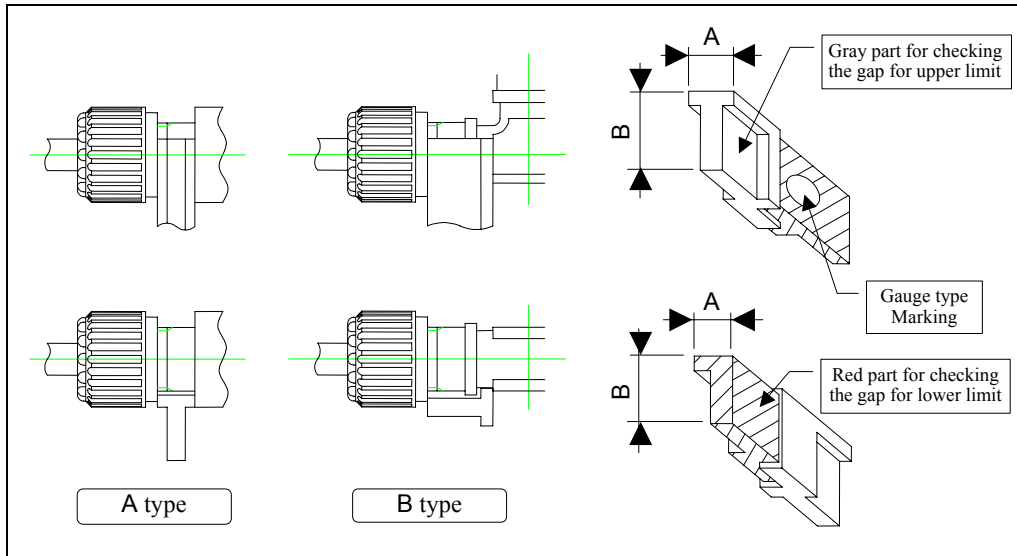


Fig. 21 - How to use gap gauge (3, 4, W1)

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

Gap gauge type	Nominal tube size	
	Millimeter size	Inch size
SSG-3(W1)	3	W1
SSG-4	4	-

Notes:

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

5-3. 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.

5-4. 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.**

5-5. Measures against liquid leakage (Nominal tube size: 3, 4, W1)

- 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		
 CAUTION	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.	
	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).	
	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.	

6. Dimensional tolerance of applicable tubes

- Table 10 shows the inside and outside diameters of nominal size tubes and their dimensional tolerances.
- Table 11 shows the inside and outside diameters of the color tube.

Table 10 - Dimensional tolerances of nominal size tubes




		Units of inside/outside diameter and tolerance in mm								
Millimeter size	Nominal	3	4	6	8	10	12	19	25	
		O.D.×I.D.	3×2	4×3	6×4	8×6	10×8	12×10	19×15.8	25×22
		O.D. tolerance	±0.1	±0.1	±0.1	±0.12	±0.12	±0.12	±0.12	±0.2
		Thickness tolerance	±0.05	±0.05	±0.06	±0.06	±0.06	±0.06	±0.1	±0.1
Inch size	Nominal	W1		W2		W3	W4	W6	W8	
		O.D.×I.D.	3.18×2.18		6.35×3.95		9.53×6.33	12.7×9.5	19×15.8	25.4×22.2
		O.D. tolerance	±0.1		±0.1		±0.12	±0.12	±0.12	±0.2
		Thickness tolerance	±0.05		±0.1		±0.1	±0.1	±0.1	±0.1
Inch size (Thin wall)	Nominal			W2Y		W3Y				
		O.D.×I.D.			6.35×4.35		9.53×7.53			
		O.D. tolerance			±0.1		±0.12			
		Thickness tolerance			±0.1		±0.1			
Remarks:		<ul style="list-style-type: none"> • Body: in common use with Super Type Pillar Fitting • Nut: in common use with Super Type Pillar Fitting • <u>Sleeve: dedicated for P Series Super 300 Type Pillar Fitting</u> 			<ul style="list-style-type: none"> • Body: in common use with J Series Super 300 Type Pillar Fitting • <u>Nut: dedicated for P Series Super 300 Type Pillar Fitting</u> • <u>Sleeve: dedicated for P Series Super 300 Type Pillar Fitting</u> 					

Table 11 - Inside and outside diameter of color tube

	Color tube
O.D.×I.D.	6.35×3.15

7. 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.	

8. Office Locations

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