Safety Precautions

Always read this section before use.

Design & selection

⚠WARNING

■ Use the product within specifications.
Using this product with fluid other than compressed air or at a pressure or temperature exceeding the specifications could result in rupture, the tube coming off, or leakage.

■ Avoid installing this product outdoors or where it is exposed to direct sunlight.

■ Do not use the normal fitting if electrostatic discharge could build up. Otherwise system faults or failure could occur. An antistatic fitting and antistatic tubing should be used in such a case.

■ Do not constantly push down or apply a load onto the push-ring of the push-in fitting.
- The tube may lose its ability to hold.
- When transporting an assembled product, avoid positions in which the push ring is constantly pressed down.

⚠CAUTION

■ Confirm that the product withstands the working environment.
- This product cannot be used in environments where functional obstacles could occur.
Such environments include high temperature, chemical atmosphere, or where chemical, vibration, moisture, water drip or gas is present. Environment where ozone is generated. Outdoors or where the product could be subject to direct sunlight; or where cutting oil, coolant, or spatter could occur or where static electricity could pose a problem.

■ Contact CKD if ozone could occur in supplied air. (Ozone proof products are available.)

■ Avoid using this product in hot or humid places, or where it could be subject to direct sunlight. Install this product where the temperature is 40˚C or less.

■ Flame-resistant resin (equivalent to UL94 Standard V-O) is provided for GW Series' push ring, but not for GWJ Series.
Check specifications when selecting the product.

Mounting / Installation / Adjustment

⚠WARNING

■ Securely insert the tube until it contacts the fittings tube end, and check that it does not come off the fitting.

■ Stop air flow and confirm that there is no residual pressure before replacing the tube.

Piping

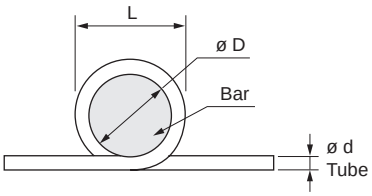
⚠CAUTION

■ Observe the following precautions when using nylon tubes or urethane tubes for piping material.
- Use the designated tube and CKD's plastic plug (GWP Series). Do not use metal plugs as they may cause problems.
Tube outer diameter precision
· Polyamide tube ·····Within ±0.1 mm
· Polyurethane tube (to ø6) ·····Within ±0.1 mm
(ø8 to) ·····Within $^{+0.1}_{-0.15}$ mm
Use a tube with hardness of 92˚ and over. If a tube that does not satisfy diameter accuracy or hardness is used, chucking force may drop or the tube may come off or be difficult to insert.
Contact CKD when using a non-designated tube or plug.
- Use a flame resistant tube or metal pipe where spatter could occur.
- When using the standard push-in fitting on the spiral tube, fix the base of the tube with a hose band. Otherwise rotation occurs, causing a reduction in holding force.
- Cut the tube at a right angle with a dedicated cutter.
- Prevent the tube from being worn or damaged during use. Otherwise the tube may break or rupture.
- Do not reuse a tube as it could be deteriorated and deformed once used.
- Do not let the tube directly contact other surfaces, it could wear and break.

■ Do not use this product for applications that constantly rotate, oscillate or which have a tube that moves vigorously.
- The elbow can be mounted by turning it, but must not be used for constant rotating or oscillating applications. Fittings could be damaged.
- Provide sufficient allowance in the tube so that it does not bent sharply.

■ Observe the min. installation radius and do not bend the tube sharply.
- Consider changes in tubing length caused by pressure when connecting tubing, and provide sufficient length of the tubing min. installation radius or over.
- Measuring method

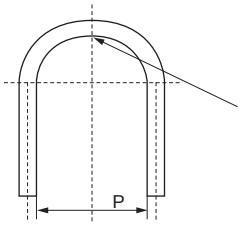
(1) Min. bending radius (JIS B 8381)
The values are based on JIS B 8381.
If tube is tightly wound around a bar, indicate the bar radius when deformation ratio η reaches 25%.



$$\eta = \left(1 - \frac{L-D}{2d}\right) \times 100$$

η: Deformation ratio (%)
d: Tube outer diameter (mm)
L: Measuring volume (mm)
D: Bar diameter (mm)
(2 times of min. bending radius)

(2) Min. installation radius
To measure, simply bend the tube and confirm the radius when tube diameter deformation is 10%.



Shall be the min. mounting pitch P when the deformation rate is 10%.
Min. installation radius = P/2

■ Always flush just before piping pneumatic component.
- Any foreign matter that has entered during piping must be removed so it does not enter the pneumatic component. Remove all swarf and foreign matter generated during piping and tube insertion before use.

■ When supplying compressed air for the first time after connecting pipes, do not apply high pressure suddenly.
- Piping connection could be dislocated or the piping tube jump about leading to accidents.

■ After connecting pipes, check pipe connections for air leaks before supplying compressed air.
- Apply a leakage detection agent on pipe connections with a brush, and check for air leaks.

■ Use proper torque to tighten the pipes when connecting them.
- Using an appropriate torque can prevent air leakage and screw damage. First tighten the screw by hand to prevent threads from being damaged, then use a tool. Check that the tool's hexagon face and wrench are the correct size.

(Reference value)

Port thread	Tightening torque N·m
M3	0.3 to 0.6
M5	1.0 to 1.5
Rc1/8	3 to 5
Rc1/4	6 to 8
Rc3/8	13 to 15
Rc1/2	16 to 18

* The above values apply when the matching screw is a JISB0203 tapered female thread for piping (material: C3604BD).

■ Connect piping so that connections are not dislocated by system movement, vibration, or tension, etc.
- Control of actuator speed will be disabled if piping on the exhaust face of the pneumatic circuit is disengaged.
- When using the chuck holding mechanism, the chuck will be released creating a hazardous state.
- Confirm that the tube has been inserted properly, and make sure that there is no tension during use. The tube could be dislocated or damaged if there is any tension.

■ Make sure that the fitting and tube are not twisted or pulled, and that moment load is not applied.

■ Do not tighten while pressure is applied.

■ Observe the following precautions when using nylon tubes or urethane tubes for piping material.
- Use a flame resistant tube or metal pipe where spatter could occur.
- Use a hydraulic hose for common piping of hydraulic and pneumatic specifications.
- When using for hot liquids, use a spigot fitting. The push-in fitting cannot be used.

■ Make sure that the tube is not worn or damaged.
- Tubing could be crushed, break, or be dislocated.

■ Use the designated tube.

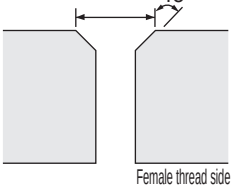
■ Securely insert the tube to the tube end, and make sure that the tube cannot be pulled off.

■ Cut the tube with a dedicated cutter, and cut at a right angle.

■ If the port thread is M3 or M5, the chamfered O. D. of the female thread side must be within the following values.

Chamfered outer diameter 45°

Port thread	Chamfered outer diameter (mm)
M3	ø3.3 to 3.9
M5	ø5.4 to 5.8



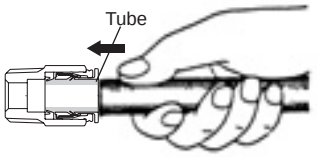
■ The effective cross-sectional area of the turn elbow (GWL □ - □ -T, GWL □ - □ -2T) varies based on the direction.

During use & maintenance

⚠CAUTION

Mounting and removal

Installation



Push the tube in until it contacts the tube end. Check that the tube does not come off the fitting. Tube goes in approx. 15 to 21 mm into the end of the fitting body. The end of the mounted tube must be cut at a right angle.

Removal

While pushing the push ring with a finger, pull the tube to remove it.