CKD

Fittng
GW Series
GWJ Series

INSTRUCTION MANUAL

SM-275629-A/6

- Read this Instruction Manual before using the product.
- Read the safety notes carefully.
- Keep this Instruction Manual in a safe and convenient place for future reference.

CKD Corporation

PREFACE

Thank you for purchasing CKD's **"GW Series/GWJ Series " fitting**.
This Instruction Manual contains basic matters such as installation and usage instructions in order to ensure optimal performance of the product. Please read this Instruction Manual thoroughly and use the product properly.
Keep this Instruction Manual in a safe place and be careful not to lose it.

Product specifications and appearances presented in this Instruction Manual are subject to change without notice.

- The product is intended for users who have basic knowledge about materials, piping, electricity, and mechanisms of pneumatic components. CKD shall not be responsible for accidents caused by persons who selected or used the product without knowledge or sufficient training.
- Since there are a wide variety of customer applications, it is impossible for CKD to be aware of all of them. Depending on the application or usage, the product may not be able to exercise its full performance or an accident may occur due to fluid, piping, or other conditions. It is the responsibility of the customer to check the product specifications and decide how the product shall be used in accordance with the application and usage.

SAFETY INFORMATION

When designing and manufacturing any device incorporating the product, the manufacturer has an obligation to ensure that the device is safe. To that end, make sure that the safety of the machine mechanism of the device, the pneumatic control circuit, and the electric system that controls such mechanism is ensured.

To ensure the safety of device design and control, observe organization standards, relevant laws and regulations, which include the following:

ISO 4414, JIS B 8370, JFPS 2008 (the latest edition of each standard), the High Pressure Gas Safety Act, the Industrial Safety and Health Act, other safety rules, organization standards, relevant laws and regulations

In order to use our products safely, it is important to select, use, handle, and maintain the products properly.
Observe the warnings and precautions described in this Instruction Manual to ensure device safety.

Although various safety measures have been adopted in the product, customer's improper handling may lead to an accident. To avoid this:

Thoroughly read and understand this Instruction Manual before using the product.

To explicitly indicate the severity and likelihood of a potential harm or damage, precautions are classified into three categories: "DANGER", "WARNING", and "CAUTION".

⚠ **DANGER**	Indicates an imminent hazard. Improper handling will cause death or serious injury to people.
⚠ **WARNING**	Indicates a potential hazard. Improper handling may cause death or serious injury to people.
⚠ **CAUTION**	Indicates a potential hazard. Improper handling may cause injury to people or damage to property.

Precautions classified as "CAUTION" may still lead to serious results depending on the situation.
All precautions are equally important and must be observed.

Other general precautions and tips on using the product are indicated by the following icon.

Indicates general precautions and tips on using the product.

Precautions on Product Use

⚠ WARNING

The product must be handled by a qualified person who has extensive knowledge and experience.

The product is designed and manufactured as a device or part for general industrial machinery.

Use the product within the specifications.

The product must not be used beyond its specifications. Also, the product must not be modified and additional work on the product must not be performed.
The product is intended for use in devices or parts for general industrial machinery. It is not intended for use outdoors or in the conditions or environment listed below.

- In applications for nuclear power, railroad system, aviation, ship, vehicle, medical equipment, and equipment that directly touches beverage or food.
- For special applications that require safety including amusement equipment, emergency shut-off circuit, press machine, brake circuit, and safety measures.
- For applications where life or properties may be adversely affected and special safety measures are required.

(Exception is made if the customer consults with CKD prior to use and understands the specifications of the product. However, even in that case, safety measures must be taken to avoid danger in case of a possible failure.)

Do not handle the product or remove pipes and devices until confirming safety.

- Inspect and service the machine and devices after confirming the safety of the entire system. Also, turn off the energy source (air supply or water supply) and power to the relevant facility. Release compressed air and fluid from the system and use extreme care to avoid water or electric leakage.
- Since there may be hot or live parts even after operation has stopped, use extreme care when handling the product or removing pipes and devices.
- When starting or restarting a machine or device that incorporates pneumatic components, make sure that a safety measure (such as a pop-out prevention mechanism) is in place and system safety is secured.

Precautions on Design and Selection

⚠ WARNING

Use the product within the specifications.

Use of the product without the specifications range may result in insufficient performance and safety cannot be guaranteed.

Do not continuously push and hold down or apply load to the push ring on the push-in fitting.

- The push-in fitting may lose tube holding capacity.
- When transporting an assembled product, avoid positions which constantly press on the push ring.

⚠ CAUTION

Confirm whether PTFE can be used.

The sealant contains PTFE (polytetrafluoroethylene resin) powder.

Check the resin material.

The GW series uses flame-resistant resin (UL94 standard V-0 equivalent) for the body and push ring, but the GWJ series is not made of flame-resistant resin.

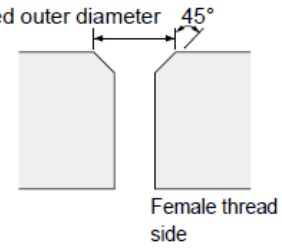
Do not use the product for applications that involve continuous rotation or oscillations , or in which tubes move violently.

The elbow can be mounted by turning, but must not use the product for applications that involve continuous rotation or oscillations. Fittings may be damaged.

If the port size is M3 or M5, the chamfered outer diameter of the female thread side must be within the following values.

Port size M3 and M5 are sealed with a gasket.

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



⚠ CAUTION

Pay attention to the following points when using nylon tubes or urethane tubes as piping material.

- Use tubes and plastic plugs (GWP/GWJP Series) manufactured by CKD. Do not use a metallic plug since it may cause failures.
- When using tubes other than CKD, use tubes outside diameter tolerance as specified below and hardness of 92° or more.

  Nylon tube between ±0.1 mm

  Polyurethane tube between +0.1 mm and −0.15 mm

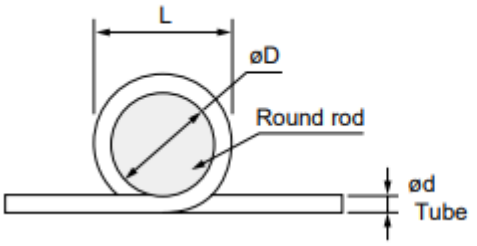
  Using a tube that does not satisfy the specified outside diameter tolerance and hardness may cause the tube to come off easily due to a drop in the chucking force or make it difficult to insert the tube.

Use the tube that is sufficient length to avoid bending it below the minimum installation radius.

- When tube connected, consider tube length change caused by pressure and provide sufficient length to bending it above the minimum installation radius.
- Measuring method

  (1) Minimum bending radius (JIS B 8381)

  When tube is tightly wound around a round rod, indicate the rod radius when deformation ratio reaches 25%.

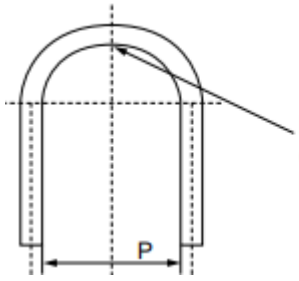


$$\eta = \left(1 - \frac{L-D}{2d}\right) \times 100$$

η: Deformation ratio (%)
d: Tube O.D. (mm)
L: Measuring volume (mm)
D: Round rod diameter (mm)
(Twice the min. bending radius)

  (2) Minimum installation radius

  Bend simply the tube and confirm the radius when tube diameter deformation is 10%.



Minimum mounting pitch P when deformation rate is 10%.
Min. installation radius = P/2

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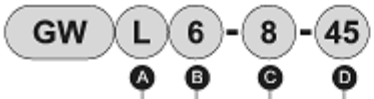
1. PRODUCT OVERVIEW

1.1 Model Number Indication

1.1.1 GW Series



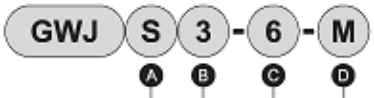
A Shape	
S	Straight
L	Elbow
T	Tee
TR	Tetrapod
Y	Y tee
FY	FY
WY	Double Y
CR	Cross
P	Plug
C	Cap
M	For tightening fitting
MF	Manifold

B Compatible tube O.D.	
3	ø3.2
4	ø4
6	ø6
8	ø8
10	ø10
12	ø12
16	ø16
44	ø4/ø4
46	ø4/ø6
48	ø4/ø8
64	ø6/ø4
66	ø6/ø6
68	ø6/ø8
610	ø6/ø10
86	ø8/ø6
88	ø8/ø8
810	ø8/ø10
812	ø8/ø12
108	ø10/ø8
1010	ø10/ø10
1012	ø10/ø12
1210	ø12/ø10
1212	ø12/ø12

C Port size	
M3	M 3 x 0.5
M5	M 5 x 0.8
6	R 1/8
8	R 1/4
10	R 3/8
15	R 1/2
0	No thread
4P	Plug for ø4
6P	Plug for ø6
8P	Plug for ø8
10P	Plug for ø10
12P	Plug for ø12
B	Blanking plug
C	C-plug
L	L-plug
Y	Y-plug

D Other combinations	
L	Long
T	Turn
D	D type
X	Bulkhead
S	Round
M	Female
E	Bulkhead female
W	Double
2T	2-port turn
45	Single 45°

1.1.2 GWJ Series



A Shape	
S	Straight
L	Elbow
Y	Y tee
T	Tee
P	Plug

B Compatible tube O.D.	
3	ø3.2
4	ø4
6	ø6

C Port size	
M3	M3x0.5
M5	M5x0.8
6	R1/8
0	No thread
B	Blanking plug

D Other combinations	
L	Long
D	D type
X	Bulkhead
M	Female

Refer to the model No. on the dimensions page of catalog for the model No. combination.

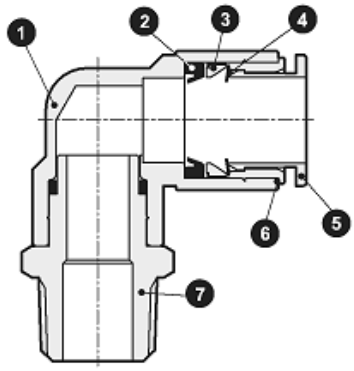
1.2 Specifications

Descriptions		Specifications
Working fluid		Compressed air
Max. working pressure	MPa	1.0
Negative pressure	KPa	GW series： −100 (Note1) GWJ series： Do not use
Ambient temperature	℃	−10 to 60(no freezing)
Tube used		Soft nylon tube (F-15*) Urethane tube (U-95*,NU-*)

Note1: Use a urethane tube (U-95*/NU-*) together with an insert ring at nagative pressure.

1.3 Internal structure

1.3.1 GW Series

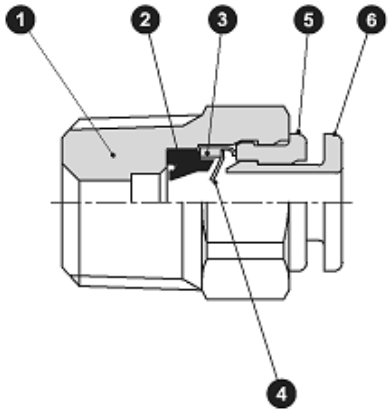


Shape: Elbow

Part No.	Part name	Material
1	Body *1	Brass (electroless nickeling treatment)
		Polybutylene terephthalate (Flame-resistant resin *2)
2	Packing	Nitrile rubber
3	Chuck holder	polyether sulfone
4	Chuck	Stainless steel
5	Push ring *3	Polybutylene terephthalate (flame-resistant resin *2)
6	Outer ring	Brass(electroless nickeling treatment)
7	Drive-in nipple	Brass(electroless nickeling treatment)

*1: Body is copper alloy (electroless nickel plated) for single straight, single straight (round), female straight, female bulkhead, bulkhead and bulkhead female connector.
*2: UL94 standard V0 equivalent

1.3.2 GWJ Series



Shape: Straight

No.	Name	Material	
1	Body *1	Copper alloy (electroless nickeling treatment)	
		Polybutylene terephthalate	
2	Packing	Nitrile rubber	
3	Holder	Copper alloy (electroless nickeling treatment)	
4	Chuck	Stainless steel	
5	Outer ring	Metal	Polyacetal
		Resin	CU alloy (electroless Ni treatment)
6	Push ring *2	Polyacetal	

*1: The body of the single straight, female straight and bulkhead is copper alloy (electroless nickeling).

2. INSTALLATION

2.1 Environment

Do not use the product in an environment where:
- Ambient temperature is outside the range of 0°C to 60°C
- The air freezes
- Water drop or cutting oil can splash onto the product
- Condensation may occur due to high humidity and temperature change
- Atmosphere contains corrosive gas, fluids, or chemicals
- It is subject to strong vibrations or shocks
- Atmosphere contains a lot of dust
- Spatter can splash onto the product
- It is exposed to direct sunlight, rain, wind, or water
- Ozone is produced
- Static electricity could pose a problem

Store the product where the temperature does not exceed 40°C and it is not exposed to high temperature, high humidity, or direct sunlight.

2.2 Unpacking

⚠ CAUTION

Do not open the packing of the product until just before piping.
Foreign matters may enter the product and cause a failure or malfunction.

- Check that the model number ordered and the model number indicated on the product are the same.
- Check the exterior of the product for any damage.

2.3 Piping

⚠ WARNING

Insert the tube into the fitting until it firmly rests on the tube end and make sure that the tube does not come off before use.

Do not continuously push and hold down or apply load to the push ring on the push-in fitting.

- The push-in fitting may lose tube holding capacity.
- When transporting an assembled product, avoid positions which constantly press on the push ring.

⚠ CAUTION

Flush the pipes/tubes just before connecting the product to the pneumatic components.

Tight with the appropriate tightening torque.

Cut the tube at right angles with a tube cutter.

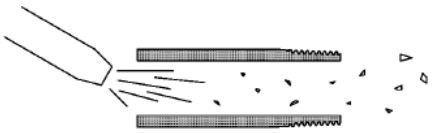
Do not apply torsion, tension, and moment load to the fitting and the tube.

Connect piping so that connections are not come off by equipment movement, vibration, tension, etc.

- Actuator speed will be not controlled, if piping is come off on the exhaust side of the pneumatic circuit.
- If the tube holding mechanism releaced, 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 come off or damaged if there is any tension.

2.3.1 Pipe cleaning

Before piping, blow air into the pipes to clean the interior and to remove cutting chips and foreign matters.



2.3.2 Tightening torque

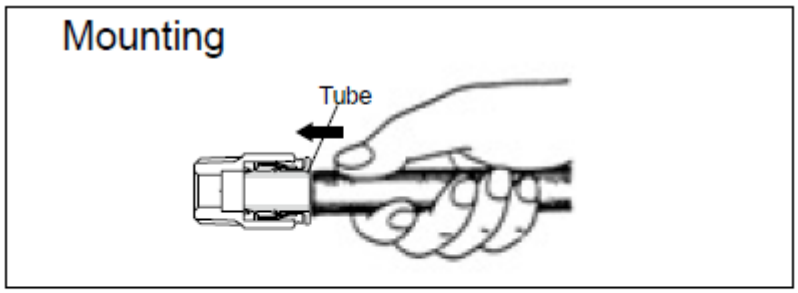
- The purpose is to prevent air leakage and damage to threads. Tight by hand first to ensure that threads are not damaged, then use a tool.
- Check that the tool's hexagon face and wrench are the correct size.

[Reference value]

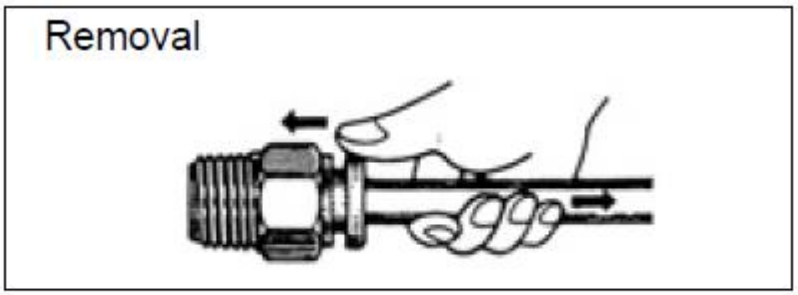
Port thread	Tightening torque N·m
M3	0.3 to 0.6
M5	1.0 to 1.5
Rc1/8	3 to 5
Rc1/4	6 to 8
Rc3/8	13 to 15
Rc1/2	16 to 18

* The above values apply when partner threads are JIS B 0203 piping tapered female threads (material C3604BD).

2.3.3 Mounting and removal the tube



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



While pressing down on the push ring with your fingers, the tube can be removed by pulling on it.

3. USAGE

3.1 Safety Instructions

⚠ WARNING

Use the product within the specifications.
Using 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.

Stop supplying air and make sure that there is no residual pressure before replacing fittings and tubes.

⚠ CAUTION

When supplying compressed air for the first time after piping is complete, make sure that there is no air leakage at the joints.
Apply a leakage detection agent on pipe connections with a brush, and check for air leaks.

When supplying compressed air for the first time after piping is complete, do not apply high pressure suddenly.
The pipe connection could come off, the tube jump up and down, leading to accidents.

Do not retighten while applying pressure.

Do not reuse used tube.
Used tube may have deteriorated or become deformed and so always use a new tube.

Confirm the tube is not worn or damaged.
Tube could collapse, rupture, or come off.

Do not contact the tube with other structures direct.
It may become worn out or damaged.

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

If the tubes can move around when come off, bind the tubes or use a safety cover.

4. WARRANTY PROVISIONS

4.1 Warranty Conditions

■ Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified below, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.
However, following failures are excluded from this warranty:

- Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or this Instruction Manual.
- Failure caused by incorrect use such as careless handling or improper management.
- Failure not caused by the product.
- Failure caused by use not intended for the product.
- Failure caused by modifications/alterations or repairs not carried out by CKD.
- Failure that could have been avoided if the customer's machinery or device, into which the product is incorporated, had functions and structures generally provided in the industry.
- Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- Failure caused by acts of nature and disasters beyond control of CKD.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.

■ Confirmation of product compatibility

It is the responsibility of the customer to confirm compatibility of the product with any system, machinery, or device used by the customer.

■ Others

The terms and conditions of this warranty stipulate basic matters.
When the terms and conditions of the warranty described in individual specification drawings or the Specifications are different from those of this warranty, the specification drawings or the Specifications shall have a higher priority.

4.2 Warranty Period

The product is warranted for one (1) year from the date of delivery to the location specified by the customer.