

## Tube Cutter with Measuring tape built-in Tube Cutter

- *Cut Tubings to Required Length, using Measuring tape.  
(easuring tape length: 1m (metric tape measure))*
- *Mountain-shaped Double Blade. Rotate it for New Blade Side.*
- *Nicely and Surely Cut Tubing with Tube Guide.*
- *Safety Lock Function.*

■ Model Code of Tube Cutter (Example)

**TC-21**



Tube Cutter

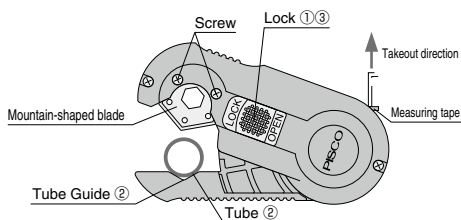
■ Model Code of Tube Cutter Blade (Example)

**TC-C**



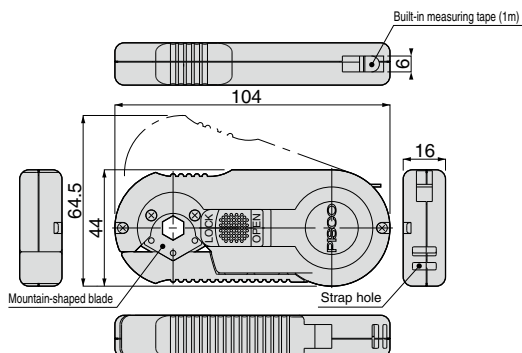
Replacement Blade

### Operating procedure and Parts names

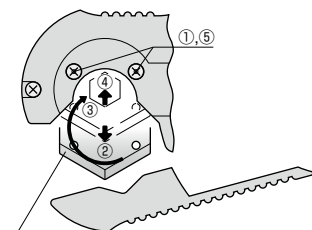


- ① Unlock the safety lock by sliding it to "Open" side.
- ② Place a tube on Tube Guide and cut it.
- ③ Lock the safety lock by sliding it to "Lock" side.

### TC-21 Tube Cutter



### How to replace the blade



Mountain-shaped blade  
(Replacement blade model code: TC-C)

- ① Loosen two screws after unlocking the safety lock.
- ② Take the blade out from the blade groove.
- ③ Rotate the blade by 180° to use other side of it.
- ④ Install it into the blade groove by holding the hexagonal hole of the blade.
- ⑤ Tighten the screws until the blade is fixed properly.  
(Recommended tightening torque: 0.4Nm)

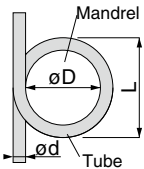
## ⚠ Caution

1. When bending tubes, observe the minimum bending radius and minimum installation radius.
2. When piping, provide sufficient lengths of tube, considering possible shrinkage.
3. When Tubes are inserted into Push-In Fitting, make sure that cut end surface of Tubes are right angle, without any scratches on the surface and deformations.
4. Note that the effective cross-section area varies by tube length. Refer to "Effective Area of Piping" in "Tube Performance" .

## ■ Minimum Bending Radius & Minimum Mounting Radius

### 1. Measurement method

#### ● Minimum Bend Radius (JIS method)



JIS method (based on JIS B8381)

Minimum Bending Radius is measured by winding a tube tightly around a mandrel. Minimum Bending Radius is the value when the deformation ratio of the tube O.D. reaches 25%.

Measurement condition: 20°C  
65%RH

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

n = Deformation ratio (%)

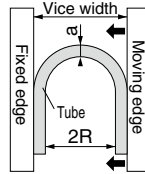
Standard: under 25%

d = Tube O.D.

L = Measured value (mm)

D = Mandrel diameter (mm)

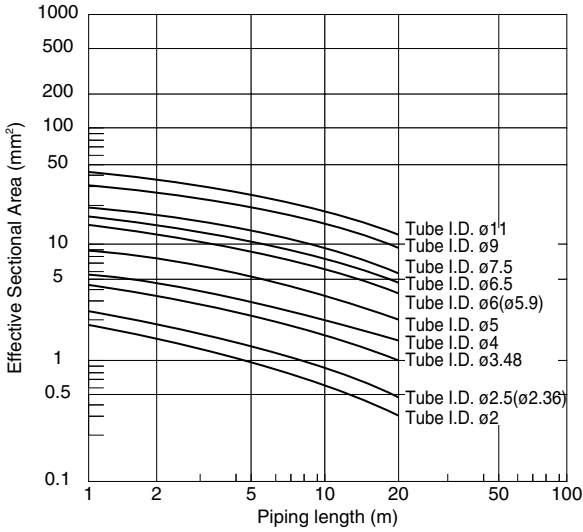
#### ● Minimum Installation Radius (Vice method)



Fix the tube as the left figure shows. Slowly move the moving edge toward the fixed edge. When "a" deforms 25% from the initial value, the measured R is Minimum Installation Radius.  
Measurement condition: 20°C  
65%RH

# Tube Performance

## Effective Sectional Area of Piping





# SAFETY Instructions

This safety instructions aim to prevent personal injury and damage to properties by requiring proper use of PISCO products.

Be certain to follow ISO 4414 and JIS B 8370

ISO 4414 : Pneumatic fluid power...Recommendations for the application of equipment to transmission and control systems.

JIS B 8370 : General rules and safety requirements for systems and their components.

This safety instructions is classified into "Danger", "Warning" and "Caution" depending on the degree of danger or damages caused by improper use of PISCO products.



**Danger**

Hazardous conditions. It can cause death or serious personal injury.



**Warning**

Hazardous conditions depending on usages. Improper use of PISCO products can cause death or serious personal injury.



**Caution**

Hazardous conditions depending on usages. Improper use of PISCO products can cause personal injury or damages to properties.



## Warning

### 1. Selection of pneumatic products

- ① A user who is a pneumatic system designer or has sufficient experience and technical expertise should select PISCO products.
- ② Due to wide variety of operating conditions and applications for PISCO products, carry out the analysis and evaluation on PISCO products. The pneumatic system designer is solely responsible for assuring that the user's requirements are met and that the application presents no health or safety hazards. All designers are required to fully understand the specifications of PISCO products and constitute all systems based on the latest catalog or information, considering any malfunctions.

### 2. Handle the pneumatic equipment with enough knowledge and experience

- ① Improper use of compressed air is dangerous. Assembly, operation and maintenance of machines using pneumatic equipment should be conducted by a person with enough knowledge and experience.

### 3. Do not operate machine / equipment or remove pneumatic equipment until safety is confirmed.

- ① Make sure that preventive measures against falling work-pieces or sudden movements of machine are completed before inspection or maintenance of these machine.
- ② Make sure the above preventive measures are completed. A compressed air supply and the power supply to the machine must be off, and also the compressed air in the systems must be exhausted.
- ③ Restart the machines with care after ensuring to take all preventive measures against sudden movements.

## Disclaimer

1. PISCO does not take any responsibility for any incidental or indirect loss, such as production line stop, interruption of business, loss of benefits, personal injury, etc., caused by any failure on use or application of PISCO products.
2. PISCO does not take any responsibility for any loss caused by natural disasters, fires not related to PISCO products, acts by third parties, and intentional or accidental damages of PISCO products due to incorrect usage.
3. PISCO does not take any responsibility for any loss caused by improper usage of PISCO products such as exceeding the specification limit or not following the usage the published instructions and catalog allow.
4. PISCO does not take any responsibility for any loss caused by remodeling of PISCO products, or by combinational use with non-PISCO products and other software systems.
5. The damages caused by the defect of Pisco products shall be covered but limited to the full amount of the PISCO products paid by the customer.



# SAFETY INSTRUCTION MANUAL

PISCO products are designed and manufactured for use in general industrial machines. Be sure to read and follow the instructions below.

## Danger

1. Do not use PISCO products for the following applications.
  - ① Equipment used for maintaining / handling human life and body.
  - ② Equipment used for moving / transporting human.
  - ③ Equipment specifically used for safety purposes.

## Warning

1. Do not use PISCO products under the following conditions.
  - ① Beyond the specifications or conditions stated in the catalog, or the instructions.
  - ② Under the direct sunlight or outdoors.
  - ③ Excessive vibrations and impacts.
  - ④ Exposure / adhere to corrosive gas, inflammable gas, chemicals, seawater, water and vapor. \*  
\* Some products can be used under the condition above(④), refer to the details of specification and condition of each product.
2. Do not disassemble or modify PISCO products, which affect the performance, function, and basic structure of the product.
3. Turn off the power supply, stop the air supply to PISCO products, and make sure there is no residual air pressure in the pipes before maintenance and inspection.
4. Do not touch the release-ring of push-in fitting when there is a working pressure. The lock may be released by the physical contact, and tube may fly out or slip out.
5. Frequent switchover of compressed air may generate heat, and there is a risk of causing burn injury.
6. Avoid any load on PISCO products, such as a tensile strength, twisting and bending. Otherwise, there is a risk of causing damage to the products.
7. As for applications where threads or tubes swing / rotate, use Rotary Joints, High Rotary Joints or Multi-Circuit Rotary Block only. The other PISCO products can be damaged in these applications.
8. Use only Die Temperature Control Fitting Series, Tube Fitting Stainless SUS316 Series, Tube Fitting Stainless SUS316 Compression Fitting Series or Tube Fitting Brass Series under the condition of over 60°C (140° F) water or thermal oil. Other PISCO products can be damaged by heat and hydrolysis under the condition above.
9. As for the condition required to dissipate static electricity or provide an antistatic performance, use EG series fitting and antistatic products only, and do not use other PISCO products. There is a risk that static electricity can cause system defects or failures.
10. Use only Fittings with a characteristic of spatter-proof such as Anti-spatter or Brass series in a place where flame and weld spatter is produced. There is a risk of causing fire by sparks.
11. Turn off the power supply to PISCO products, and make sure there is no residual air pressure in the pipes and equipment before maintenance. Follow the instructions below in order to ensure safety.
  - ① Make sure the safety of all systems related to PISCO products before maintenance.
  - ② Restart of operation after maintenance shall be proceeded with care after ensuring safety of the system by preventive measures against unexpected movements of machines and devices where pneumatic equipment is used.
  - ③ Keep enough space for maintenance when designing a circuit.
12. Take safety measures such as providing a protection cover if there is a risk of causing damages or fires on machine / facilities by a fluid leakage.



## Common Safety Instructions for Tubes

Before selecting or using PISCO products, read the following instructions. Read the detailed instructions for individual series as well as the instructions below.

### Warning

1. Avoid any load on Tubes such as tensile strength, twisting and bending. These may cause the crush, burst and escape of Tubes.
2. Protect Tubes from scratches caused by snagging or kinking. It may cause the burst of Tubes.
3. The burst pressure of Tubes drops as temperature rises. Read the operating pressure in the catalog well, and apply safety factor.
4. The minimum bending radius and the minimum installation radius are reference values at 20°C and 65% RH. They are not guaranteed values. Refer to the minimum bending radius when Tubes are wound around a mandrel (round bar). As for the other operating conditions, refer to the minimum installation radius. These values vary depending on operating environments or the tube length. In order to make sure the suitability of Tubes, carry out the operation test by the user's actual machine before using Tubes.
5. Place Insert Ring into the edge of soft tubes like UD Series or tubes inserted to Push-In Fittings with a water fluid. There is a possibility of escape of Tube without Insert Ring.
6. Only Anti-spatter Tube can be used under the flame and weld spatter condition. Otherwise, there is a possibility of danger to catch fire by sparks.
7. Only Soft Nylon Tube can be used for warm water or thermal oil. Otherwise, tubes may burst due to deterioration.
8. Only Anti-static Tube can be used under the condition required to dissipate static electricity or provide an anti-static performance. There is a possibility that static electricity can cause malfunction or other troubles with the system.
9. An abnormal rise in temperature due to adiabatic compression may cause damage to Tubes.
10. If Tubes are used with any fluid or under any condition / environment other than listed in the catalog, as well as used outdoors, the conformity evaluation with the actual machine and safety measures taken by the responsible person are highly recommended.



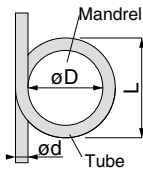
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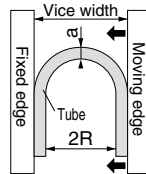
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