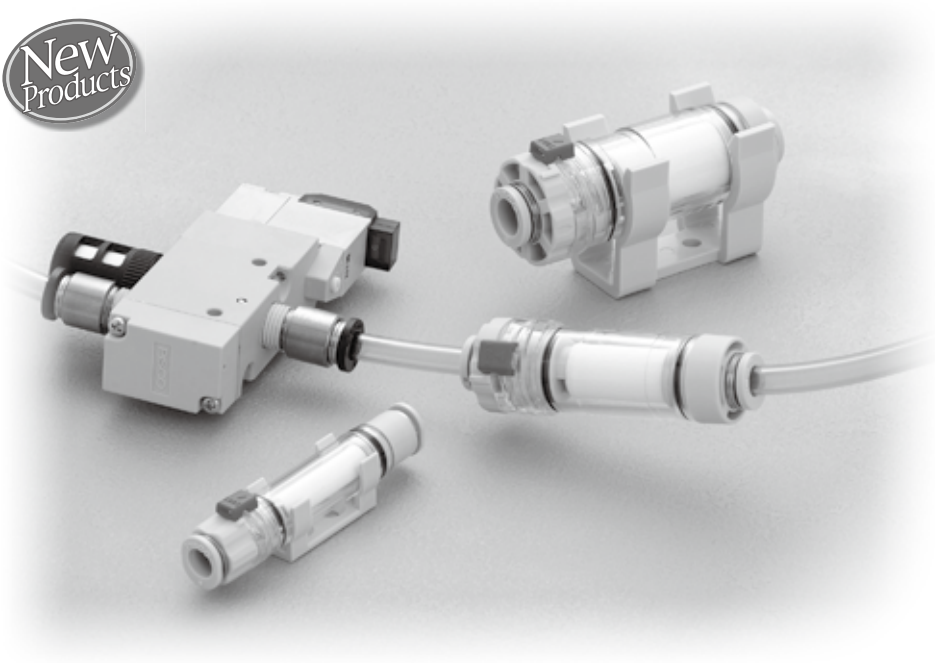


In-line Filter of Easy Maintenance

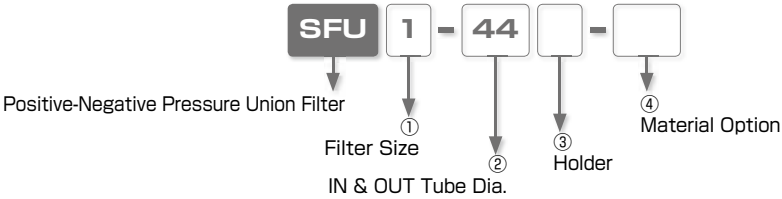
Positive-Negative Pressure Union Filter

Copper alloy free Available

- *Keeping the same usability with vacuum filter "VFU Series" and usable with positive pressure.*
- *Suitable as pre-filter in positive pressure system.*
- *Element can be replaced without any tool, easy maintenance*
- *Positive-Negative Pressure Union Filter of Copper alloy free specification is available for the field requiring "No copper alloy" and "Low level ozone resistance".*

Positive-Negative Pressure Union Filter

Model Designation (Example)



① Filter Size

Code	1	2	3
Filter Area(cm²)	4.7	7.5	12.7

② IN & OUT Tube Dia.

Code	44	66	88	1010
Tube O.D.(mm)	ø4	ø6	ø8	ø10
Applied Filter Size	1, 2		3	

③ Holder

No Code : With Holder

NH : Without Holder

④ Material Option

No Code : Standard specification

-S3 : Copper alloy free specification

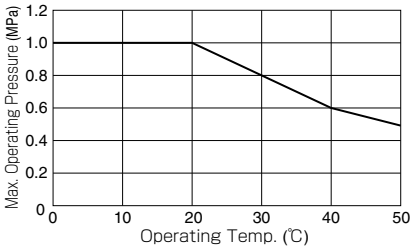
Specifications

Type	SFU1	SFU2	SFU3
Fluid Medium	Air		
Max. Operating Pressure	1MPa (at 20℃) (※1)		
Vacuum Operating Pressure	-100kPa		
Pressure Resistance	1.5MPa		
Filtering Accuracy	10μm		
Operating Temp. Range	0～50℃ (No freezing)		
Filter Area	4.7cm²	7.5cm²	12.7cm²

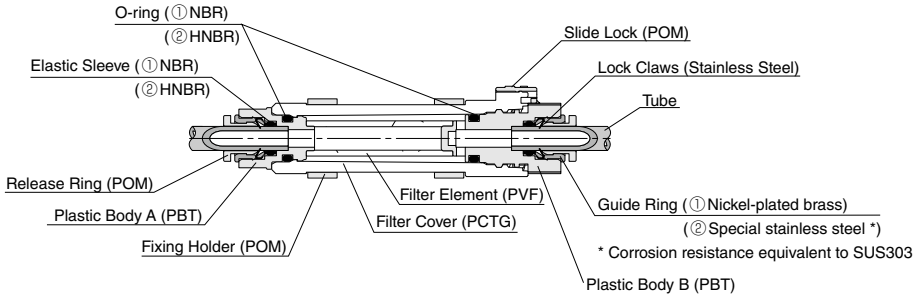
*1. Max. operating pressure represents the value at 20℃ . When the product is used in other temperature range, refer to "Chart of Operationg Temperature & Max. Operationg Pressure" below.

*2. When the filter is operated under a high temperature due to an adiabatic compression, refer to "Chart of Operationg Temperature & Max. Operationg Pressure" and use the producut under the condition where the environmental and product temperature shall not be exceeded operating temperature.

Chart of Operationg Temperature & Max. Operationg Pressure



Construction



①Standard specification ②Copper alloy free specification.

⚠ Detailed Safety Instructions

Before using PISCO products, be sure to read “Safety Instructions” and “Safety Instruction Manual” on page 17-21 and Common Safety Instructions for In-line Filter” on page 175.

Warning

1. Implement periodic maintenances for the filter element. There is a risk of impairing the performance or causing troubles by the clogging. Thoroughly read and understand the instructions of replacing elements or removing dust in this catalog. Make sure to release the residual pressure completely in the system before the maintenance.
2. Avoid a tensile strength, twisting, bending, falling and an excessive force on products. Otherwise, there is a risk of damaging to products.
3. The filter's clear cover is made of PCTG. Avoid using the product under the einvironment where the following chemical substance is contained in the ambient air, or either felt in the air or the chemical substance can attach to the filter itself.

● Table Chemical list

Chemical Name	
Thinner	Cyclohexane
Carbon tetrachloride	Trichloroethylene
Chloroform	Sulfuric acid
Acetate ester	Lactic acid
Aniline	Soluble cutting oil (alkaline)

* There can be other chemicals that cannot be used in the same environment. For specific applications and/or chemical(s), it is recommended to contact our sales representative.

4. Make sure the slide lock is in the lock position before operation. If a fitting part is rotated or an excessive force is applied on the slide lock during the lock is on, there is a risk to damage the slide lock which may result in separating the fitting part and the filter cover and causing injuries.
5. The max. operation pressure of the filter differs according to the operating temperature (operating ambient temprature). Make sure to check “Chart of Operationg Temperature & Max. Operationg Pressure” and operate the product within the limits.

Caution

1. Before connecting the tubes and installing the filter, make sure of the air flow direction. The specified performance cannot be attained if the filter is placed in the wrong direction.
2. Make sure that the casing is properly fixed and there is no leak after the dust is removed and/or the element is replaced.
3. When used in a circuit where the vacuum and the vacuum breaking air is interchangeably applied, extra attention is required since the dust removed by the filter element can be discharged by the vacuum breaking air.
4. Make sure that the O-ring is not damaged at each overhauling or reassembly. Using a damaged O-ring can cause leak and/or other function failure.

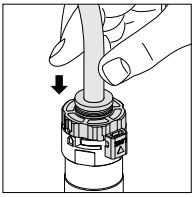
How to insert and disconnect

1. How to insert and disconnect tubes

① Tube installation

For Positive-Negative Pressure Union Filter (Filter with a built-in tube fitting inside), insert a Push-In Fitting until it touches to the tube end which makes the lock-claws bite the tube to fix and the elastic sleeve seal around the tube.

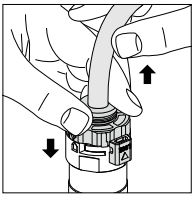
Refer to "2. Instructions for Tube Installation" under "Common Safety Instructions for Fittings" when installing a tube fitting.



② Tube disconnection

The tube is disconnected by pushing the release-ring which releases the lock-claws.

Make sure to stop air supply before the tube disconnection.



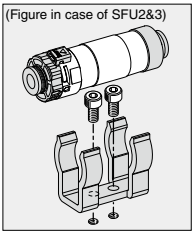
2. How to tighten screw

① Tightening screw

Use two fixing holes on the holder and the following screws to fix the product.

(Refer to the dimensional drawings of the hole pitch)

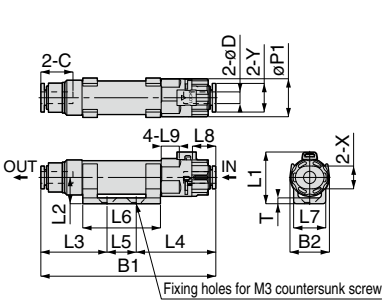
Fixing screws for SFU1: M3 countersunk screw and for ▶M4 screw



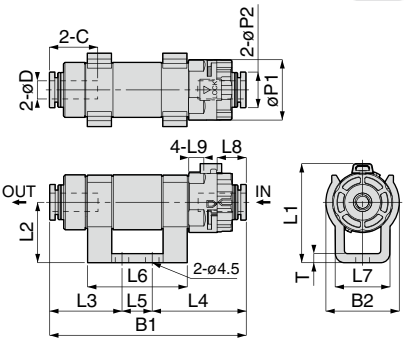
SFU Positive-Negative Pressure Union Filter

3D CAD CAD

RoHS compliant
Copper alloy free
Selectable



SFU1



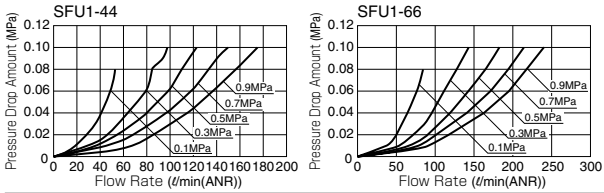
SFU2&3

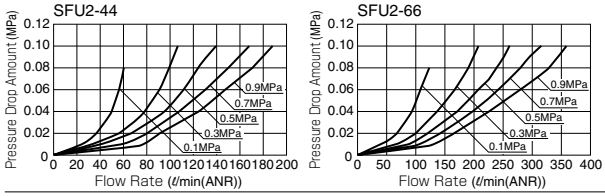
Unit：mm

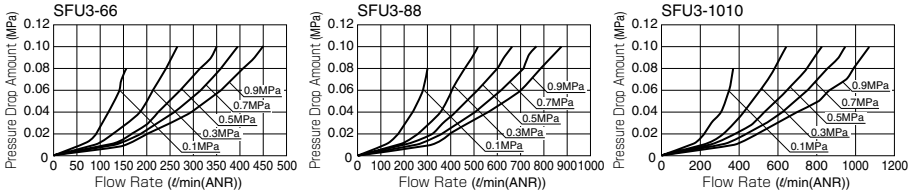
Model Code	Tube O.D. øD	C	B1	B2	L1	L2	L3	L4	L5	L6	L7	L8	L9	øP1	øP2	X	Y	T	Filter Area (cm²)	Weight (g)
SFU1-44③④	4	11	60.1	13.5	17.9	9	22.65	27.45	10	26.6	11	8.2	6.2	13	–	7.8	9.8	2	4.7	8
SFU1-66③④	6	11.6	64.4	13.5	17.9	9	25.05	29.35	10	26.6	11	10.1	6.2	13	–	9.8	11.8	2		8.5
SFU2-44③④	4	14.9	61.1	24.3	33	20	20.2	30.9	10	33	18.2	9.2	5	20	9.9	–	–	3	7.5	20.5
SFU2-66③④	6	16	65.3	24.3	33	20	23.95	31.35	10	33	18.2	9.7	5	20	11.8	–	–	3		21.5
SFU3-66③④	6	17	71.9	28.3	39.5	24	19.5	38.4	14	39.5	20.2	11.8	8.5	25	11.8	–	–	3	12.7	34.5
SFU3-88③④	8	17.9	71.1	28.3	39.5	24	20.75	36.35	14	39.5	20.2	9.7	8.5	25	13.8	–	–	3		33.5
SFU3-1010③④	10	19.2	77.3	28.3	39.5	24	26.65	36.65	14	39.5	20.2	10	8.5	25	16.8	–	–	3		39

*1. Fill in Code③ with "NH" for "Without Holder".
*2. Fill in Code④ with "-S3" for "Copper alloy free specification".
*3. CAD file name is the same as the model code.

Chart of Pressure Loss Characteristics



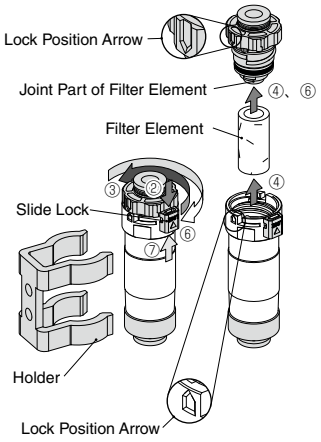




3D CAD 3D CAD data is available at PISCO website. CAD CAD data is available at PISCO website.

Replacement of Filter Element

① Release the residual pressure inside the filter and make the inside pressure at the atmospheric pressure level.
② Unlock the red slide lock by moving it to the opposite direction of the lock arrow mark.
③ Turn the fitting part 180° counteclockwise.
④ Take off the fitting part from the filter cover and replace elements.
⑤ Remove dust inside of the filter cover by air blowing.
⑥ Place a filter on the joint part of filter element. Insert the fitting part and turn it clockwise until it stops.
⑦ Make sure the lock position arrow on the fitting part and that on the filter cover meet face to face, then push up the slide lock to the arrowed direction. Check if the fitting part is fixed on the filter cover properly.



Model designation of Replacement Parts

■ Filter Element

Code of Positive-Negative Pressure Union Filter	Code of Filter Element
SFU1-□□-□	VFE025B01
SFU2-□□-□	SFE2
SFU3-□□-□	SFE3

■ Holder

Code of Positive-Negative Pressure Union Filter	Code of Holder
SFU1-□□-□	SFUH010P01
SFU2-□□-□	VFUH2
SFU3-□□-□	VFUH3

⚠ 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…Recomendations 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.

※. This safety instructions are subject to change without notice.

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℃ (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.

⚠ Caution

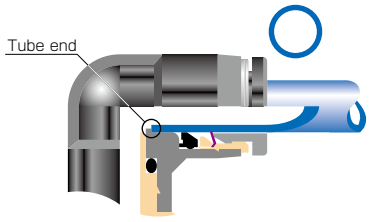
1. Remove dusts or drain before piping. They may get into the peripheral machine / facilities and cause malfunction.
2. When inserting an ultra-soft tube into push-in fitting, make sure to place an Insert Ring into the tube edge. There is a risk of causing the escape of tube and a fluid leakage without using an Insert Ring.
3. The product incorporating NBR as seal rubber material has a risk of malfunction caused by ozone crack. Ozone exists in high concentrations in static elimination air, clean-room, and near the high-voltage motors, etc. As a countermeasure, material change from NBR to HNBR or FKM is necessary. Consult with PISCO for more information.
4. Special option "Oil-free" products may cause a very small amount of a fluid leakage. When a fluid medium is liquid or the products are required to be used in harsh environments, contact us for further information.
5. In case of using non-PISCO brand tubes, make sure the tolerance of the outer tube diameter is within the limits of Table 1.

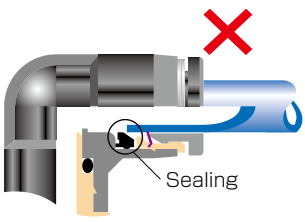
● Table 1. Tube O.D. Tolerance

mm size	Nylon tube	Polyurethane tube
ø1.8mm	—	±0.05mm
ø3mm	—	±0.15mm
ø4mm	±0.1mm	±0.15mm
ø6mm	±0.1mm	±0.15mm
ø8mm	±0.1mm	±0.15mm
ø10mm	±0.1mm	±0.15mm
ø12mm	±0.1mm	±0.15mm
ø16mm	±0.1mm	±0.15mm

inch size	Nylon tube	Polyurethane tube
ø1/8	±0.1mm	±0.15mm
ø5/32	±0.1mm	±0.15mm
ø3/16	±0.1mm	±0.15mm
ø1/4	±0.1mm	±0.15mm
ø5/16	±0.1mm	±0.15mm
ø3/8	±0.1mm	±0.15mm
ø1/2	±0.1mm	±0.15mm
ø5/8	±0.1mm	±0.15mm

6. Instructions for Tube Insertion
   ① Make sure that the cut end surface of the tube is at right angle without a scratch on the surface and deformations.
   ② When inserting a tube, the tube needs to be inserted fully into the push-in fitting until the tubing edge touches the tube end of the fitting as shown in the figure below. Otherwise, there is a risk of leakage.





Tube is not fully inserted up to tube end.

   ③ After inserting the tube, make sure it is inserted properly and not to be disconnected by pulling it moderately.

※. When inserting tubes, Lock-claws may be hardly visible in the hole, observed from the front face of the release-ring. But it does not mean the tube will surely escape. Major causes of the tube escape are the followings;
①Shear drop of the lock-claws edge
②The problem of tube diameter (usually small)
Therefore, follow the above instructions from ① to ③, even lock-claws is hardly visible.

7. Instructions for Tube Disconnection
   ① Make sure there is no air pressure inside of the tube, before disconnecting it.
   ② Push the release-ring of the push-in fitting evenly and deeply enough to pull out the tube toward oneself. By insufficient pushing of the release-ring, the tube may not be pulled out or damaged by scratch, and tube shavings may remain inside of the fitting, which may cause the leakage later.
8. Instructions for Installing a fitting
   ① When installing a fitting, use proper tools to tighten a hexagonal-column or an inner hexagonal socket. When inserting a hex key into the inner hexagonal socket of the fitting, be careful so that the tool does not touch lock-claws. The deformation of lock-claws may result in a poor performance of systems or an escape of the tube.
   ② Refer to Table 2 which shows the recommended tightening torque. Do not exceed these limits to tighten a thread. Excessive tightening may break the thread part or deform the gasket and cause a fluid leakage. Tightening thread with tightening torque lower than these limits may cause a loosened thread or a fluid leakage.
   ③ Adjust the tube direction while tightening thread within these limits, since some PISCO products are not rotatable after the installation.

● Table 2: Recommended tightening torque / Sealock color / Gasket materials

Thread type	Thread size	Tightening torque	Sealock color	Gasket materials
Metric thread	M3 × 0.5	0.7N·m	—	SUS304 NBR
	M5 × 0.8	1.0 ~ 1.5N·m		
	M6 × 1	2 ~ 2.7N·m		
	M3 × 0.5	0.7N·m		POM
	M5 × 0.8	1 ~ 1.5N·m		
	M6 × 0.75	0.8 ~ 1N·m		
	M8 × 0.75	1 ~ 2N·m		
Taper pipe thread	R1/8	4.5 ~ 6.5N·m	White	—
	R1/4	7 ~ 9N·m		
	R3/8	12.5 ~ 14.5N·m		
	R1/2	20 ~ 22N·m		
Unified thread	No.10-32UNF	1.0 ~ 1.5N·m	—	SUS304、NBR
National pipe thread taper	1/16-27NPT	4.5 ~ 6.5N·m	White	—
	1/8-27NPT	4.5 ~ 6.5N·m		
	1/4-18NPT	7 ~ 9N·m		
	3/8-18NPT	12.5 ~ 14.5N·m		
	1/2-14NPT	20 ~ 22N·m		

※ These values may differ for some products. Refer to each specification as well.

9. Instructions for removing a fitting
   ① When removing a fitting, use proper tools to loosen a hexagonal-column or an inner hex bolt.
   ② Remove the sealant stuck on the mating equipment. The remained sealant may get into the peripheral equipment and cause malfunctions.
10. Arrange piping avoiding any load on fittings and tubes such as twist, tensile, moment load, shaking and physical impact. These may cause damages to fittings, tube deformations, bursting and the escape of tubes.

⚠ Common Safety Instructions for In-line Filter

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

⚠ Warning

1. Each device has its control direction. Check it in this caltalog and the mark indicated on the product before using. Wrong control direction may cause injuries on the operator or damage to the equipment.

2. Avoid any load such as a tensile strength, twisting, bending, falling and an excessive force on products. Otherwise, there is a risk of damaging to products.

3. Implement periodic maintenances for the filter element. There is a risk of impairing the performance or causing troubles by the clogging. Thoroughly read and understand the instructions of replacing elements or removing dust in this catalog. Make sure to release the residual pressure completely in the system before the maintenance.

⚠ Caution

1. Refer to “Common Safety Instructions for Fittings” for handling of fittings.

2. Make sure the direction of “IN” and “OUT” in this manual or the indication on products when piping. Wrong direction of installation may impair the filtering function.

3. Make sure to place the filter case properly and that there is no leakage after removing dust or replacing elements.