CKD

Anti-bacterial/Bacteria removing Filter

SFC/SFS Series

To ensure the safety of your food

CKD Corporation

CC-1311A 1

What is important compressed air is anti-bacterial and removing properties

Proprietary anti-bacterial filter

Non-woven fabric filter element

Using silver-based anti-bacterial agents

Anti-bacterial power

Proprietary bacteria removing filter

Hollow string membrane

with 99.99% removal rate for 0.01μm particles

Bacteria removing power

Bactericidal activity value 3

Bacteria trapping performance

LRV≥8

for

bacteria

Food Process

The background is a simulated image.

Reliable anti-bacterial and bacteria removing power with a module type triple block design

Anti-bacterial pre-filter | High-performance anti-bacterial filter | Bacteria removing filter

Bactericidal activity value **3**

Bacteria trapping performance **LRV8** or higher

Made of materials compliant with Food Sanitation Law
Fluid passage areas made of resin/rubber

Uses food-grade grease **NSF H1**

External parts are made of materials with **anti-bacterial** properties

Maintenance

Replaceable elements

Elements are easy to replace.

Equipped with maintenance seal

*Supplied with the product, except for SFS 10.

The replacement period is clearly indicated.

* The bactericidal activity value and bacterial trapping performance value are actual values based on predetermined conditions set by CKD.

Anti-bacterial

Proprietary anti-bacterial filter Stops bacteria growth!

Non-woven fabric filter element that uses silver-based anti-bacterial agent

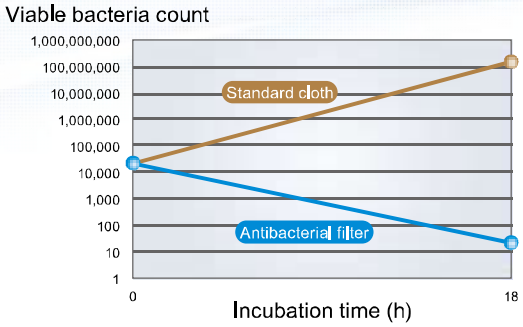
Non-woven fabric uses silver-based anti-bacterial agent

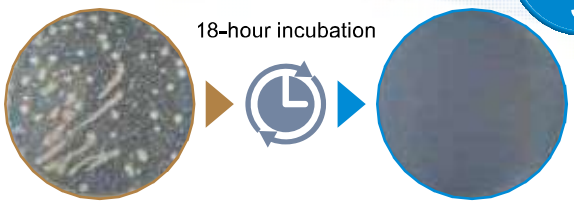
Silver ions in the anti-bacterial filter penetrate into bacteria cells, where they inhibit enzyme activity and eradicate the bacteria.

Silver ions penetrate into bacteria cells | Enzyme activity is inhibited | Bacteria is eradicated

Anti-bacterial performance

Bactericidal activity value 3





Immediately after inoculation | After incubation

Testing provider: Japan Food Research Laboratories
Test certificate issuance number: 15037764001-0101

Verification data from tests based on JIS L 1902

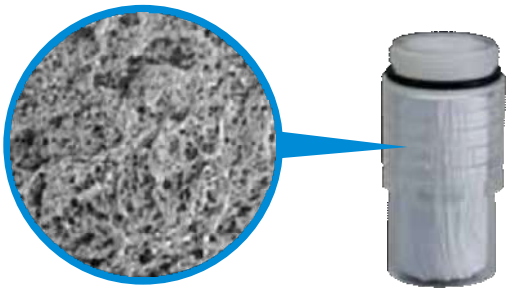
Bacteria Removal

Proprietary bacteria removing filter Removes bacteria!

Hollow string membrane with 99.99% removal rate for 0.01μm particles

Hollow string membrane

The bacteria removing filter consists of a straw-shaped fiber membrane with a countless number of special slit-shaped ultrafine pores.
These pores trap bacteria when the compressed air passes through.



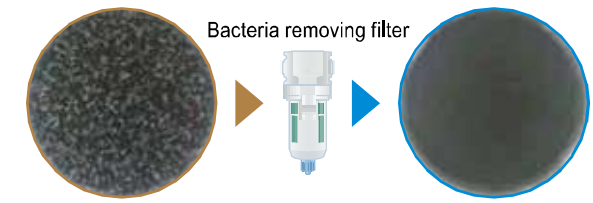
Bacteria removing performance

$$\text{Bacteria trapping performance LRV} = \frac{\log_{10}\text{ total bacterial count of raw water}}{\text{Number of bacteria in filtrate}}$$

$$= \frac{\log_{10} 8.5\times10^{8}}{1^{*}} = 8.9$$

Bacteria trapping performance LRV8 or higher

* A value of 1 is used when the number of bacteria in the filtrate is 0.



Raw water
Bacteria count: 8.5×10^8

Filtrate
Bacteria count: 0

Testing provider: Japan Microbiological Clinic Co., Ltd.
Test certificate issuance number: CJ2014.10-1

Verification data from tests based on JIS K 3835

	Anti-bacterial/Bacteria removal Combination		Anti-bacterial Combination	
	 SFC307	 SFC407	 SFC306	 SFC406
Select from various options **Flow rate** Unit: L/min (ANR) Primary side pressure 0.7 MPa	300	500	360	700
Trap bacteria **Bacteria removing performance** Bacteria trapping performance LRV8 or higher	●	●	–	–
Stop bacteria growth **Anti-bacterial performance** Bactericidal activity value 3	●	●	●	●
Safe to use **Materials compliant with Food Sanitation Law** Notification No.370 of Ministry of Health - Fluid passage areas made of resin/rubber	●	●	●	●
Safe to apply **Lubricant for food equipment** NSF H1 grease	●	●	●	●
Easy to expand **Modular connection**	●	●	●	●

Explanation of keywords

Bactericidal activity value

This value is an assessment of the extent to which the growth of adherent bacteria is suppressed.

Ma − Mc

Ma: Average of common logarithm of the number of living bacteria immediately after the inoculation of test bacteria on standard cloth

Mc: Average of common logarithm of the number of living bacteria after 18-hour incubation of the processed cloth

Bacteria trapping performance

This indicates the bacterial trapping performance of the filter using test bacteria as defined in JIS K 3835.

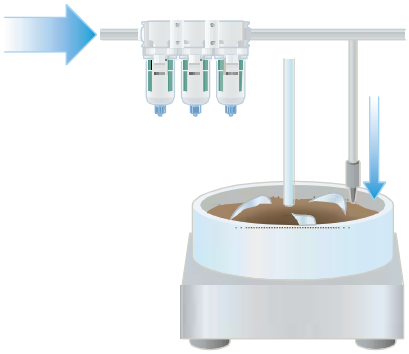
It is expressed using a log reduction value (LRV).

* The bactericidal activity value and bacterial trapping performance value are actual values based on predetermined conditions set by CKD.

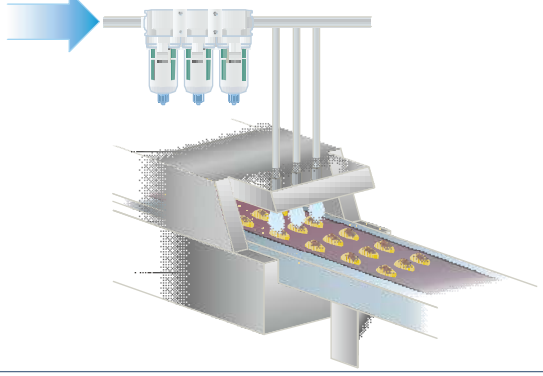
Bacteria removing filter Single		Bacteria removing filter Inline
 SFC330	 SFC430	 SFS10
300	500	300
●	●	●
–	–	–
●	●	●
●	●	–
●	●	–

Usage examples

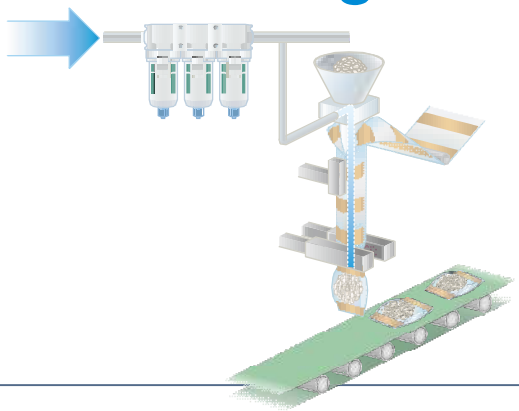
Mixing (kneading)



Cleaning



Filling



Food Sanitation Law

This Japanese law aims to prevent the occurrence of sanitation hazards associated with eating and drinking.
The standards for apparatuses, containers and packaging are stipulated in the Standards and Criteria for Food and Food Additives, etc. (Notification No. 370 of Ministry of Health in 1959), based on Article 18 of the Food Sanitation Law.

FP mark

This logo mark indicates our approval that the CKD equipment can safely support food manufacturing processes.

FP Food Process

Anti-bacterial/Bacteria removing Combination

Materials compliant with Food Sanitation Law

SFC307/SFC407-FP2 Series

● Port size: Rc1/4 to Rc1/2

RoHS CAD

Specifications

Description			SFC307	SFC407
Components	(1)	Anti-bacterial pre-filter	SFC306	SFC406
	(2)	High-performance anti-bacterial filter		
	(3)	Bacteria removing filter	SFC330	SFC430
Working fluid			Compressed air	
Working pressure range		MPa	0.15 to 1.0	
Proof pressure		MPa	1.5	
Differential pressure proof		MPa	0.5	
Ambient temperature/fluid temperature		°C	5 to 45	
Filtration rating		μm	0.01 (removal efficiency 99.99%)	
Max. flow rate Note 1		m^3/min (ANR)	0.3	0.5
Port size			Rc1/4, Rc3/8	Rc1/4, Rc3/8, Rc1/2
Weight		Kg	0.96	1.61
Standard accessories			Maintenance seal (supplied with product)	
Element replacement			1 year (6000 hours) or when pressure drops to 0.1 MPa	

Note 1: Use the product within the max. flow rate. These values are for when the primary pressure is 0.7 MPa.

How to order

SFC307 - 10 - X1 - FP2

- SFC307 → Ⓐ Model No.
- 10 → Ⓑ Port size
- X1 → Ⓒ Flow direction

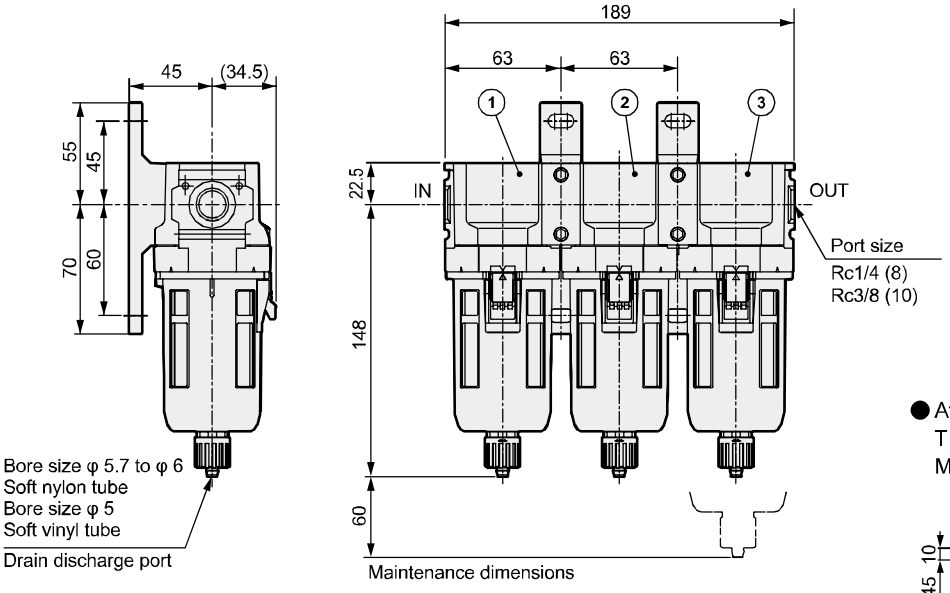
Code	Description	Ⓐ Model No. SFC307	Ⓐ Model No. SFC407
Ⓑ Port size			
8	Rc1/4	●	●
10	Rc3/8	●	●
15	Rc1/2		●
Ⓒ Flow direction			
Blank	Standard flow (left → right)	●	●
X1	Reverse flow (right → left)	●	●

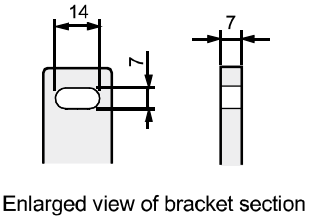
● Replacement element model numbers

Element model No. / Model	Anti-bacterial pre-filter Element	High-performance anti-bacterial filter Element	Bacteria removing filter Element
SFC307	SFC310-ELEMENT	SFC320-ELEMENT	SFC330-ELEMENT
SFC407	SFC410-ELEMENT	SFC420-ELEMENT	SFC430-ELEMENT

Dimensions

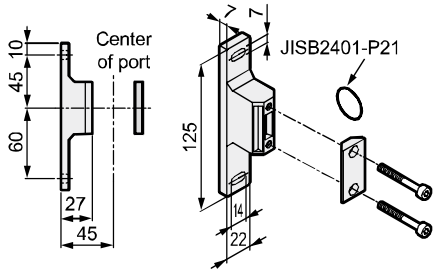
● SFC307





Enlarged view of bracket section

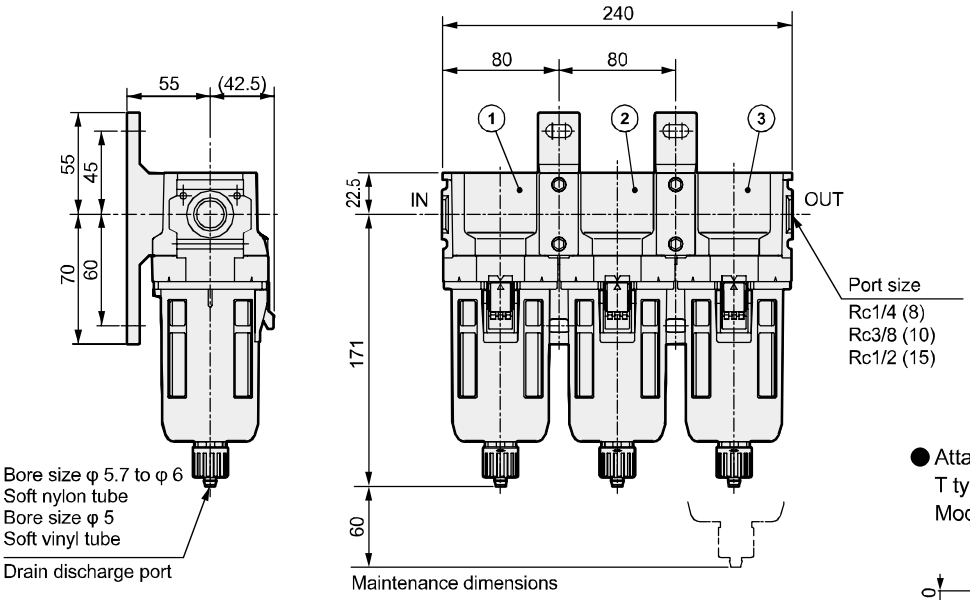
● Attachment
T type bracket
Model No.: SFB310-FP2

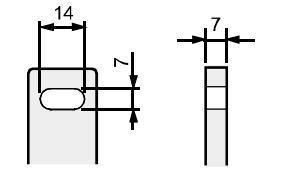


* Set screws made of stainless steel

No.	Series
(1)	Anti-bacterial pre-filter
(2)	High-performance anti-bacterial filter
(3)	Bacteria removing filter

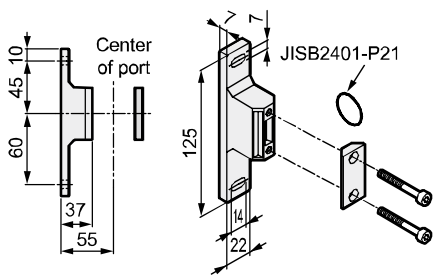
● SFC407





Enlarged view of bracket section

● Attachment
T type bracket
Model No.: SFB410-FP2



* Set screws made of stainless steel

No.	Series
(1)	Anti-bacterial pre-filter
(2)	High-performance anti-bacterial filter
(3)	Bacteria removing filter

Anti-bacterial Combination

Materials compliant with Food Sanitation Law

SFC306/SFC406-FP2 Series

● Port size: Rc1/4 to Rc1/2

RoHS CAD

Specifications

Description		SFC306	SFC406
Working fluid		Compressed air	
Working pressure range	MPa	0.15 to 1.0	
Proof pressure	MPa	1.5	
Ambient temperature/fluid temperature	°C	5 to 45	
Filtration rating	μm	0.01 (nominal)	
Max. flow rate Note 1	m^3/min (ANR)	0.36	0.7
Port size		Rc1/4, Rc3/8	Rc1/4, Rc3/8, Rc1/2
Weight	Kg	0.62	1.06
Standard accessories		Maintenance seal (supplied with product)	
Element replacement		1 year (6000 hours) or pressure drop to 0.1 MPa	

Note 1: Use the product within the max. flow rate. These values are for when the primary pressure is 0.7 MPa.

How to order

SFC306 - 10 - X1 - FP2

Ⓐ Model No.

Ⓑ Port size

Ⓒ Flow direction

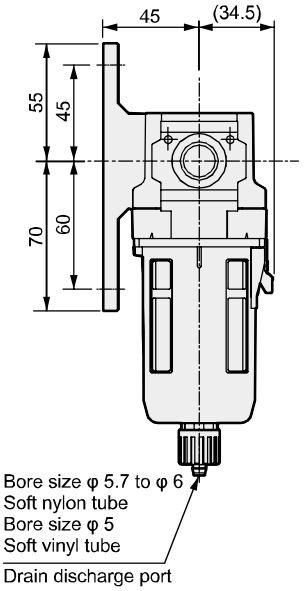
Code	Description	Ⓐ Model No. SFC306	Ⓐ Model No. SFC406
Ⓑ Port size			
8	Rc1/4	●	●
10	Rc3/8	●	●
15	Rc1/2		●
Ⓒ Flow direction			
Blank	Standard flow (left → right)	●	●
X1	Reverse flow (right → left)	●	●

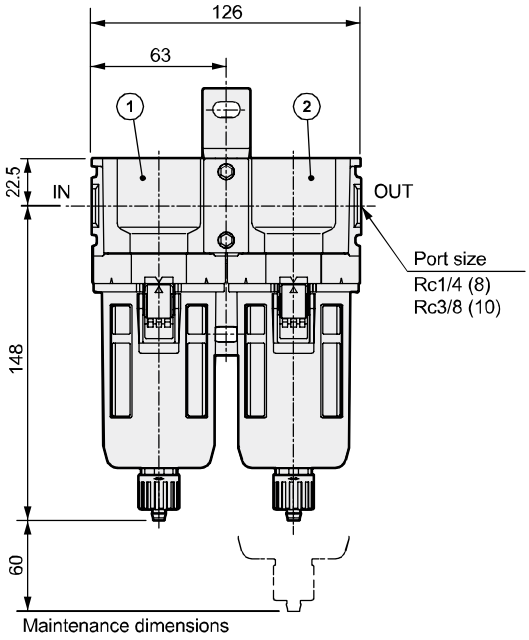
● Replacement element model numbers

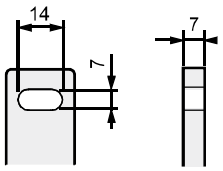
Element model No. / Model	Anti-bacterial pre-filter Element	High-performance anti-bacterial filter Element
SFC306	SFC310-ELEMENT	SFC320-ELEMENT
SFC406	SFC410-ELEMENT	SFC420-ELEMENT

Dimensions

● SFC306

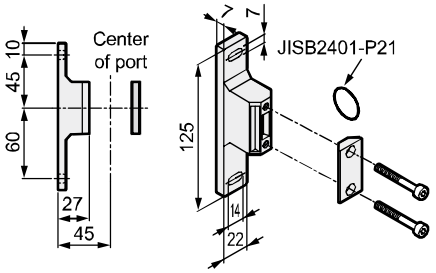






Enlarged view of bracket section

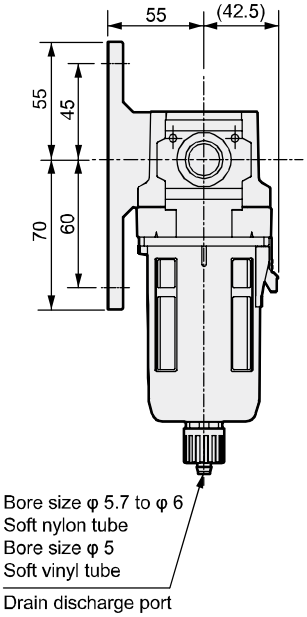
● Attachment
T type bracket
Model No.: SFB310-FP2

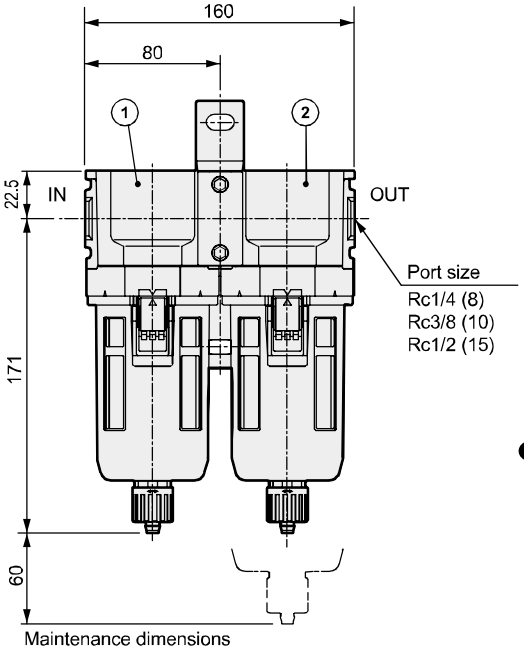


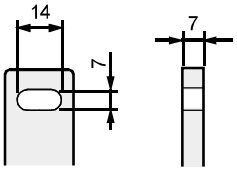
* Set screws made of stainless steel

No.	Series
(1)	Anti-bacterial pre-filter
(2)	High-performance anti-bacterial filter

● SFC406

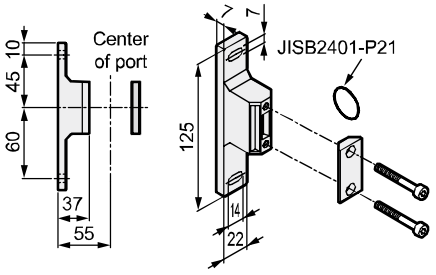






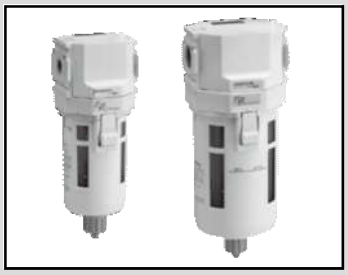
Enlarged view of bracket section

● Attachment
T type bracket
Model No.: SFB410-FP2



* Set screws made of stainless steel

No.	Series
(1)	Anti-bacterial pre-filter
(2)	High-performance anti-bacterial filter



Bacteria removing filter

SFC330/SFC430-FP2 Series

● Port size: Rc1/4 to Rc1/2

Materials compliant with Food Sanitation Law

RoHS CAD

Specifications

Description		SFC330	SFC430
Working fluid		Compressed air	
Working pressure range	MPa	0.15 to 1.0	
Proof pressure	MPa	1.5	
Differential pressure proof	MPa	0.5	
Ambient temperature/fluid temperature	°C	5 to 45	
Filtration rating	μm	0.01 (removal efficiency 99.99%)	
Max. flow rate Note 1	m^3/min (ANR)	0.3	0.5
Port size		Rc1/4, Rc3/8	Rc1/4, Rc3/8, Rc1/2
Weight	Kg	0.28	0.52
Standard accessories		Maintenance seal (supplied with product)	
Element replacement		1 year (6000 hours) or pressure drop to 0.1 MPa	

Note 1: Use the product within the max. flow rate. These values are for when the primary pressure is 0.7 MPa.

How to order

SFC330 - 10 - X1 - FP2

Ⓐ Model No.

Ⓑ Port size

Ⓒ Flow direction

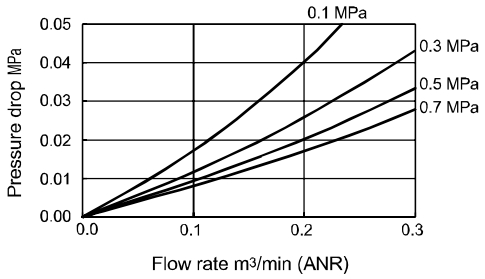
Code	Description	Ⓐ Model No. SFC330	Ⓐ Model No. SFC430
Ⓑ Port size			
8	Rc1/4	●	●
10	Rc3/8	●	●
15	Rc1/2		●
Ⓒ Flow direction			
Blank	Standard flow (left → right)	●	●
X1	Reverse flow (right → left)	●	●

● Replacement element model numbers

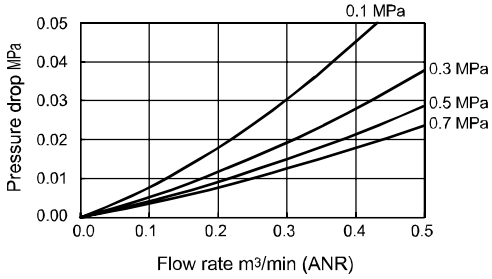
Element model No. / Model	Bacteria removing filter Element
SFC330	SFC330-ELEMENT
SFC430	SFC430-ELEMENT

Flow characteristics

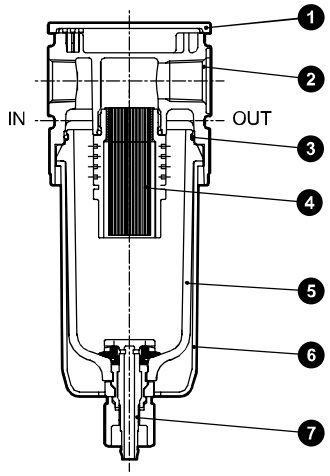
● SFC330



● SFC430



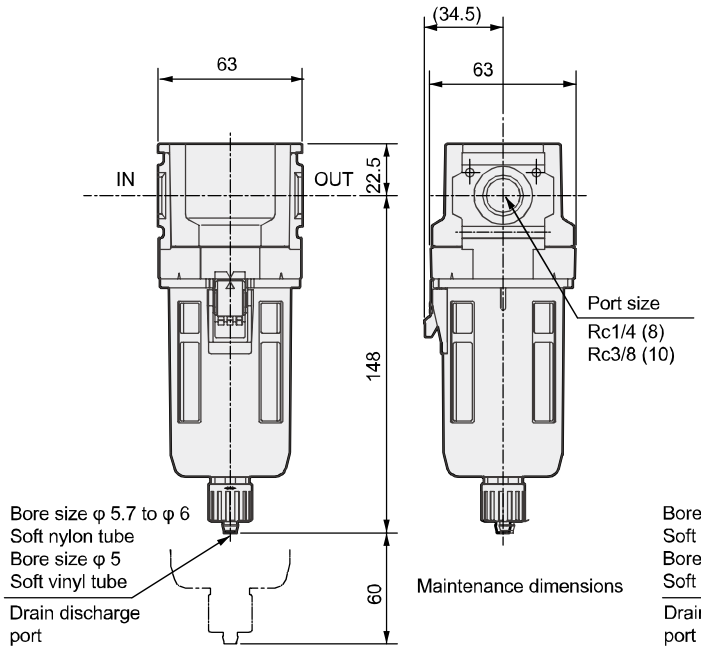
Internal structure and parts list



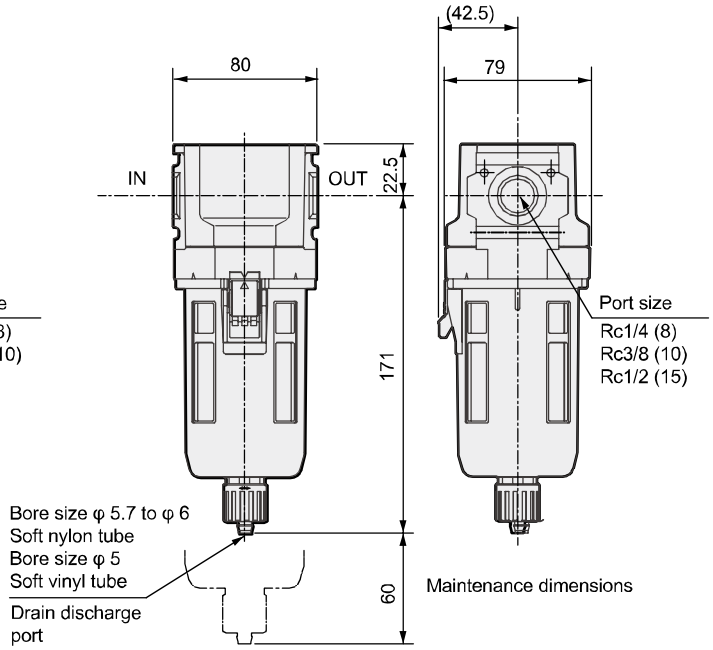
No.	Parts name	Material	
		SFC330	SFC430
1	Plate cover	ABS resin infused with anti-bacterial agent	
2	Body	Aluminum alloy die-casting (paint infused with anti-bacterial agent)	
3	O ring	Fluoro rubber (compliant with Food Sanitation Law)	
4	Element	Polypropylene (compliant with Food Sanitation Law) and urethane resin (compliant with Food Sanitation Law) Transparent polyamide resin (compliant with Food Sanitation Law)	
5	Bowl	Polyamide resin (compliant with Food Sanitation Law)	
6	Bowl guard	Polyamide resin infused with anti-bacterial material	
7	Drain cock	Polyacetal resin infused with anti-bacterial material	

Dimensions

● SFC330



● SFC430



Bacteria removing Filter/Inline Type

SFS10-FP2 Series

Materials compliant with Food Sanitation Law

● Port size: Rc1/4, Rc3/8
Push-in fitting φ 8, φ 10, φ 12

RoHS CAD

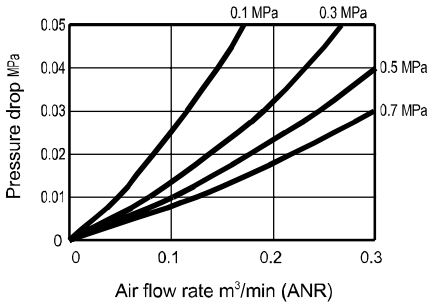
Specifications

Description	Resin type		Stainless steel type
	SFS10- (*1) (*2)		SFS10- (*1) (*2) -M
Working fluid	Compressed air, N_2		
IN side port size (*1) / OUT side port size (*2)	Push-in fitting φ 8, φ 10, φ 12, select from Rc1/4 and Rc3/8		Select from Rc1/4 and Rc3/8
Proof pressure MPa	1.5		2.25 (compressed air) , 1.5 (N_2)
Differential pressure proof MPa	0.5		
Working pressure MPa	-0.095 to 0.99		-0.095 to 1.5 (compressed air) , -0.095 to 0.99 (N_2)
Ambient temperature/ fluid temperature °C	5 to 45		
Filtration rating μm	0.01 (removal efficiency 99.99%)		
Processing flow rate ℓ/min (ANR)	300 to 400 Note 1		
Weight Kg	Push-in fitting	Thread type	0.5
	0.15	0.11	
Assembling/inspection/packaging	Integrated production in cleanroom		
Cleaning	Degreasing and cleaning		

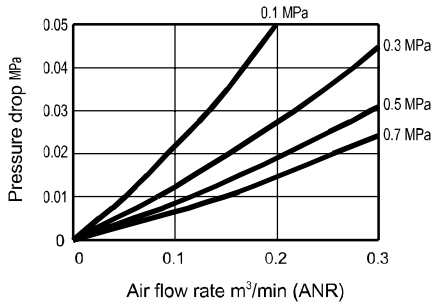
Note 1: Initial flow rate at primary pressure 0.7 MPa and pressure drop 0.03 MPa. (This may vary depending on the port size.)

Flow characteristics

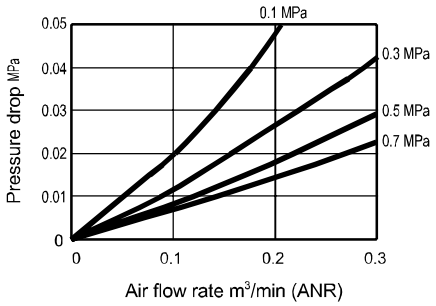
● SFS10-H8H8



● SFS10-H10H10
● SFS10-88



● SFS10-H12H12
● SFS10-1010



How to order

● Resin type

SFS10 - H8 H8 - FP2

Model No.

Ⓐ IN side Port size

Ⓐ IN side port size	
H8	φ 8
H10	φ 10
H12	φ 12
8	Rc1/4
10	Rc3/8

Ⓑ OUT side Port size

Ⓑ OUT side port size	
H8	φ 8
H10	φ 10
H12	φ 12
8	Rc1/4
10	Rc3/8

● Stainless steel type (custom order)

SFS10 - 8 8 - M - FP2

Model No.

Ⓐ IN side Port size

Ⓐ IN side port size	
8	Rc1/4
10	Rc3/8

Ⓑ OUT side Port size

Ⓑ OUT side port size	
8	Rc1/4
10	Rc3/8

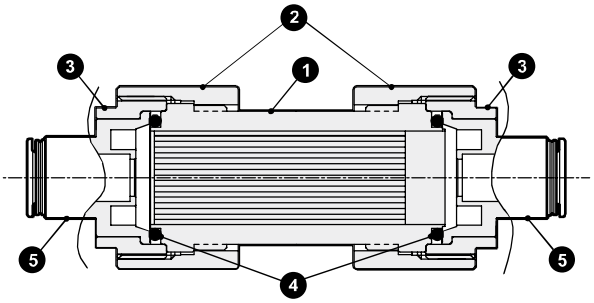
Note 1: Two set screws (M3 × 40), two plain washers, and two spring washers are included with the product.

● Replacement element model numbers (1 element, 2 O-rings)

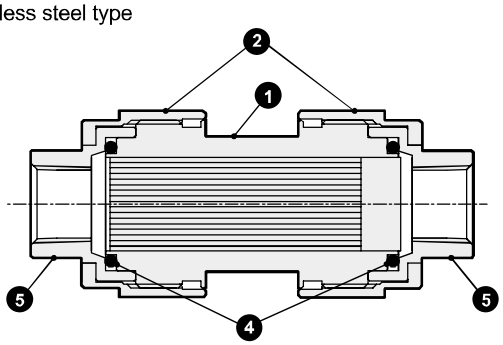
• For resin type: **SFS10-E** • For stainless steel type: **SFS10-E-M**

Internal structure and parts list

● Resin type



● Stainless steel type

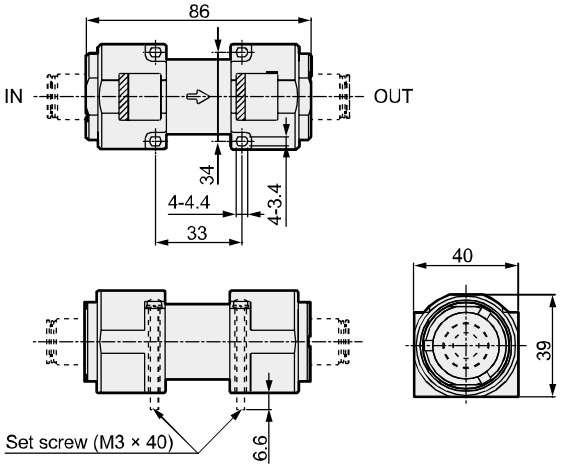


● Parts list

No.	Parts name		Resin type	Stainless steel type
1	Element	Housing	Transparent polyamide (compliant with Food Sanitation Law)	Stainless steel
		Filter	Polypropylene (compliant with Food Sanitation Law)	
		Potting material	Urethane (compliant with Food Sanitation Law)	
2	Body		Polyamide resin infused with anti-bacterial material	Stainless steel
3	Plug		Polyamide resin infused with anti-bacterial material	-
4	O ring		Fluoro rubber (compliant with Food Sanitation Law)	Fluoro rubber (compliant with Food Sanitation Law)
5	Cartridge fitting (port size φ 8, φ 10, φ 12)		Copper alloy (nickeling) Hydrogenated nitrile rubber (compliant with Food Sanitation Law)	-
	Adaptor (port size Rc1/4, Rc3/8)		Aluminum (alumite treatment)	Stainless steel

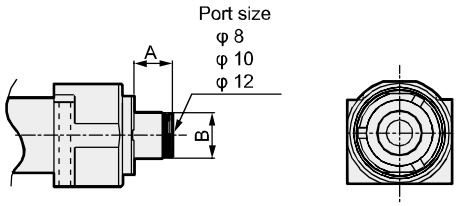
Dimensions CAD

● Resin type

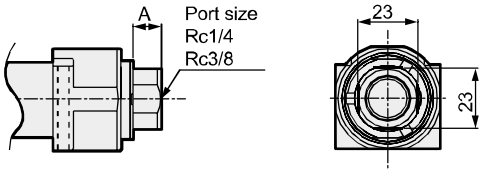


Connection model No.	Port size	A	B
H8	φ 8 push-in fitting	12	φ 17.5
H10	φ 10 push-in fitting	14.5	φ 17.5
H12	φ 12 push-in fitting	16	φ 19.5
8	Rc1/4	11	-
10	Rc3/8	11	-

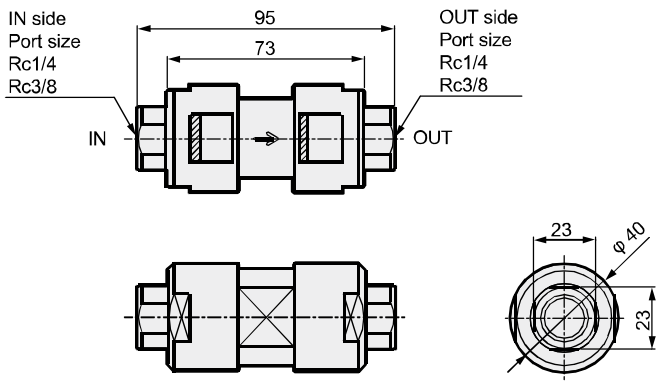
• Push-in fitting (φ 8, φ 10, φ 12)



• Rc thread (Rc1/4, Rc3/8)



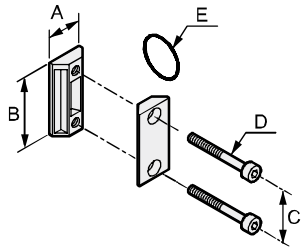
● Stainless steel type



Anti-bacterial/Bacteria Removing Filter

Joiner set

● Model No.: SFJ400-FP2



Model No.	Applicable model	A	B	C	D	E	Weight (kg)
SFJ400-FP2	SFC3**Series SFC4**Series	21	44	32	M5	JIS B2401-P21	0.036

* Set screws made of stainless steel

Distributor

How to order

SFD401 - 00 - 8 - B31 - FP2

Ⓐ Port size

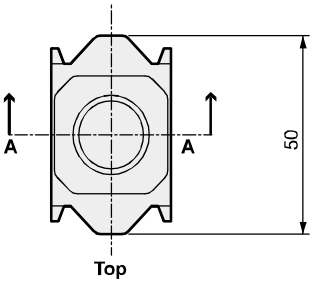
Ⓑ T type bracket

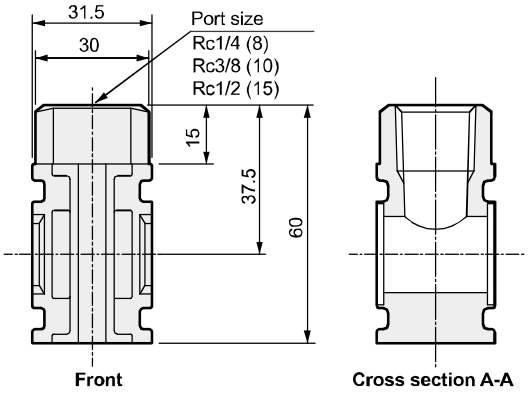
Code	Description
Ⓐ Port size	
8	Rc1/4
10	Rc3/8
15	Rc1/2
Ⓑ T type bracket	
Blank	None
B31	SFC3**Series
B41	SFC4**Series

⚠ Note on model No. selection

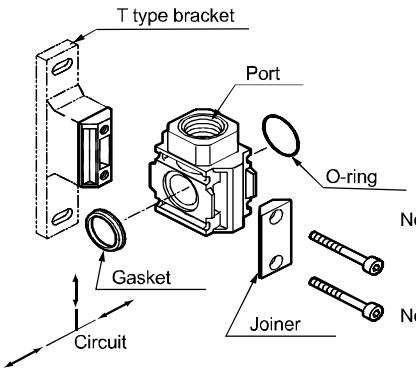
Note 1: The joiner set (joiner, bolt, O-ring) and one gasket are enclosed as a standard.
Note 2: Contact CKD for 2 way branch.

● SFD401-00-*-*-FP2





Assembly method



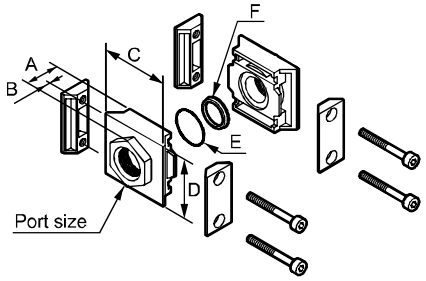
Note 1: Insert the O-ring when mounting on the primary side, and insert the gasket when mounting on the secondary side for the air flow.
Note 2: When inserting the O-ring and gasket for assembly, the O-ring and gasket must not be folded.

* Set screws made of stainless steel

Dimensions and applications

Piping adaptor set

● Model No.: SFA400-*-FP2



Model No.	Port size	A	B	C	D	E (O ring)	F (gasket)	Weight (kg)
SFA400-8-FP2	Rc1/4	20	6	50	45	JISB2401 P21 1 pc.	1 pc.	0.16
SFA400-10-FP2	Rc3/8							
SFA400-15-FP2	Rc1/2							

* Set screws made of stainless steel

Anti-bacterial/Bacteria Removing Filter

Safety Precautions

Always read this section before use.
For general precautions and safety precautions for each individual product, refer to "Pneumatic Valves (CB-023SA)" and "Pneumatic, Vacuum, and Auxiliary Components (CB-024SA)".
The products in the general catalogs above are not intended for use in applications that come into contact with beverages or food, but FP2 series products can be used in these applications within the range indicated in the product specifications.

Design & selection

⚠WARNING

■ The bacteria removing filter performs a sterilization process on the bacteria that adhere to the internal filter element, thereby suppressing the growth of bacteria. The sterilization process is not performed by applying compressed air.
The anti-bacterial power is indicated by the bactericidal activity value, which is an actual value based on predetermined conditions set by CKD.

■ The bacteria removing filter eliminates and reduces the bacteria in compressed air, but it does not completely remove all bacteria. Viruses cannot be removed. Particulates smaller than the filtration rating also cannot be removed. The bacteria removing power is indicated by the LRV, which is an actual value based on predetermined conditions set by CKD.

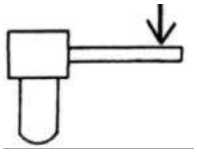
■ This product is designed for industrial use. Do not use the product in any systems or circuits that involve human lives.

■ The filters remove particulates and bacteria from the compressed air, supplying clean compressed air to the secondary side.
The compressed air itself does not obtain anti-bacterial/bacteria removing properties.

■ These parts are made of polycarbonate, and cannot be used in environments containing sodium hypochlorite, synthetic oil, organic solvents, chemicals, coolant, screw locking agent, leak detection solutions, or hot water, etc., or where these substances may come in contact with them.
Refer to page 12 for details on the chemical resistance characteristics of the plastic bowl and transparent case.

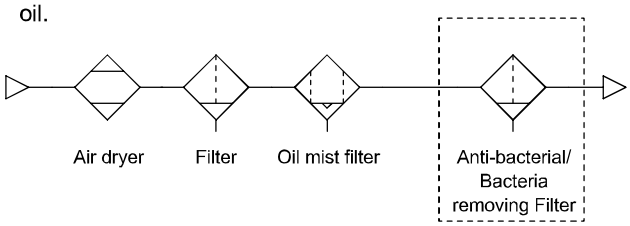
■ Piping load torque
Avoid piping fixed with a single support, as this can result in excessive force and lead to damage.
[Combination, modular type]
Make sure that no piping load or torque is applied to the body or pipes.

Tightening torque N·m
50



⚠CAUTION

■ Check the working circuit and working fluid.
To prevent drop in filter performance, install dryer, air filter and oil mist filter on the primary side, and remove water or oil.



■ Do not exceed the max. working or differential pressure.
Failure to observe this precaution could damage the product or element.

■ Do not flow over the max. flow rate.
Failure to observe this precaution could degrade the filtration accuracy or damage the element.

■ This device cannot be used as an absolute filter.

■ Do not use where IN and OUT side pressure difference exceeds 0.1 MPa.
Supplying air suddenly to the filter (by blowing air with secondary side released to atmospheric pressure, etc.) could make removal inefficient. Install a metering valve on the filter's IN side to make the pressure difference 0.1 MPa or less.

■ When the amount of drainage is significant install the air dryer and drain separator before the anti-bacterial/bacteria removing filter.
If there is a large amount of drainage from the compressor, hot and highly humid air could shorten the device's life or result in corrosion.

■ For a water-lubricated compressor circuit take measures to prevent chlorine-based substances from entering the compressed air.

Installation & adjustment

⚠WARNING

■Prevent the generated ozone from passing through the filter. Otherwise the filter element may be degraded. Take special care when using the product together with an ozone generator (e.g., ionizer).

(1) Do not install it upstream from the filter.

(2) When installing it downstream of the filter, stop the air while neutralizing static electricity, since the generated ozone may flow back.

⚠CAUTION

■ Do not use the products in an environment where they are exposed to direct ultraviolet light.

■ Match the flow direction and the direction of the arrow on the product for a correct connection.

■ Securing of maintenance space

Secure sufficient space for maintenance and inspection.

■ Flush and clean the pipes.

Dirt or foreign materials in piping will lower product performance.

■ Check that foreign materials do not enter when tightening pipes or fittings.

Make sure that debris of pipe thread or sealant material enters the pipes when connecting the pipes and fittings. Dirt or foreign materials in piping will lower the product performance. In particular, if there are any debris of pipe thread from the OUT side port of the unit that is installed last, they will enter the pipes. When piping, tighten each connection to the torque specified in the catalog, and sufficiently flush the pipes before use.

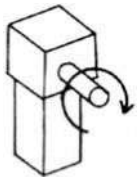
■ Install the drain cock vertically facing downward.

■ Piping screw-in torque

[Combination, modular type]

Make sure that excessive torque is not applied on the body and pipe when piping.

Tightening torque N·m
30



[Inline type]

Port thread	Tightening torque N·m
Rc1/4	6 to 8
Rc3/8	13 to 15

■ Drain piping

● The drain pipe for the plastic bowl has a barb fitting, and a tube can be directly installed. Confirm that the drain cock is closed before inserting the tube.

Pipe so that no lateral load is applied to the bowl.

Do not secure the tube connected to the drain discharge port with a lateral load applied. If drained with a lateral load applied, external leakage may occur.

■ Tightening torque of the drain cock

● The maximum tightening torque of the drain cock of a plastic bowl is 0.5 N·m.

■ Pipe so no excessive force is applied to the product.

When piping or installing, do not apply tension, pressure, bending or external force from a tube, etc.

■ When supplying compressed air for the first time after connecting pipes, do not apply high pressure suddenly.

Connected piping could dislocate, and tubing could fly off.

■ Select the correct piping tube.

■ Securely insert a tube into the push-in fitting before use.

■ Use the hex section of the connection parts when piping.

[Inline type]

When piping Rc threaded pipes, use a wrench on the hex of the connection parts. Do not clamp on any other parts when tightening.

During use & maintenance

⚠ WARNING

■ Perform a periodic inspection at least once every six months to check for any cracks, scratches, or other damage to the plastic bowl and transparent housing. Replace with a new bowl or product if you find any cracks, scratches or other deterioration, as they may result in breakage.

■ Periodically check the plastic bowl for any staining.
- If it is stained and becomes difficult to see through, replace it with a new one.
- Use water and household detergent to wash parts. Rinse them out well with clean water afterward.

■ Removing the plastic bowl
Stop the compressed air supply. Release the pressure in the bowls completely before you remove them. Make sure that there is no residual pressure.

■ Drain the air filter.
Components could malfunction if drainage flows into the secondary side.

■ Do not use alcohol to disinfect or clean the product. Doing so could cause plastic parts or other components to deteriorate and break.

⚠ CAUTION

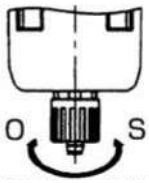
■ The anti-bacterial/bacteria removing power decreases if any dirt or oil has adhered to the filter element. Periodically check and replace the filter element. Contact CKD for maintenance details.

■ Attach the maintenance seal enclosed with the product so that the maintenance period can be clearly identified.

■ Do not disassemble or modify the product.

■ Read the instructions and precautions enclosed with the product before use or maintenance. Make sure to wash your hands before installing a new element.

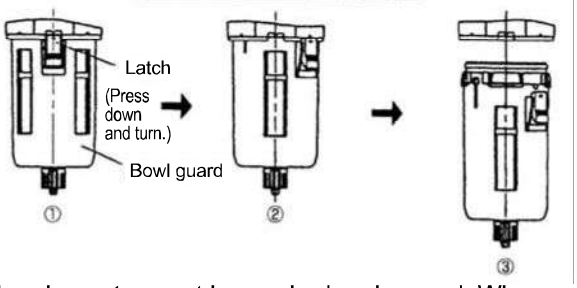
How to release drainage



Plastic bowl

- Drainage starts when the cock is turned to the O side, and the discharge stops when the cock is turned in the S direction. Tighten by hand in the S direction.

Detaching the resin bowl



■ The element cannot be washed and reused. When one year (6,000 hours) elapses or the pressure drops to 0.1 MPa, replace the element with a new one.

■ Storing the product
Do not store this product in a hot, humid atmosphere or in atmospheric conditions outside of the specified range for a prolonged period of time. Resin or rubber parts could deteriorate, and the resin element housing could become discolored. Contact CKD before storing the product outside of the specified range.

■ While operating, do not apply vibration, impact, or other external force from the tube.

Chemical resistance of plastic

⚠ WARNING

- The chemical resistance of plastic parts is shown below.
- Avoid using products in an atmosphere where chemicals are contained in the compressed air, the atmosphere, or where they could adhere to parts.
- Use in the above state could lead to bowl damage and accidents.

Chemical resistance of plastic bowl and transparent housing

Contact CKD when using the product in an atmosphere containing the chemicals indicated below. Check whether the testing solutions, sealants and adhesives contain the following chemicals.

Chemicals	Category of chemicals	Major products of chemicals	General applications	Nylon
Inorganic chemicals	Acids	Sodium hypochlorite, hydrochloric acid, sulphuric acid, hydrofluoric acid, phosphoric acid, chromic acid, etc.	Sterilization, acid pickle for metals, acidic degreasing solution, coating treatment solution, etc.	×
	Alkalines	Alkaline substances such as caustic soda, caustic potash, slaked lime, aqueous ammonia, sodium carbonate	Alkaline degreasing solution for metals Water-based cutting oil, leakage detection agent	○
	Inorganic salts	Sodium sulfide, sodium nitrate, potassium bichromate, sodium sulfate, etc.		○
Organic chemicals	Aromatic group Hydrocarbons	Benzene, toluene, xylene, ethyl benzene, styrene, etc.	Contained in paint thinner (benzene, toluene, and xylene)	×
	Chlorine aliphatic hydrocarbons	Methyl chloride, ethylene chloride, methylene chloride, acetylene chloride, chloroform, trichlene, perchlene, carbon tetrachloride	Organic solvent-based cleaning liquid for metals (trichlene, perchlene, carbon tetrachloride)	○
	Chlorinated aromatic hydrocarbons	Chlorobenzene, dichlorobenzene, benzene hexachloride (B/H/C), etc.	Agricultural chemicals	○
	Petroleum components	Solvent naphtha, gasoline, kerosene		○
	Alcohols	Methyl alcohol, ethyl alcohol, cyclohexanol, benzyl alcohol	Used as antifreezing agent Leakage detection agent	×
	Phenols	Carbolic acid, cresol, naphthol, etc.	Disinfectant solution	×
	Ethers	Methyl ether, methyl ether ethyl, ethyl ether	Additives for brake fluid	○
	Ketones	Acetone, methyl ethyl ketone, cyclohexanone, acetophenone, etc.		×
	Carboxylic acids	Formic acid, acetic acid, butyl acid, acrylic acid, oxalic acid, phthalic acid, etc.	Dyes/oxalic acid for aluminum processing, phthalic acid for paint base and leak-detection agent	×
	Esters	Dimethyl phthalate (DMP), diethyl phthalate (DEP), dibutyl phthalate (DBP), dioctyl phthalate (DOP)	Lubricant, synthetic oil, rust-prevention agent additive plasticizer for synthetic resin.	○
	Oxyacids	Glycol acid, lactic acid, malic acid, citric acid, tartaric acid		×
	Nitro compounds	Nitro methane, nitro ethane, nitro ethylene, nitro benzene, etc.		○
	Amines	Methylamine, die methylamine, ethylamine, aniline, acetoacetanilide, etc.	Additives for brake fluid	×
	Nitriles	Acetonitrile, acrylonitrile, benzonitrile, aceto isonitrile, etc.	Raw material for nitrile rubber	○