



# Operation Manual

PRODUCT NAME

***Clean Gas Filter***

MODEL / Series / Product Number

***SFB Series***

**SFB3\*\*-02**

**SMC Corporation**

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# Clean Gas Filter Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger." They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)\*1), and other safety regulations.

- \*1) ISO 4414: Pneumatic fluid power -- General rules relating to systems.
- ISO 4413: Hydraulic fluid power -- General rules relating to systems.
- IEC 60204-1: Safety of machinery -- Electrical equipment of machines .(Part 1: General requirements)
- ISO 10218: Manipulating industrial robots -Safety.
- etc.

	<b>Caution</b>	<b>Caution</b> indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	<b>Warning</b>	<b>Warning</b> indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	<b>Danger</b>	<b>Danger</b> indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

## Warning

### **1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.

The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.

This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

### **2. Only personnel with appropriate training should operate machinery and equipment.**

The product specified here may become unsafe if handled incorrectly.

The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

### **3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.

2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.

3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

### **4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.

3. An application which could have negative effects on people, property, or animals requiring special safety analysis.

4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.



# Clean Gas Filter Safety Instructions

## Caution

### **1. The product is provided for use in manufacturing industries.**

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

## **Limited warranty and Disclaimer/Compliance Requirements**

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".

Read and accept them before using the product.

### **Limited warranty and Disclaimer**

**1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.\*2)**

**Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.**

**2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.**

**This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.**

**3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.**

**\*2) Vacuum pads are excluded from this 1 year warranty.**

**A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.**

**Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.**

### **Compliance Requirements**

**1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction(WMD) or any other weapon is strictly prohibited.**

**2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulation of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.**

## Caution

**SMC products are not intended for use as instruments for legal metrology.**

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country.

Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.



## SFB Series / Specific Product Precautions

Be sure to read this before handling the products.

Refer to "Handling Precautions for SMC Products" (M-E03-3) for Safety Instructions

### Caution on Design/Selection

#### Warning

**1. Confirm the specifications.**

The clean gas filter is designed for use with only compressed air or nitrogen. Do not use this product with fluid, pressure or temperature beyond the specifications. Otherwise, they could cause damage to the product.

**2. Determine the product by the maximum consumption flow rate.**

When using compressed air for an air blow application, calculate the maximum volume of air that will be consumed before selecting the SFB series product size. (Using a product which exceeds the maximum air flow and running excessive compressed air can cause the cleanliness of the compressed air to deteriorate and/or its element to be damaged.)

**3. Set the air flow capacity with an initial pressure drop of 0.02 MPa or less. If the initial pressure drop is set to be too high, the product's replacement cycle will become much shorter due to clogging.**

#### Caution

**1. Do not use under conditions where a pressure difference exceeding 0.1 MPa is present between the inlet side and the outlet side.**

Use under such conditions may lead to not only a decline in cleanliness but also element damage.

**2. Install in a location where the product will not be subject to pulsations or pressure fluctuations exceeding 0.1 MPa.**

Pulsations and pressure fluctuations exceeding 0.1 MPa may damage the product.

**3. Use caution regarding the particles that may be emitted from the outlet side of a pneumatic equipment.**

Installation of a pneumatic equipment on the outlet side of the SFB series can deteriorate the cleanliness because a particle will be generated from the equipment. In the case of installing the pneumatic equipment in the outlet side of the SFB series, dusts can be generated from the equipment, and the degree of cleanliness can be deteriorated.

The mounting position of the pneumatic equipment needs to be considered depending on the degree of cleanliness of a required operating fluid.

### Caution on Design/Selection

**4. Design that the piping load should not be applied on the product body.**

Mount a bracket for the piping and the other connecting equipment so that the piping load is not applied to the product body.

**5. Generally, the following pollutant particles are contained in compressed air, although the degree of cleanliness of the compressed air is different depending on the compressor type and specifications.**

[Pollutant particle substances contained in the compressed air]

- Moisture (drainage)
- Dusts and particles which are in the surrounding air
- Deteriorated oil which is discharged from the compressor
- Solid foreign matter such as rust and/or oil in the piping

- 1) The SFB series is not compatible with compressed air which contains fluids such as water and/or oil.
- 2) Install a dryer (IDF, IDG, ID series), mist separator (AM series), micro mist separator (AMD series), super mist separator (AME series), or odor removal filter (AMF series), etc., for the source of the air for the SFB series.

### Piping

#### Caution

**1. Unpacking the sealed package**

Since the filter is sealed in an antistatic double bag, the inner package should be unpacked in a clean atmosphere (such as a clean room).

**2. Confirm that there is enough space for maintenance before installing and piping this product.**

**3. Apply a wrench to 2 chamfered flats on the IN side or the OUT side to prevent the housing from rotating.**

**4. Confirm the IN and the OUT before piping. The product should not be used with the wrong connection.**

**5. Connection**

1) Rc connection

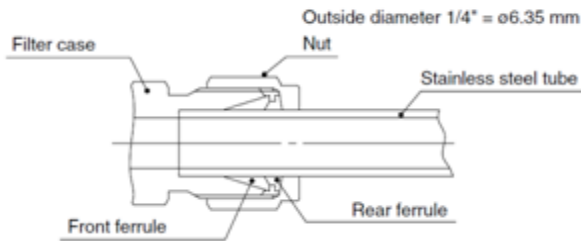
Confirm that chips from the pipe threads and sealing material do not enter the piping.

Also, when sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.

## Piping

### 2) TSJ connection

The TSJ fitting is a kind of a self-align fittings. Set it as shown in the figure.



Regarding the TSJ fittings, after tightening the nut by hand, add another 1 1/4 to 1 1/2 turns with a wrench to seal the fitting. In case the fitting is re-installed after filter replacement, first tighten the nut by hand and add another 1/4 to 1/2 turns for sealing. Use the following parts as piping and fittings.

- Piping
    - Outside diameter 1/4" =  $\phi$ 6.35 mm
    - Stainless steel tube
  - Nut
  - Front ferrule
  - Rear ferrule
- } Attached to product  
(2 pcs each)

In the event of replacing the body, a space (20 mm or longer) for extending the stainless steel tubes from the IN and OUT side will be required.

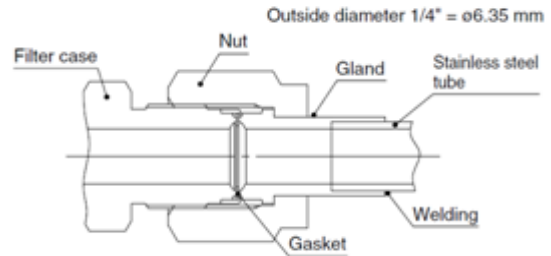
When using similar fittings of other brands, be sure to conduct a helium leak test to confirm there is no leakage before using.

## Piping

### 3) URJ fittings

The URJ fitting is a union type fitting using a metal gasket.

Install it as illustrated below.



Weld the gland and piping when the fitting is used. At the time of welding, supply inert gas such as Nitrogen to the piping to prevent the formation of an oxide film. Also, remove the oxide film on the external surface through electrolytic polishing or acid cleaning. After tightening the nut by hand, add another 1/8 turn with a wrench to seal the fitting. Use the following parts for piping and fittings.

- <1/4">
- Piping
    - Outside diameter 1/4" =  $\phi$ 6.35 mm
    - Stainless steel tube
  - Nut Swagelok® fittings by Swagelok Company  
VCR female nut  
(SS-4-VCR-1)
  - Gland Swagelok® fittings by Swagelok Company  
VCR gland  
(SS-4-VCR-3)
  - Gasket Swagelok® fittings by Swagelok Company  
VCR gasket retainer assembly  
(SS-4-VCR-2-GR)

Be sure to conduct a helium leak test before using similar fittings from other companies.

Note) Swagelok is a registered trademark of Swagelok Company

### 6. Line flushing

Flush the piping line when the filter is used for the first time or has been replaced. In the event of connecting such as piping, flush (air blow) when using this product for the first time or replacing its elements in order to reduce the affect of the dust generated from the connection, etc.

Flushing the line is also required to eliminate contamination resulting from the piping line installation. Therefore, be sure to flush the line before actually running the system.

## Operating Environment

### Caution

- 1. Use caution in order to prevent workpieces from being damaged by entrained air from the surrounding area.**

When the compressed air is used for air blow, the exhausted air from the blow nozzle may have taken in airborne foreign matter (such as solid particle, fluid particle) from the surround air. The foreign matter will be sprayed on the workpiece, and the airborne foreign matter may adhere to it. Therefore, use caution for the surrounding environment.

## Maintenance

### Caution

- 1. When the element comes to the end of its life, immediately replace it with a new filter .**
- 2. Timing of filter replacement**

The replacement time for filter is when one of the following conditions occurs.

  - 1) After 1 year of usage has elapsed.
  - 2) When the pressure drop reaches 0.1 MPa even though the operating period has been less than 1 year.
- 3. Post maintenance inspection**

After installation or repair, perform an appropriate function and leakage test.

## 1. Product components and functions

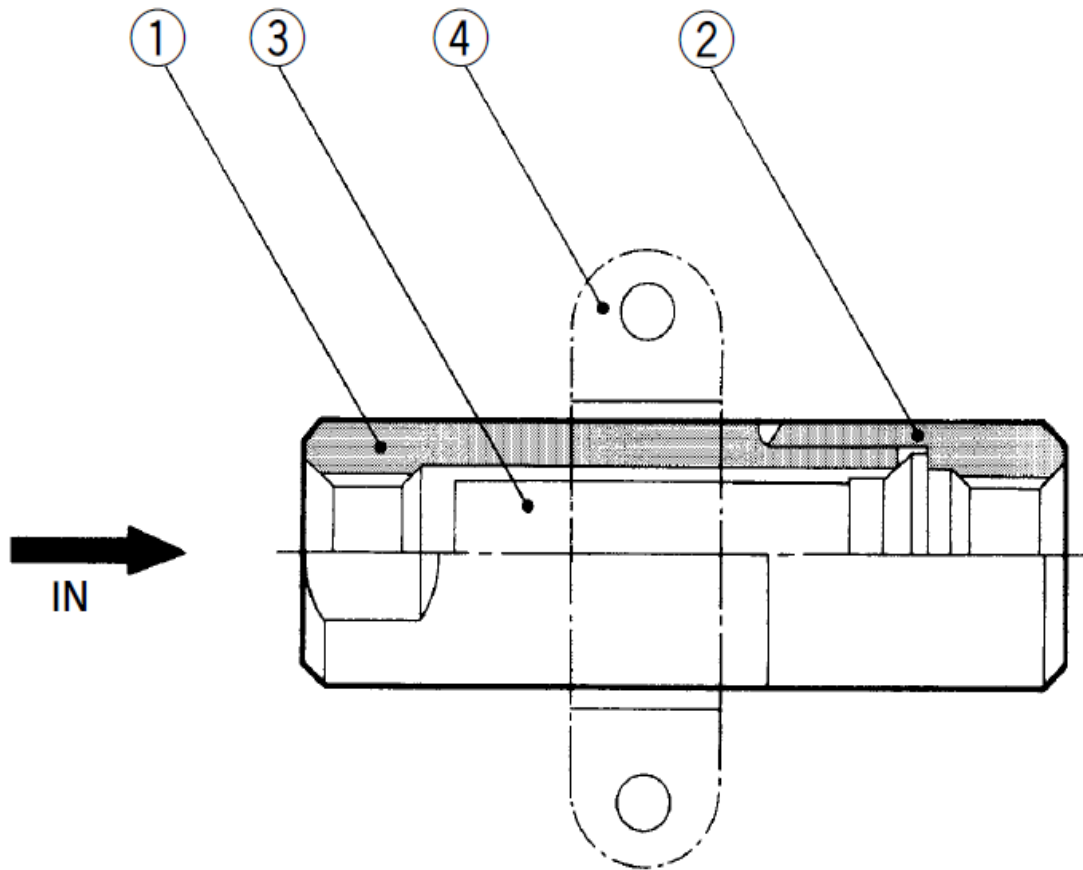


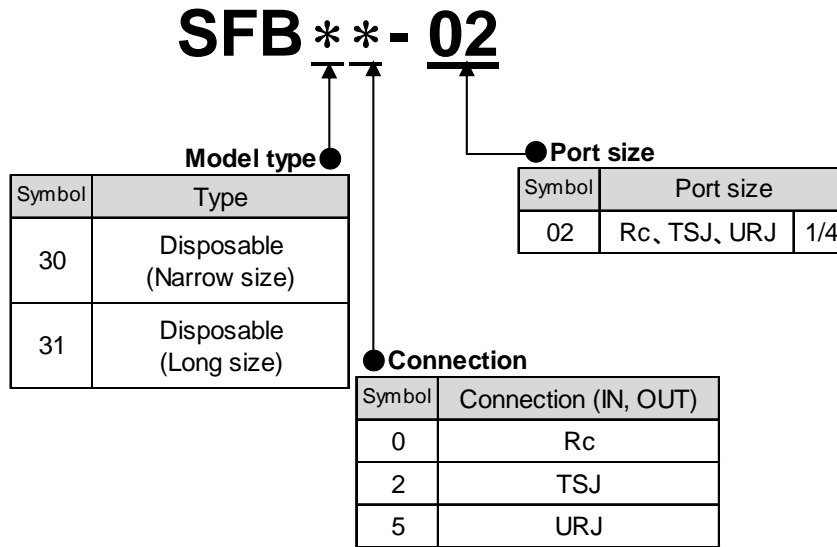
Table 1. Product components and functions

No.	Description	Material	Note
1	Case	SUS316	Main body
2	Cover		
3	Element	PTFE membrane	Catches foreign matter.
4	Bracket	SUS304	Holds the filter body. When using the bracket, use two M4 bolts.



## 2. Specifications

### 2-1 How to Order



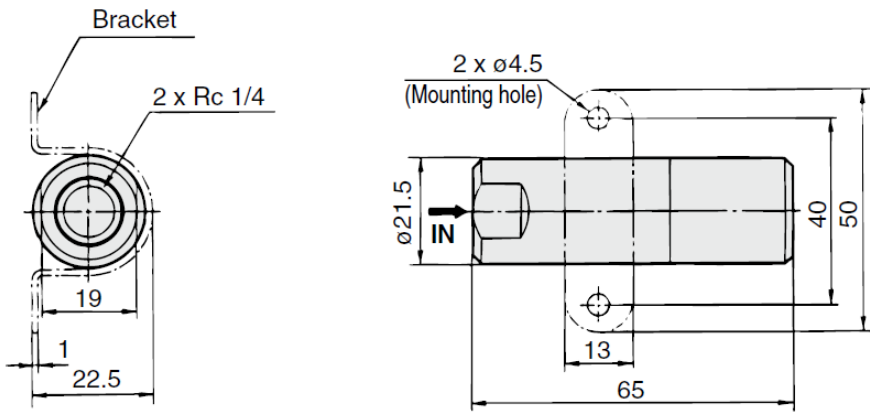
note) SFB31: Only 5 is selectable.

### 2-2 Specifications

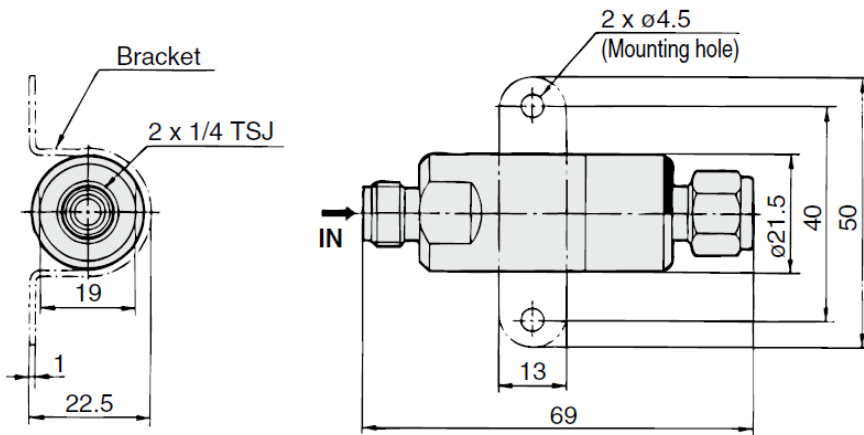
Specifications		Remarks
Fluid	Air, Nitrogen	This product cannot be used in an environment exposed to chemicals.
Operating pressure	MAX. 0.99MPa Vacuum $1.3 \times 10^{-6}$ kPa	- The maximum operating pressure is 0.99 MPa since this product does not conform to the High Pressure Gas Safety Law. - Use under conditions where pressure fluctuations (pulsations) exceeding 0.1 MPa do not occur.
Operating temperature	5°C to 120°C	
Element proof differential pressure	MAX. 0.5MPa	
Element reverse differential pressure	MAX. 0.07MPa	Not possible to use with connecting in reverse.
Filtration	0.01μm	Filtering efficiency 99.99% Based on SMC's measuring conditions.
Helium leak volume	$4.0 \times 10^{-9}$ Pa·m <sup>3</sup> /sec or less	
Main material	Case/Cover	Stainless steel 316 (Interior/Exterior: Electrolytic polishing)
	Filter medium	PTFE membrane
	Bracket	Stainless steel 304

## 2-3 Dimensions

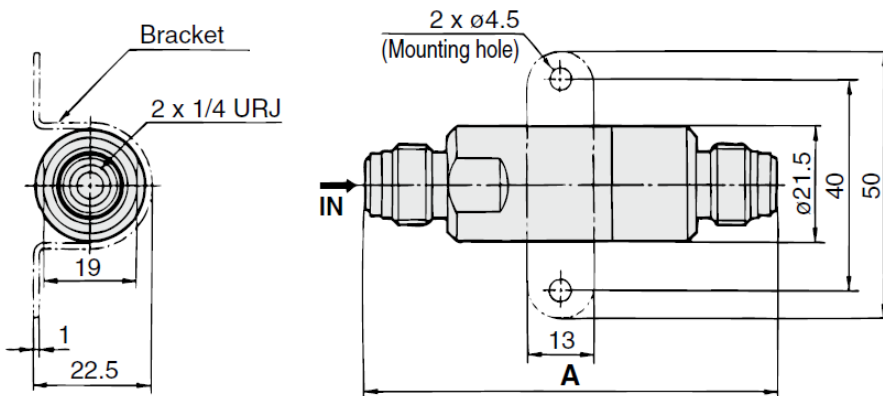
### 1) SFB300-02: Rc1/4



### 2) SFB302-02: TSJ1/4 (Tube Swage Joint)



### 3) SFB305-02, SFB315-02: URJ (Union Ring Joint)



Model	A
SFB305-02	79
SFB315-02	84

## 3. Mounting

### 1) Piping

- Flush the piping before connecting the piping.
- Confirm the IN and the OUT before piping. The product should not be used with the wrong connection.  
(IN and OUT direction should be identified by the IN mark indicated on the case.)
- Apply a wrench to 2 chamfered flats on the IN side or the OUT side to prevent the housing from rotating.  
Leakage may occur if a large rotational force is applied to the housing.

Note) Piping method should be performed in accordance with Piping in the Specific Product Precautions.

### 2) Operation

- Flush the piping line before the starting actual operation when the filter is used for the first time or has been replaced.

Revision history
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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.  
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