



# Operation Manual

**Product Name**

**High Precision Filter for Liquids**

**Model / Series / Product Number**

**FGH series**

**SMC Corporation**

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# Industrial 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)<sup>\*1)</sup>, 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 10218-1992: 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.



# Industrial Filter

## Safety Instructions

### Caution

**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.

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.

### 『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.

3 Check the law for pressure vessels or operating fluids specified in each country in advance and determine whether or not the product can be used.

4 This product does not correspond to regulations or standards for pressure vessel of any country or region.



## FGH Series / Specific Product Precautions

Be sure to read this before handling.

**These safety instructions are intended to prevent hazardous situations and/or equipment damage. Make sure to follow every instruction since they are for safety.**

### ■ Handling

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.

### Warning

- Do not operate the product outside of the specifications.
  - Operating pressure: If pressure outside of the specified range due to such things as water hammer or surge pressure is possible, install an accumulator. When the product is used for gas, the maximum operating pressure shall be 0.5Mpa.
  - Operating temperature: Even if the specified temperature range is satisfied, the product cannot be used if the temperature is over the boiling point of the operating fluid.
  - Fluid: Do not use fluid which is harmful to the human body.
  - Do not use any fluid which will cause the seal or element to swell or deteriorate.
  - Operating environment: Note that the valve is not for outdoor use. - Do not use the product where it can be exposed to vibration or impact.
  - Do not use in environments where there is a danger of corrosion.

- Do not use the product with flammable or highly permeable fluids.
  - Usage may cause a fire, explosion or leakage.

- Do not disassemble with pressure applied.
  - Never loosen the connecting part (bolt) while pressure is being applied to the product. Make sure that the gauge pressure in the line is zero before loosening the bolts. Otherwise it may cause an injury.
- Do not modify the product.
  - Broken parts may cause an injury or failure.

### Caution

- Do not touch the filter or piping when hot fluid is used.
  - Using this product at high temperatures (40 to 80 °C) may cause burns.
  - Do not touch the surface until it is cooled down to less than 40°C.
- Connect IN and OUT correctly. (Make sure that reverse flow will not be generated)
  - Make sure that back flow will not be generated. The element might break due to exposure to back flow.
- Perform regular leakage inspections and release trapped air when supplying pressure after the maintenance.
  - Stop operation if there are abnormalities such as leakage.

Do not restart operation until the corrective action (replacement with a new gasket, retightening of the fitting etc.) is taken.

  - Release the air.
- Determine the replacement period of the element by referring to the differential pressure.
  - Replace the element when the differential pressure reaches 0.1MPa. If the element is not replaced, the element can be damaged.
- Wear personal protective equipment when replacing the element.
  - When replacing, make sure to wear protective gloves, protective glasses, etc. Fluid and captured foreign matter may cause injury.
- Make sure that load such as vibration or weight is not applied to the filter piping.
  - Fix the IN/OUT piping to the base using U bolts, or fix to the panel using a bracket. Otherwise, the filter may be damaged.
- High-viscosity fluids generate large differential pressures at low temperatures, which can damage the element.

## 1. Parts Descriptions and Functions

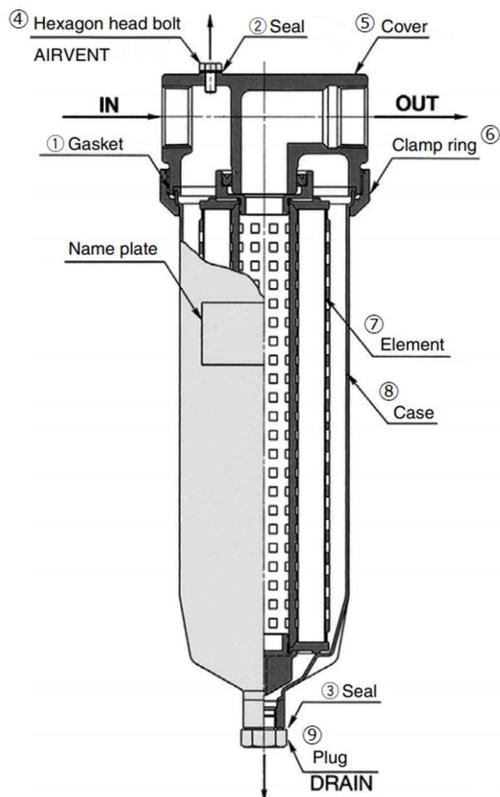


Figure 1 Parts descriptions and functions

Table 1-1 Parts Descriptions and Functions

No	Description	Material	Function
(1)	Gasket	PTFE	
(2)	Seal	PTFE	
(3)	Seal	PTFE	
(4)	Hexagon head bolt	SUS316	Plug to release air in the housing.
(5)	Cover	SUS316	The lid of the filter body.
(6)	Clamp ring	SUS316	Connects the case and cover, tightens the cover.
(7)	Element	Depends on the element type	Collects residue.
(8)	Case	SUS316	Filter body.
(9)	Plug	SUS316	Drainage discharging plug.

Table 1-2 Replacement parts

No	Descriptions	Model		
		FGH100	FGH200	FGH300
(1)	Gasket	AL-58S#1		
(2)	Seal	AL-43S		
(3)	Seal	AL-53S		

\*One of each (1) Gasket, (2) Seal and (3) Seal are used per filter.

\*Use a commercially available belt wrench to attach or remove the clamp ring.

## 2. Product Specifications

Table 2 Specifications

Model	FGH100	FGH200	FGH300
Fluid	Various kind of liquid (Industrial water, washing liquid, general solvent, etc.)		
Port size(Rc)	3/8, 1/2, 3/4, 1		
Max. operating pressure (MPa)	1.0		
Max. operating temperature (°C)	80 (below boiling point)		
Number of elements	1		
Element size(mm) <sup>Note 1)</sup>	125	250	500
Differential pressure for element replacement (MPa)	0.1		
Materials <sup>Note 2)</sup>	Cover	SUS316	
	Case	SUS316	
	Gasket/O-ring	PTFE	
	Seal	PTFE	
Weight (kg) <sup>Note 3)</sup>	2.6	3.2	4.3
Internal capacity (L)	1.0	1.8	3.3

Note 1) The element size is a nominal length.

Note 2) Fluororesin seal may lose its performance over time.

Please confirm the tightening torque periodically.

Note 3) Body only

### 3. How to order

FGH 100 - 03 - J 002 T

● Element length

Symbol	Element length	Applicable Element
100	L117	EJ701S
200	L246	EJ801S,ED801S
300	L496	EJ901S,ED901S

● Element seal aterial  
\*PTFE

● Nominal filtration accuracy

Symbol	Nominal filtration accuracy		Applicable Element	Applicable model
002	2μm	Filtration efficiency 99%	HEPO II	FGH100~300
004	4μm			
006	6μm			
013	13μm			
X20	0.2μm	Filtration efficiency 99.9%	Membrane	FGH200~300
X40	0.4μm			

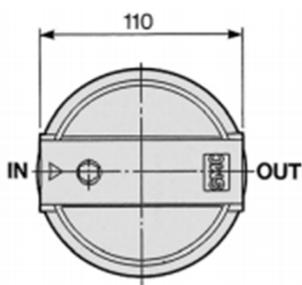
● Element category

Symbol	Element
J	HEPO II
D	Membrane

● Port size

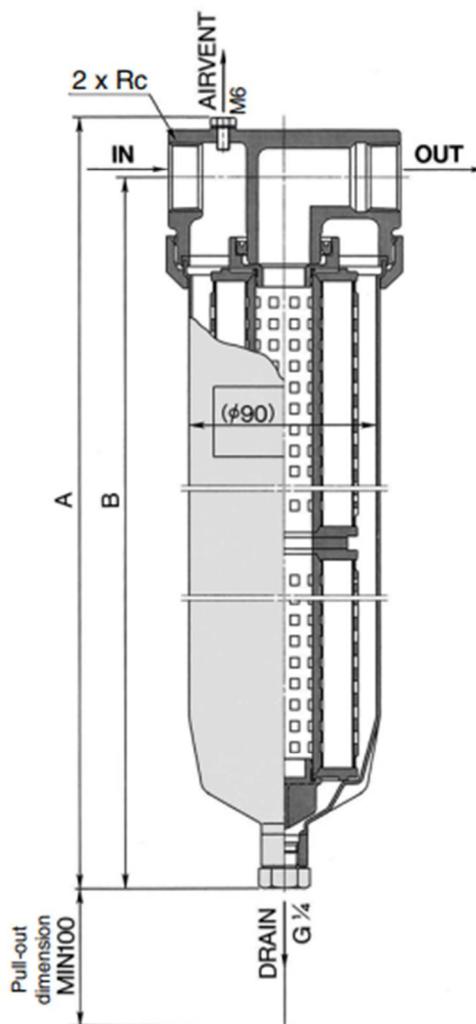
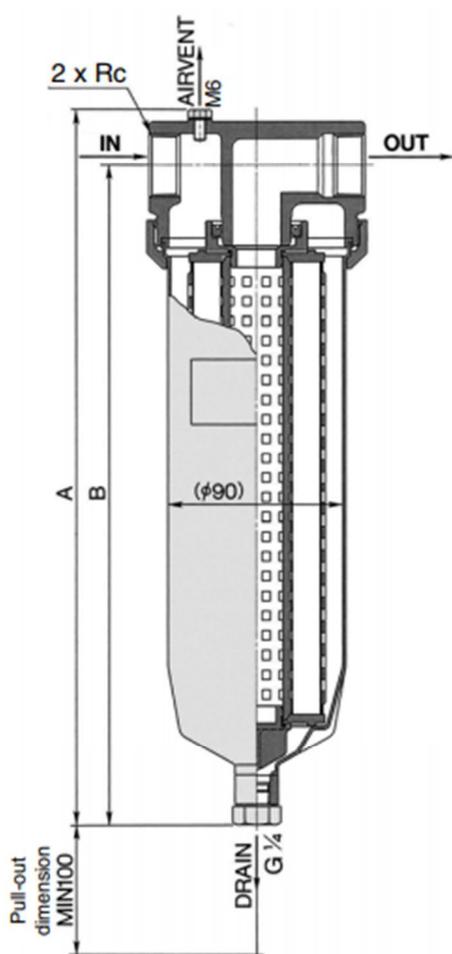
Symbol	Port size (Rc)
03	3/8
04	1/2
06	3/4

#### 4. Dimensions



**FGH100/200**

**FGH300**



#### Dimensions

Model	Element length	Port size (Rc)	A	B
<b>FGH100</b>	ø70 x L117	3/8, 1/2	235	211
		3/4, 1	240	
<b>FGH200</b>	ø70 x L246	3/8, 1/2	364	340
		3/4, 1	369	
<b>FGH300</b>	ø70 x L496	3/8, 1/2	615	591
		3/4, 1	620	

## **5. Installation and Piping**

### **[1] Installation**

- 1) When installing, allow sufficient space for maintenance.

Reserve a space of 100mm or more beneath the reservoir.

- 2) Start with a flow with an initial differential pressure across the element of 0.02 MPa or less.

If operation starts with differential pressure exceeding 0.02 MPa, the element replacement will be shortened significantly.

- 3) This filter generates particles at first. Before initial operation, flush the piping enough to remove the particles completely.

### **[2] Piping**

- 1) Check each port size for selecting valves and fittings suitable for operating conditions.

Please check Safety Instruction before use.

- 2) For filter piping, apply a spanner to the filter cover so that force is not applied to the filter case.

## **6. Maintenance**

Make sure periodically that there is no leakage from around the seals.

Periodically check the pressure, temperature, surge pressure, etc. to make sure they are within the specified range of the filter.

Replace the element before the differential pressure across it reaches 0.1 MPa due to clogging.

\* Element is a disposable product. It cannot be cleaned.

Replacement of element should be performed according to the procedure below.

**[1] Removal of the element.(See Fig.2)**

- 1) Stop operation.
- 2) Check following before maintenance.

**⚠ Confirm that the pressure of the system in which the filter is installed is zero.**

**⚠ When using the product at a high temperature, be sure to check that the surface temperature of the filter container is not more than 40 °C before starting operation in order to prevent burns.**

- 3) After closing the piping valve on the IN side of the filter, close the piping valve on the OUT side of the filter.
- 4) Loosen the air vent and release the residual pressure of the filter completely.
- 5) Discharge the residual fluid inside from the drain port.
- 6) Loosen the clamp ring with a tool such as a belt wrench and remove bowl and then the element.  
(Be careful not to lose the clamp ring.)
- 7) Clean the parts of the filter which are visibly dirty.  
If the gasket or seals are deteriorated or swollen, replace them with new ones.

**[2]Mounting of element. (See Fig.2)**

- 1) Assemble in the reverse order of section 6 Maintenance [1].
- 2) Set the element as below.
  - (1) Make sure that the bowl and the sealing surface of the cover are not scratched.
  - (2) Align the bowl in the gasket groove.
  - (3) Set the element in the bowl. Center the element in the bowl.  
(If there is enough maintenance space, it is possible to attach the element to the cover and then attach the bowl.)
  - (4) Set the clamp ring to the bowl as in Fig. 2.
  - (5) Lightly align the seal part of the element with the sheet of the cover.
  - (6) After screwing the clamp ring into the cover by hand, tighten it with a belt wrench.
  - (7) Set the seals and plug of the drain part, and tighten the hexagon bolt of the air vent.

**[3]Restart the operation**

- 1) After the replacement of the element, check the parts are assembled correctly before restarting operation. In case of fluid leakage, stop the operation immediately. Check the sealing condition and take corrective actions.
- 2) When supplying pressure by starting the pump, open the relief port (hexagon bolt) to discharge air. After the air is released, close the air exhaust port (hexagon bolt) and start operation.

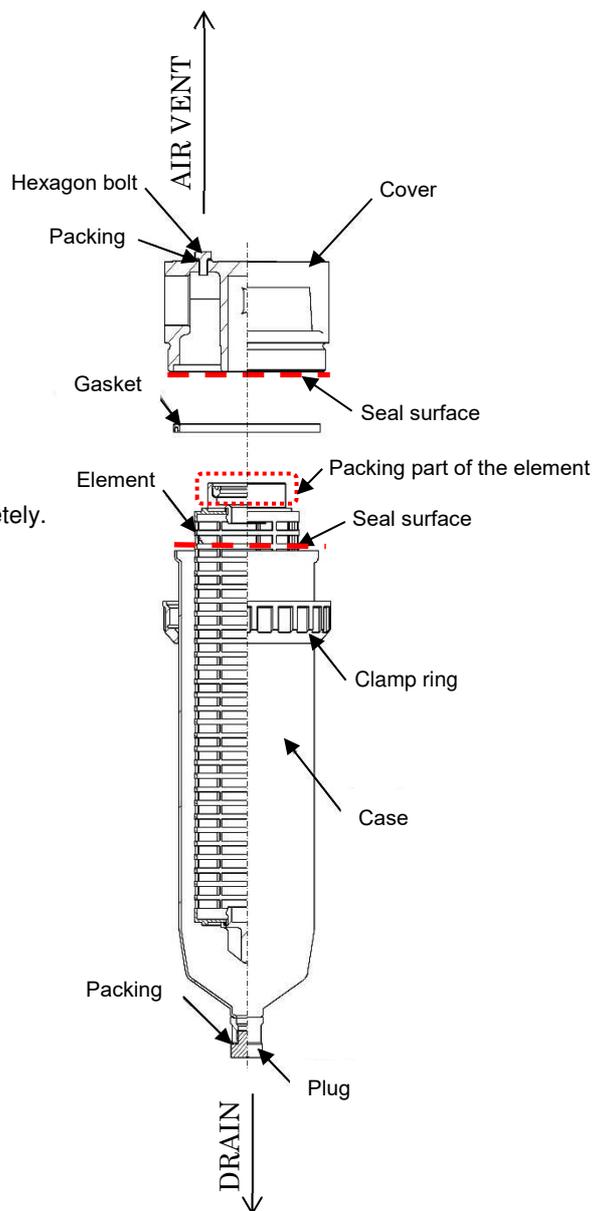


Fig.2 Structural drawing

## **7. Maintenance parts**

### **【1】Replacement Element part number**

They are printed on the name plate of the filter body. They can also be referred to in the catalogue.

### **【2】Consumables**

For other consumables such as gasket or seals, see Table 1- 2.

Revision history

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