Operation Manual

PRODUCT NAME

Bag Filter

MODE / Series

FGFS1※－20－E※B－※
FGFL1※－20－E※B－※

- This operation manual is for above model numbers. Confirm the model number of used bag filter.
- Read and understand the Operation Manual before installing and operating the product.
- In particular, before restarting the product, ensure that safety measures are taken.
- Keep this operation manual available whenever necessary.
- Please note that this Operation Manual is subject to change without prior notice.

SMC Corporation

Contents

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage.
These instructions are categorized into three groups, "Caution", "Warning" and "Danger" depending on the level of hazard and damage, and the degree of emergency.
They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC), Japan Industrial Standards (JIS)*1) and other safety regulations*2).

*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
JIS B 8370: General rules for pneumatic equipment.
JIS B 8361: General rules for hydraulic equipment.
JIS B 9960-1: Safety of machinery – Electrical equipment for machines. (Part 1: General requirements) < Example of required specifications >
JIS B 8433-1993: Manipulating industrial robots - Safety. etc.

*2) Labor Safety and Sanitation Law, etc.

Caution	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
Warning	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
Danger	Danger 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 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 dropping of driven objects or run-away of machinery/equipment 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 location 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.

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

①The warranty period of the product is 1 year in service or within 1.5 years after the product is delivered.*3)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

②For 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 SMC product independently, and not to any other damage incurred due to the failure of the product.

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

***3)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

When the product is exported, strictly follow the laws required by the Ministry of Economy, Trade and Industry (Foreign Exchange and Foreign Trade Control Law).

⚠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.

1. Precautions for handling

Selection / Design

Carefully consider the application, required specifications, and the operating conditions (fluid, pressure, flow rate, temperature, environment, etc.)
Incorrect handling can result in unexpected accidents.

⚠ Warning

①Operating pressure
Do not operate the product outside the operating pressure range of the specifications. Do not use the product where the pressure exceeds the operating pressure range due to water hammer, surge etc.

②Operating pressure
Do not operate the product outside of the operating temperature of the specifications. This model cannot be used at a temperature higher than the boiling point of the operating fluid.

③Applicable fluids
Use the product to filter coolant (oil based or aqueous type), alkalescent cleaning agent, or industrial water.
Do not use the product for gases.
Do not use the product for corrosive fluid.
Do not use any fluid which causes seals, “O” ring or element to swell or deteriorate. The fluid may deteriorate these causing leakages.
The wetted parts of the pressure gauge of the standard specification are made of brass. Check the compatibility with operating fluids.

④Operating environment
Do not use the product under operating conditions or environment in which discoloration or the deterioration of the product is possible.
Do not use the product where it is subjected to vibration or impact.

⚠ Caution

①Pressure drop（ΔP)
Use the product with the flow rate such that the initial pressure drop is 10kPa or less.

②Installation space
Allow sufficient space for maintenance and inspection.
[Maintenance space]
Upper space of the product (Space to remove the basket for replacing the element) --- 450mm or more
Around the band (Space to remove the band for replacing the element) --- 50mm or more for the upper space of the band

③This product is classed as a filter for liquid. However, the product may be classified as a pressure vessel, depending on the country, if there is trapped air inside the product.
When selecting a product model, please comply with local (national) applicable laws and regulations to determine the usability and whether it can be exported.

Installation and piping

⚠ Caution

①Use a circuit which does not apply much pressure or load fluctuation to the filter. (Fig. 1-1)

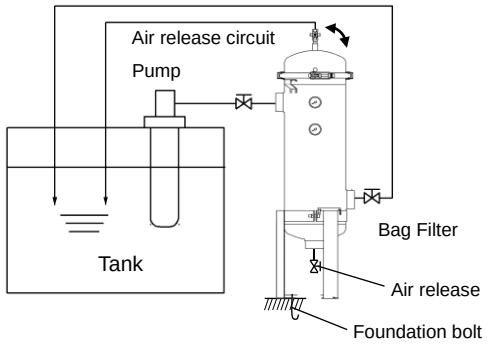


Fig. 1-1 Example of the circulating filter circuit

②Use the product in a circuit where no backflow occurs in the filter. If any backflow occurs, take appropriate measures, such as installation of a non-return valve. The riser piping at the outlet of the filter may also cause backflow. So, take appropriate measures shown above.

③Fix the feet using the foundation bolts

④Check the port size and use valves and fittings which are appropriate for the operating conditions.
Prevent cutting chips and sealant material from getting inside the piping when connecting.
Flush piping with air before operation and check there is no abnormality such as fluid leakage.

⑤Fix the piping to the base using a saddle so that it is not subjected to vibration or weight.

⑥It is necessary to discharge fluid from the reservoir for the replacement of the element.
Connect piping to the fluid outlet to discharge fluid properly.

⑦Connect piping so that air can be discharged.
Piping whereby a small amount of air constantly returns to the tank by a resin tube from the air release valve is helpful to release air properly. (Fig. 1-2)
If the location of the pump is high, the pump may idle when it is restarted. Release air at high position.

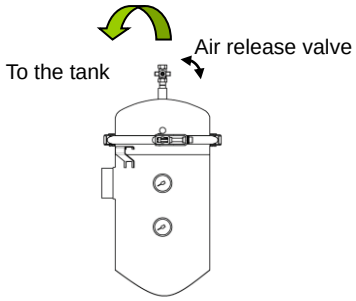


Fig. 1-2. Air release circuit

Precautions for handling

⚠Warning

①Do not loosen the V band while pressure is applied to the product

⚠Caution

①Air release

When supplying pressure when starting the pump, release air by opening the air release valve at the top of the pump. (Fig. 1-3)

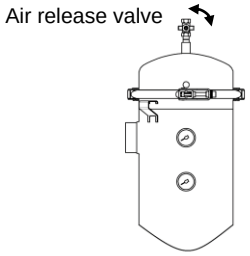


Fig. 1-3 Air release

②During operation

When pressure is applied during the starting of the pump, make sure that each connecting part is completely sealed. Stop operation if any abnormality such as fluid leakage is confirmed.

Do not restart operation until the cause has been investigated and corrective action (replacement with a new O ring, retightening of the fitting) has been taken.

Maintenance

⚠Warning

①Incorrect maintenance procedure can result in fluid leakage or falling of the cover leading to unexpected accidents. Maintenance should be performed according to the procedure indicated in the Operation Manual.

②Make sure that the line is stopped and the pressure is atmospheric pressure (gauge pressure: zero) before starting maintenance and inspection.

⚠Caution

①Element replacement timing

Replace the element with a new one when the replacement timing has come.

Element replacement timing

When pressure drop reaches 0.1 MPa.

②Element replacement

Maintenance should be performed according to the procedure in this operation manual. Improper handling can cause damage and malfunction of equipment and machinery.

Make sure that the pressure is atmospheric pressure (gauge pressure: zero) before the replacement of the element.

Mount the cover connecting parts (V band etc.) to the specified positions after replacement of the element.

③Cleaning of parts

For proper sealing during the replacement of the element, clean off any paint etc which is stuck to the threads of the sealing seat surface and the cover connecting part.

④Replacement of the sealing

Replace any deteriorated or swollen “O” ring or sealing of the holder assembly.

Replace the sealing after a year of usage or when fluid leakage is generated.

⑤Cover connecting parts

Do not use any cover connecting parts (V band) which is deformed or scratched.

⑥Temperature

The usage of this product at high temperature (40 to 80ºC) may cause burns.

To prevent burns, replace the sealing after confirming that the temperature of the filter surface and operating part (V band, element) is lower than 40ºC.

2 Name and function of parts

1) Name and function of parts

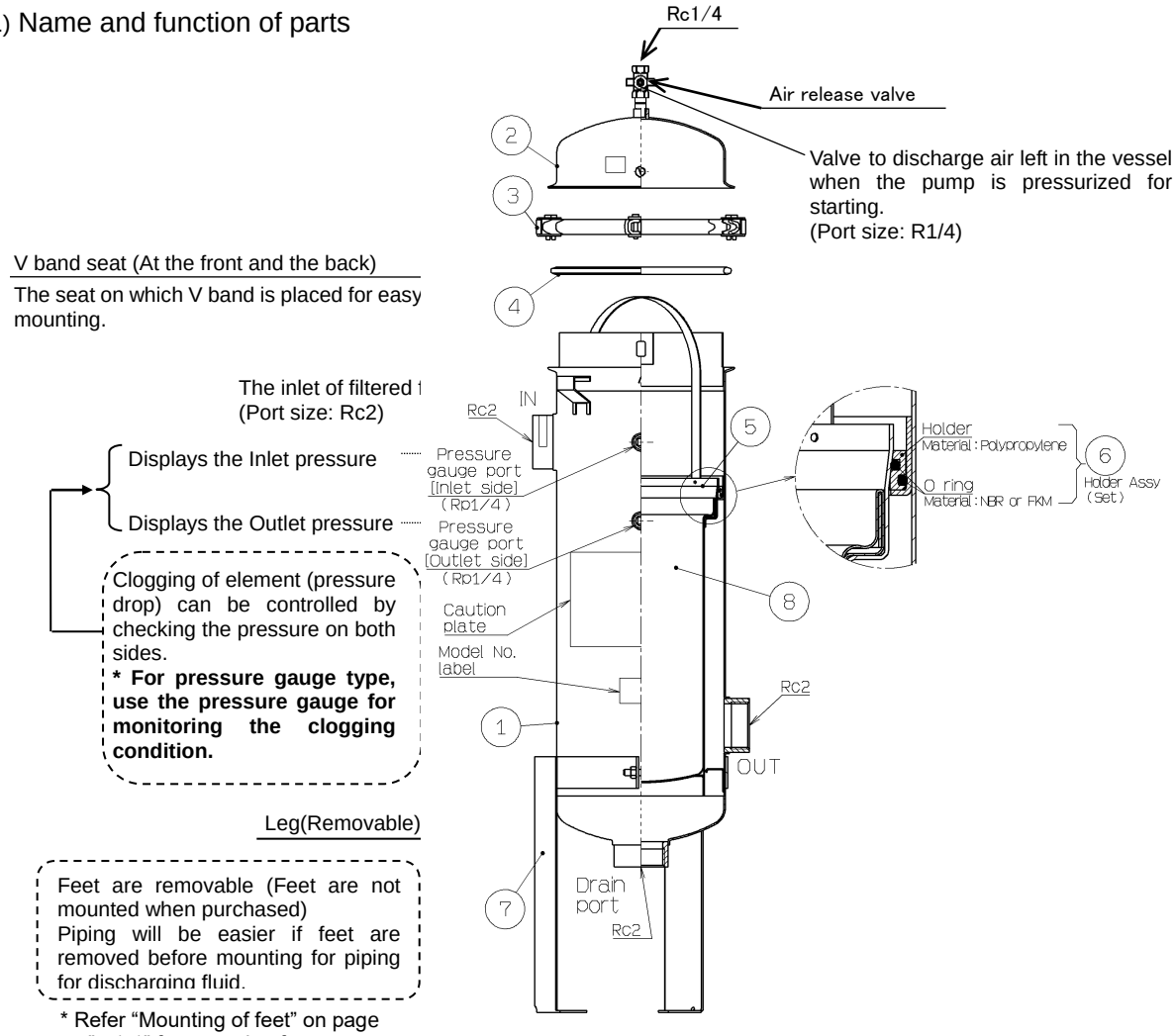


Fig. 2-1 Name and function of parts

2-1. Name and function of parts

No.	Name of components	Part no.	Application type Note 1)	Material	Function
1	Case	—	FGF□1□	Stainless steel	Body
2	Cover	—	FGF□1□	Stainless steel	The lid of the body
3	Band	FGF-BA01	FGF□1□	Stainless steel	Attach the cover to the case and fix them.
4	O-ring	FGF-KT01	FGFS1□	NBR	“O” ring which seals by the sealing part of the cover and the case.
		FGF-KT02	FGFL1□	FKM	
5	Basket	FGF-BT01	FGF□1A	Stainless steel	Basket for mounting the element and set to the body.
		FGF-BT02	FGF□1B		
6	Holder Assembly	FGF-KT03	FGFS1□	Polypropylene / NBR	Seals the basket and the body (O ring is attached to the holder)
		FGF-KT04	FGFL1□	Polypropylene / FKM	
7	Leg Assy	FGF-OP01	FGF□1□	Carbon steel	Supports the body
8	Element	EJ501S-※Note2)	FGF□1A	Polyester	Filters the fluid (Bag element made from non-woven cloth)
		EJ601S-※Note2)	FGF□1B		

Note 1) Check the model number on the model number label for ordering parts. Select the part number which is suitable for specified model number.

Note 2) ※ is the space for the symbol of filtration.

Check the element part number on the model number label before ordering.

(Example) Nominal filtration rating 5um: EJ501S-005

3. How to Order / Specifications

1) How to order

FGF※1※－20－E※B－※

Material

Symbol	S	L
Seal material	NBR	FKM

Element size

Symbol	A	B
Element length	Φ190×L440	Φ190×L770

Port size

Symbol	20
Port size	Rc2

Element

Nominal filtration

Symbol	005	010	025	050	100
Nominal filtration	5μm	10μm	25μm	50μm	100μm

Pressure gauge

Symbol	No symbol	G
Pressure gauge	No	Pressure gauge included

Model change symbol

2) Specifications

Table 3-1. Specifications

	Item	Content		Remarks
		FGF□1A	FGF□1B	
Body	Main applicable fluids	Coolant (aqueous type/ oil based) Alkalescent cleaning agent, industrial water		Not applicable for gas. Fluids which corrode, det eriorate or swell the filter and element material cannot be used.
	Maximum operating pressure	0.5MPa		
	Maximum operating temperature	80℃		
	Maximum operating flow	400L/min		Condition: Fluid Water, Initial pressure drop 7kPa, Nominal filtration 100μm (Refer to the flow characteristics in the catalog for other conditions.)
	Content	0.023m^3(23L)	0.035m^3(35L)	
	Weight	13kg	16kg	
	Applicable standards	None		
Element	Material	Polyester		
	Nominal filtration rating	5、10、25、50、100μm		Depends on the element filtration (Symbol of filtration).
	Element exchange deifferental pressure proof	0.1MPa		

Others) The outer surface of the body is finished with surface treatment equivalent to No.2D(*1). There may be scratches, rubbing, stains, or discoloration which do not affect the function or the performance.)

*1：Symbol for surface finishing of JISB4305 cold rolled stainless steel sheet.

4. Circuit

・Operating pressure, operating temperature and operating fluid conditions shall conform to the product specifications in table 3-1.

・Set the operating flow so that the initial pressure drop becomes 10kPa or less.
(Refer to the SMC catalog for flow characteristics.)

・Use a circuit which does not have large fluctuation of the pressure and flow to the filter. (Figure 4-1)

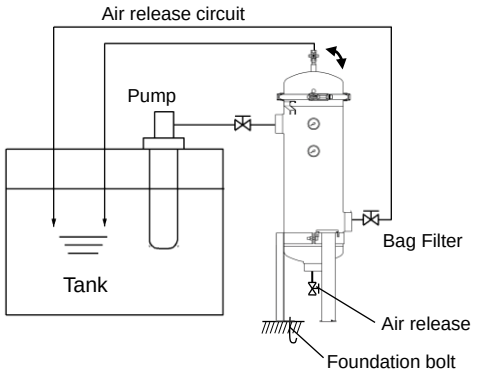


Fig. 4-1 Example of the circulating filter circuit

5. Assembly, installation and piping

1) Assembly

Assemble the product according to the following procedure.

①Check the contents

《Contents》

Filter: 1

Operation manual: 1 (This manual)

Leg: 1 set

Hexagon socket head bolt / Hexagon nut / Flat washer: (1 bag)

Pressure gauges: 2 (for pressure gauge type)

②Take out the filter body. Mount the feet. → Refer to "1-1) Mounting of feet" on page 7.

③Install the pressure gauge (For pressure gauge type) → Refer to "1-2) Mounting of the pressure gauge" on page 7.

1-1) Mounting of feet

*Detachable feet are used for easy piping for discharging fluid.

Piping will be easier if feet are removed before mounting for piping for discharging fluid.

(Piping for discharging fluid after mounting the feet limits the angle for rotating the mounting tool.)

Mount the feet according to steps ① and ② below.

<Accessory> Feet --- 1set (Hexagon socket head bolt / Hexagon nut / Flat washer: (1 bag)

①Mount the feet to the body (case). (Refer to Fig. 5-1, 5-2)

Mount the feet so that they contact the hook of the case.

For the insertion position, refer to the displayed position for mounting on the feet.

②Close the feet. Mount the hexagon socket head bolt / hexagon nut / flat washer to the mounting hole for the bolt of the feet. (Fig. 5-3) Tighten the bolts until the feet are fixed to the case so that they do not become loose.

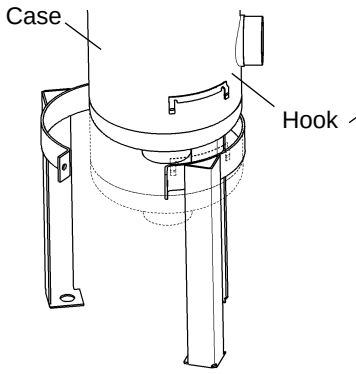


Fig. 5-1.

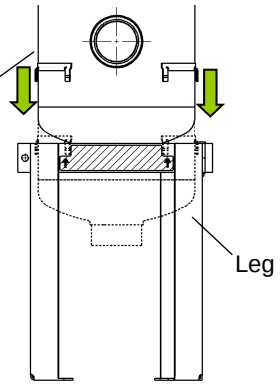


Fig. 5-2.

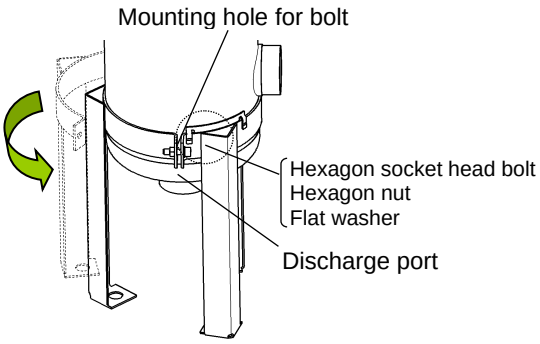


Fig. 5-3.

⚠**Be careful not to drop or knock over the body (case).**

1-2) Mounting the pressure gauges

Mount the pressure gauges (2 pcs.) included in the package to the pressure ports (2 places) without leakage.

Note) Be careful not to tighten too much. Too much tightening can cause breakage.

Use the seal tape for sealing.

Recommended tightening torque: 12 to 14Nm.

Mount the pressure gauges at an appropriate direction and angle so that the display is visible.

*Bag filter without the pressure gauge is shipped with plugs attached to the pressure gauge entry ports of the filter. It is possible to use it in this state.

2) Installation

Fix the feet to the ground using the foundation bolt (M16).

When installing and piping, allow sufficient space for maintenance.

Allow sufficient space for maintenance and inspection.

Upper space of the product (Space for removal for replacing the element) --- 450mm or more

Around the band (Space for removal for replacing the element) --- 50mm or more around the band

Reinforcement is necessary if the product is used in a location where it is exposed to vibration and impact.

3) Piping

Install a fluid discharge valve. It is necessary to discharge fluid from the reservoir for the replacement of

the element.)
Check the port size for piping the valve and fitting which are appropriate for the operating conditions.
Flush piping with air before operation, confirming there is no abnormality such as fluid leakage.
Connect piping so that air can be discharged from the case.

Piping in which a small amount of air constantly returns to the tank by a resin tube from the air release valve is helpful to release air properly. (Fig. 5-4)
If the location of the pump is high, the pump may idle when it is restarted.
Care should be taken.

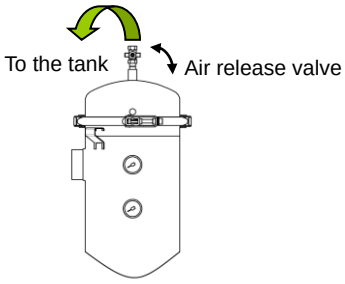


Fig. 1-2. Air release circuit

Fix the piping of the inlet and the outlet to the base using a saddle so that it is not subjected to vibration or weight.

6. Maintenance

1-1) Replacement of the element

Replace the element with a new one when the replacement timing has come.

* Continuing to use an element which is overdue for replacement may cause breakage of the element and the equipment.

[Replacement timing of the element] When differential pressure (pressure drop) reaches 0.1MPa.

[Part number of the element for replacement] EJ501S-※ (FGF☐1A: Element size Φ190 x L440)
EJ601S-※ (FGF☐1B: Element size Φ190 x L770)
* is the space for the symbol of filtration.
Check the element part number on the model number label before ordering.
(e.g.) Nominal filtration 5 μ m: EJ501S-005

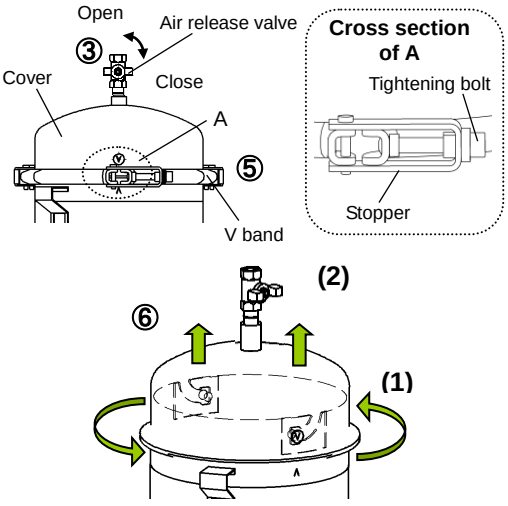
[For the replacement of element] Replace the element following Element Replacement Procedure on Page 8.

1-2) Element Replacement Procedure

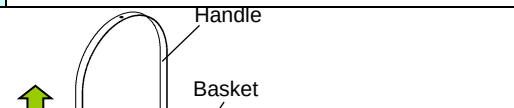
1	[Removal of operation panel]

①Stop operation
②Close the valves in order of inlet (IN) and outlet (OUT).
③Open the air exhaust valve to make the internal pressure atmospheric pressure. (Figure ③)
④Discharge fluid inside by opening the fluid discharge valve.
⑤Loosen the tightening bolt of the V band to remove the stopper. (Figure ⑤on the right)
Tightening bolt can be loosened by a hexagon wrench [flat size 6mm].
⑥Remove V band / cover.
Rotate the cover counterclockwise and lift upwards to remove it. (Steps (1) and (2) in Figure ⑥)
⑦Check O-ring. If there is any failure such as swelling, replace O ring with a new one.
[O-ring for replacement]
Part no.: FGF-KT01 (EGFS1☐: Seal material NBR)
Part no.: FGF-KT02 (EGFL1☐: Seal material FKM)

Warning: Remove the V band and the cover after confirming that the pressure in the filter is atmospheric pressure (gauge pressure: zero).



2	[Removal of the basket]



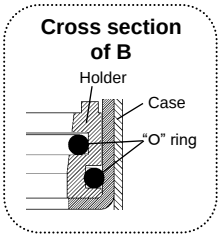
①Remove the basket by lifting it vertically. (Figure on the right)
②Check O-ring mounted to the holder in the case. If there is any failure such as swelling, replace O-ring with a new one.

[Assembly part number of the holder for replacement]

Part no.: FGF-KT03 (For FGFS1☐: Seal material NBR)
Part no.: FGF-KT04 (For FGFL1☐: Seal material FKM)

*Set of holder and O-ring.

⚠ **Caution Be careful not to burn your skin if the temperature is high.**



3 [How to remove element]

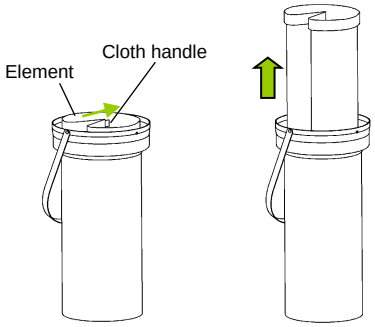
①The element has a handle made of cloth. Move the handle to the center with your finger or a bar to pull the element out of the basket.

[Element for replacement]

Part no.: EJ501S-※ (For FGF☐1A: Element size Ø190 x L440)
Part no.: EJ601S-※ (For FGF☐1B: Element size Ø190 x L770)
※ → Nominal filtration symbol

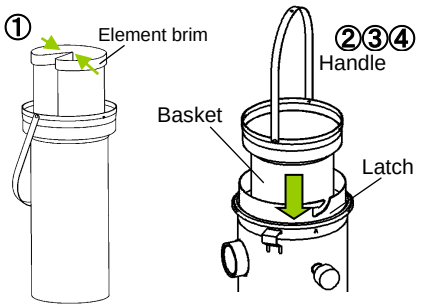
※ is the space for the symbol of filtration.
Check the element part number on the model number label before ordering.
(e.g) Nominal filtration 5mm : EJ501S-005

⚠ **Caution Be careful not to burn your skin if the temperature is high.**



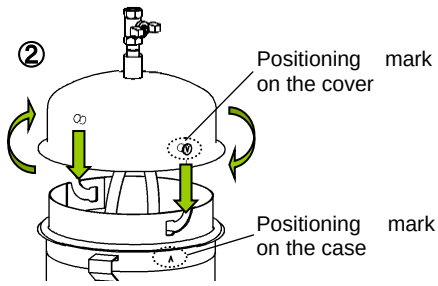
4 [How to mount the element]

①Pull the cloth handle of a new element to the center. Squeeze the element brim to insert the element into the basket. Then, put the element brim down to the level of the bottom flange of the basket.
②Put back the basket handle in the vertical direction.
③Hold the handle to install the basket in the case.
④Set the handle in a position which does not interfere with either "IN" side or "Latch" (slanted by 45 degrees)



5 [Mounting of the cover]

①Set O-ring to the case.
②Mount the tube gasket to the cover.
Rotate the cover clockwise pushing down to the end so that the positioning mark for the cover and the case meet. (Figure ②on the right)



6 [Mounting and tightening of V band]

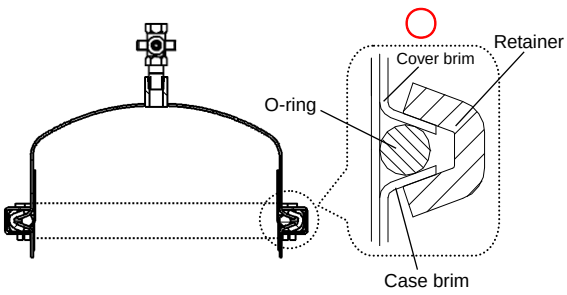


Fig. A Mounting of V band (Correct)

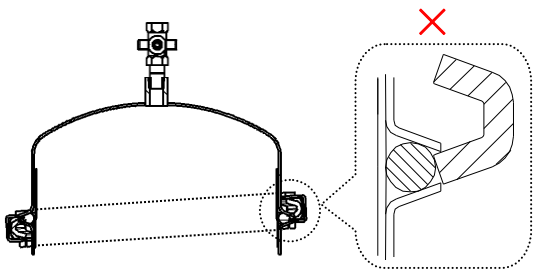


Fig. B Mounting of V band (Incorrect, not horizontal)

①Mount V band.
①-1 Mount V band to the brim of the cover and the case.(Fig. A, B)

②-2 Set the tightening bolt to the hole and tighten it properly. (Fig. C)
③-3 Tighten bolt. (Fig D)

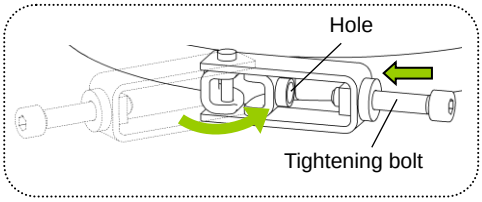


Fig. C Position for V band bolt for tightening

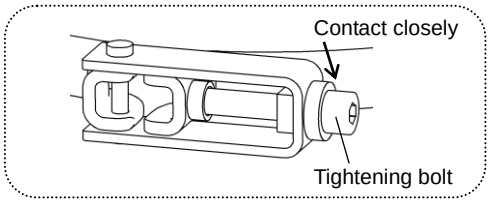


Fig. D Final condition of the tightening of V

⚠Warning Mount V band securely in the correct position.
Incorrect mounting leads to unexpected accidents such as the V band loosening or coming off.

7 [Restart and air release]

①Check opening/closing of the valve of piping and confirm that connecting parts are completely sealed when restarting the product after replacing the element.
②When restarting the product, release air by opening the air release valve on the upper part.

2-1) Sealing part replacement

When the replacement timing of sealing parts (O ring and holder assembly) has come, replace them with new parts. (Refer to P8 “Replacement of the element” and P10 “Replacement of the holder assembly”)

[Replacement timing of sealing parts] When any deterioration or swelling occurs.
When leakage occurs
1 year after starting operation.

O-ring

[Part number for replacement] FGF-KT01 (FGFS1☐: Seal material NBR)
FGF-KT02 (FGFL1☐: Seal material FKM)

[Replacement of O ring] Replace O ring following steps [1] and [5] to [7] of P8 “1-2) Element replacement procedure”
(When only O ring is replaced, steps [2] to [4] are unnecessary.)

Holder Assembly

[Part number for replacement] FGF-KT03 (FGFS1☐: Seal material NBR)
FGF-KT04 (FGFL1☐: Seal material FKM)

Check the model number on the model number label for ordering parts. Select the part number which is suitable for specified model number.

[Replacement of the holder assembly] Replace the holder assembly following steps ①to ②of P11 “2-2) Holder assembly replacement procedure”.

2-2) Holder assembly replacement procedure

①Remove old holder assembly
②Put the new holder assembly in the case with the holder slanted. (Fig. 6-1)
Mount the holder assembly so that the projection is facing upwards. (Fig. 6-2)

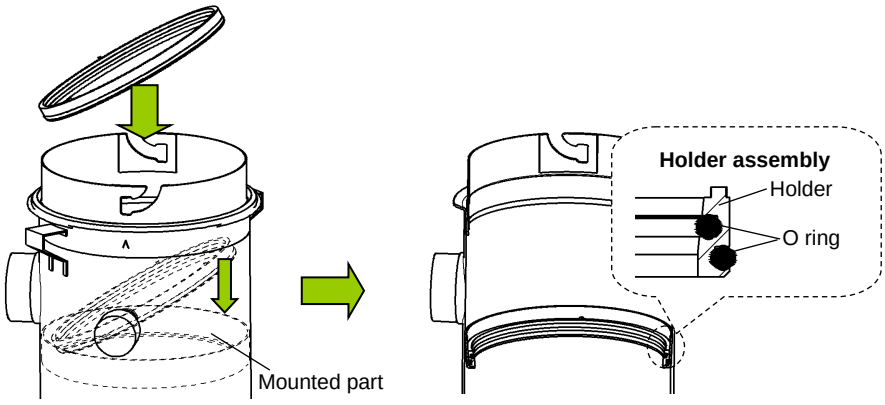


Fig. 6-1. Holder assembly replacement

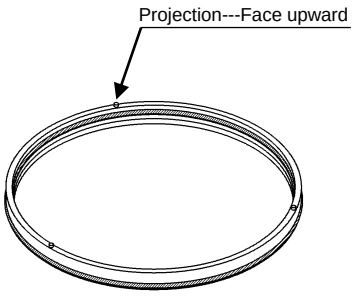


Fig. 6-2. Holder assembly mounting direction

⚠Caution Mount the holder assembly in the correct position and direction. Incorrect mounting leads to sealing failure.

Revision history
Rev A:Mar. 2013 P.8 to P.9: Illustration change. Rev B:Jan.2021 P5 to P8,P10,P11: Valve shape change. P5:Postscript

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