

Replacement Procedure Air Preparation Equipment Industrial Filters

Air Preparation Equipment

AFF-D	Line Filter	p. 719
AM-D	Mist Separator	p. 719
AMD-D	Micro Mist Separator	p. 719
AMK-D	Activated Carbon Filter	p. 730
AFF□D	Main Line Filter	p. 741
AM□D	Mist Separator	p. 741
AMD□D	Micro Mist Separator	p. 741

Industrial Filters

FGD	Vessel Series	p. 743
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FGET	Vessel Series	p. 746
FGG	Vessel Series	p. 749
FGA	Vessel Series	p. 751
FGB (Discontinued products)	Vessel Series	p. 755
FGC	Vessel Series	p. 759
FGF	Bag Filter	p. 761
FGH	High Precision Filter for Liquids	p. 763
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FN1/FN4	Low Maintenance Filter	p. 766

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Air Grippers

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Pressure Control Equipment

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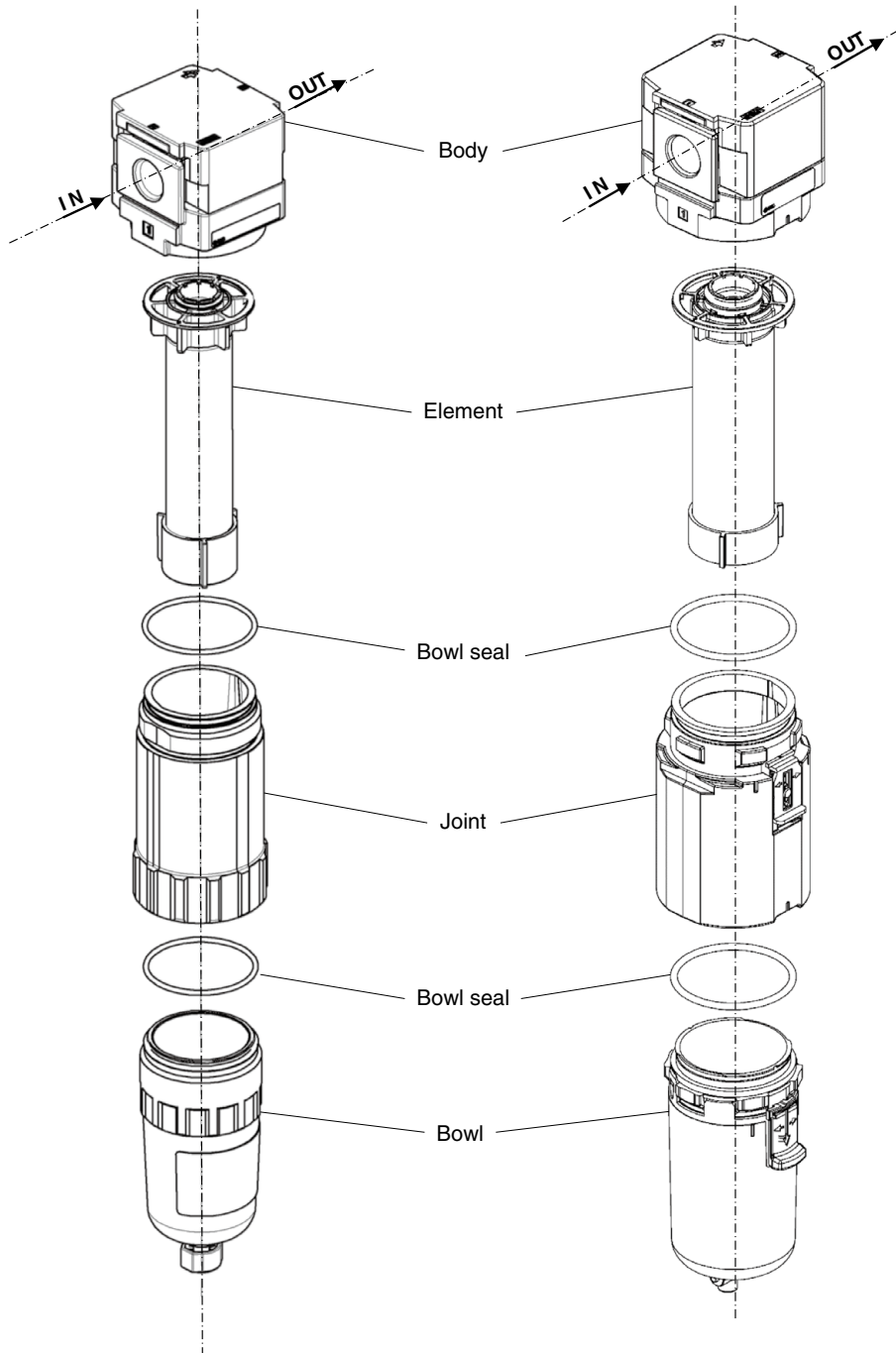
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AFF-D/AM-D/AMD-D Series Exploded View

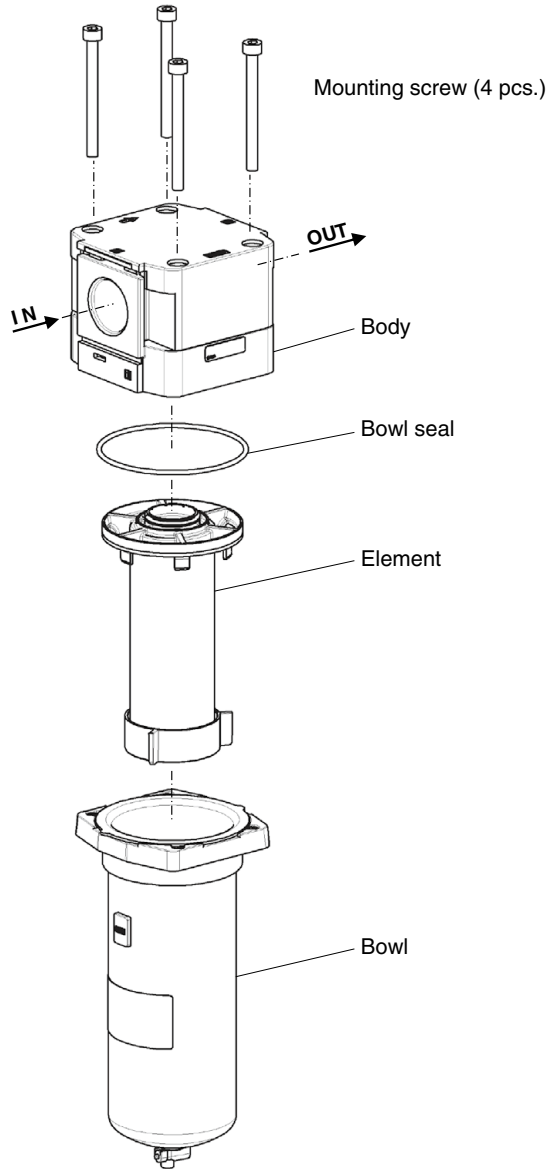
1) AFF/AM/AMD20

2) AFF/AM/AMD30
AFF/AM/AMD40



AFF-D/AM-D/AMD-D Series Exploded View

3) AFF/AM/AMD50 AFF/AM/AMD60



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AFF-D/AM-D/AMD-D Series Replacement Procedure 1

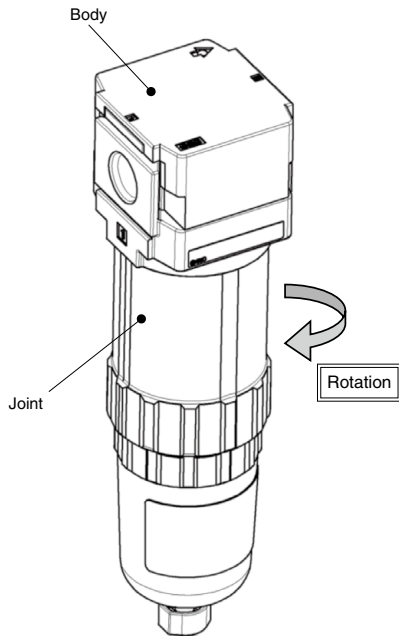
⚠ Warning

Before replacement, ensure that the regulator is not pressurized.
After replacement, ensure that the specified function is satisfied and that no external leakage is found before resuming operation.

1. Element — Disassembly [AFF/AM/AMD20]

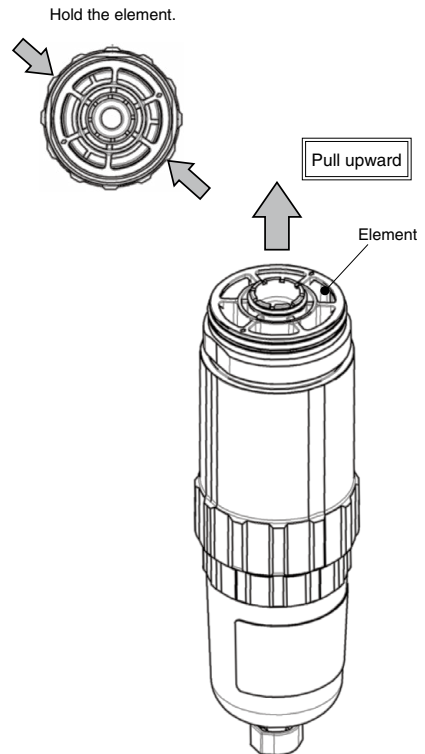
Step 1

Remove the joint from the product.



Step 2

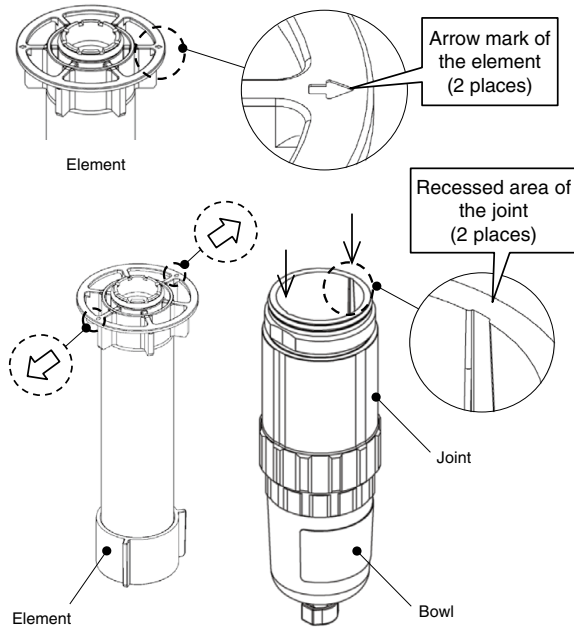
Remove the element by the holding part of the element (shown by the arrows below).



2. Element — Assembly [AFF/AM/AMD20]

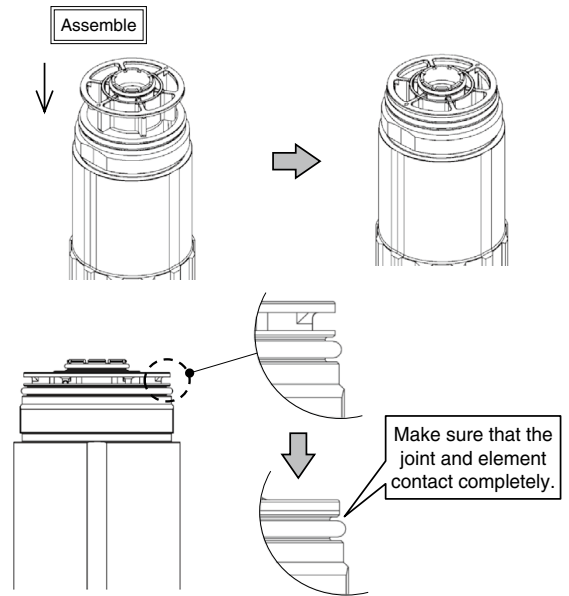
Step 1

Align 2 arrow marks and 2 recessed areas of the joint.



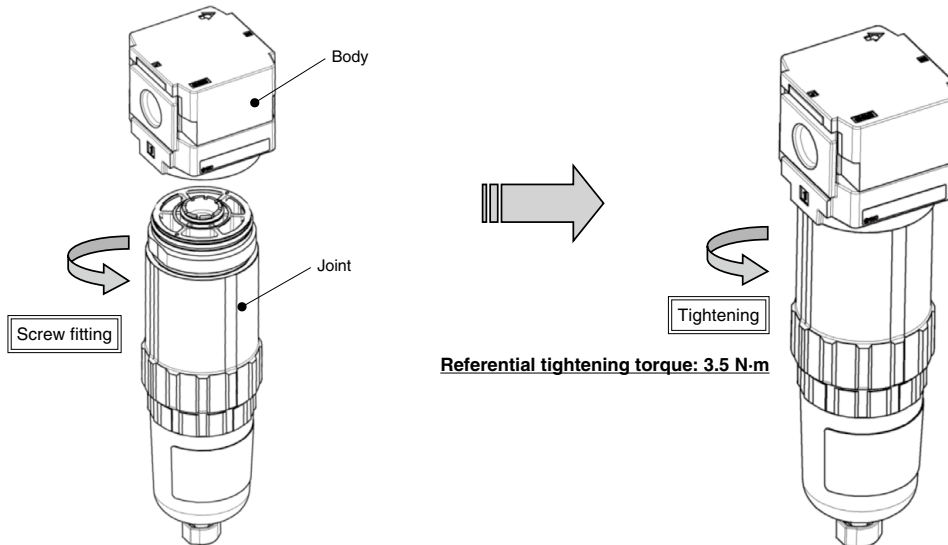
Step 2

Press the element downward until the element and joint come into contact with each other completely. If they are forced to be inserted without aligning, the element will break.



Step 3

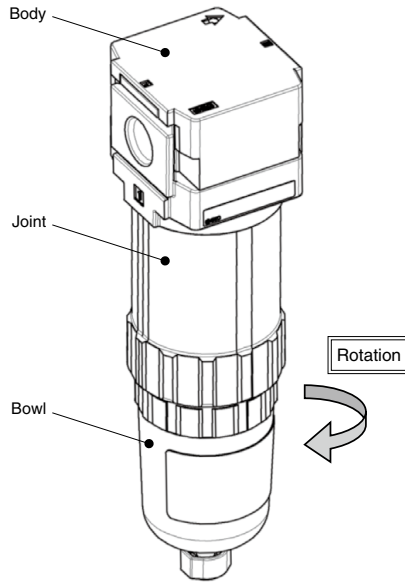
Screw the bowl into the product.
Tighten it referring to the specified torque below.



3. Bowl — Disassembly [AFF/AM/AMD20]

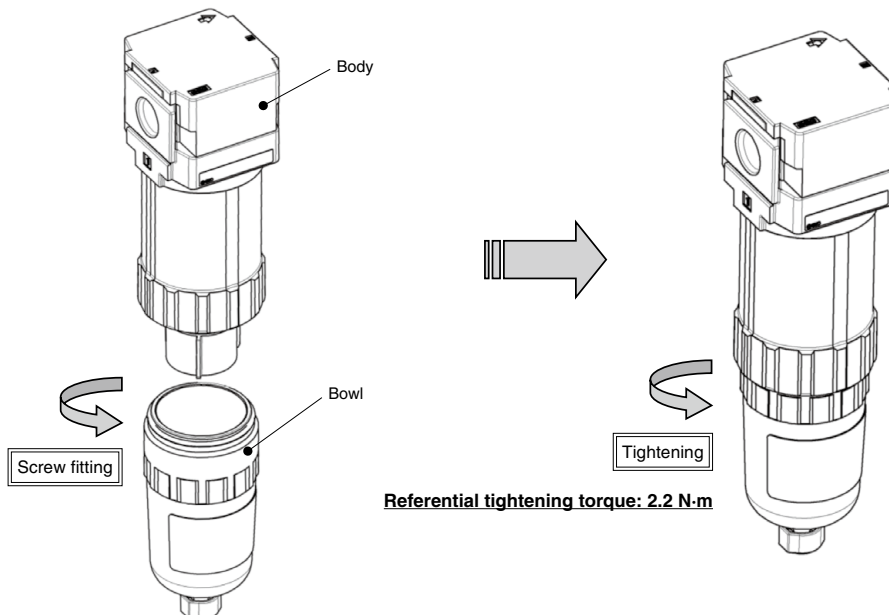
Step 1

Remove the bowl from the product.



Step 2

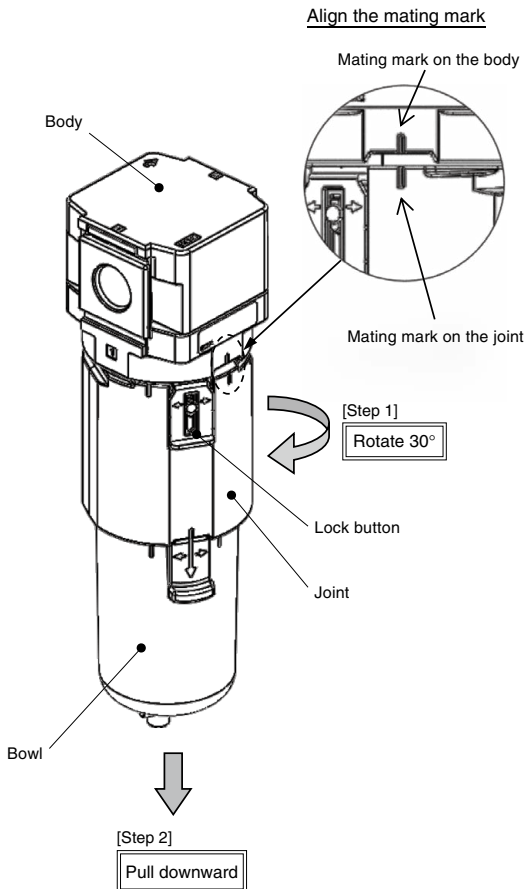
Screw the bowl assembly into the product.
Tighten it referring to the specified torque below.



4. Element — Disassembly [AFF/AM/AMD30, 40]

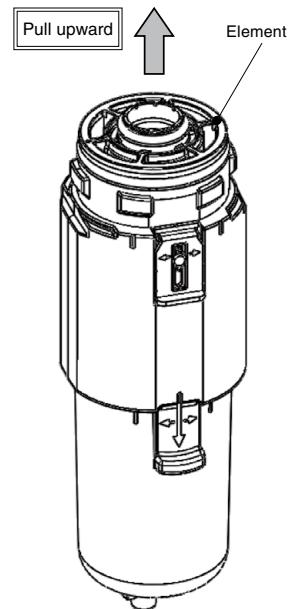
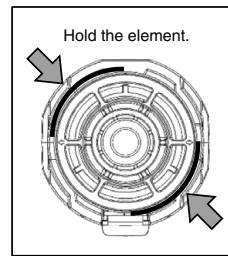
Step 1

To remove the joint from the body, rotate for approx. 30 degrees with the lock button held down. Align the mating mark of the body and joint and pull down the bowl assembly to remove it.



Step 2

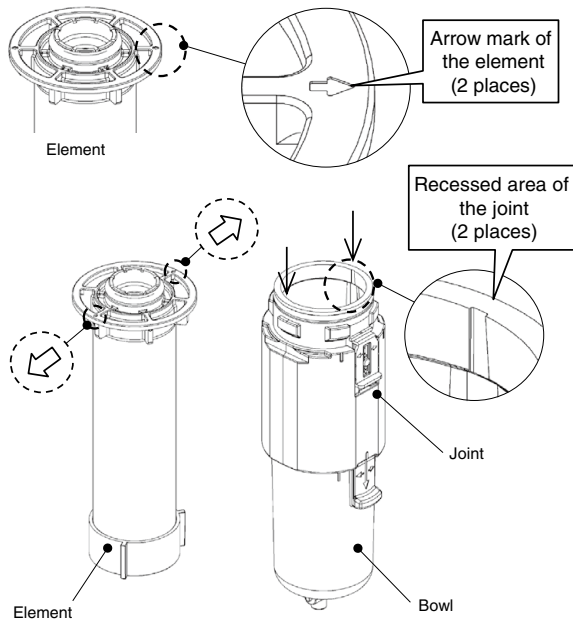
Hold the element as shown below and pull upward to remove the element.



5. Element — Assembly [AFF/AM/AMD30, 40]

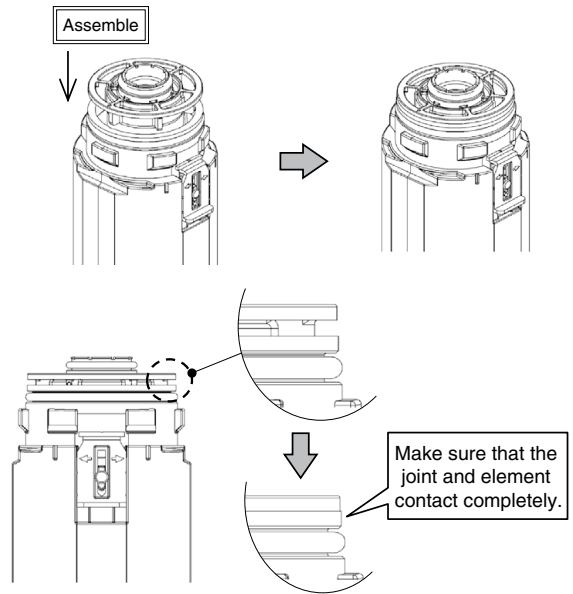
Step 1

Align 2 arrow marks and 2 recessed areas of the joint.



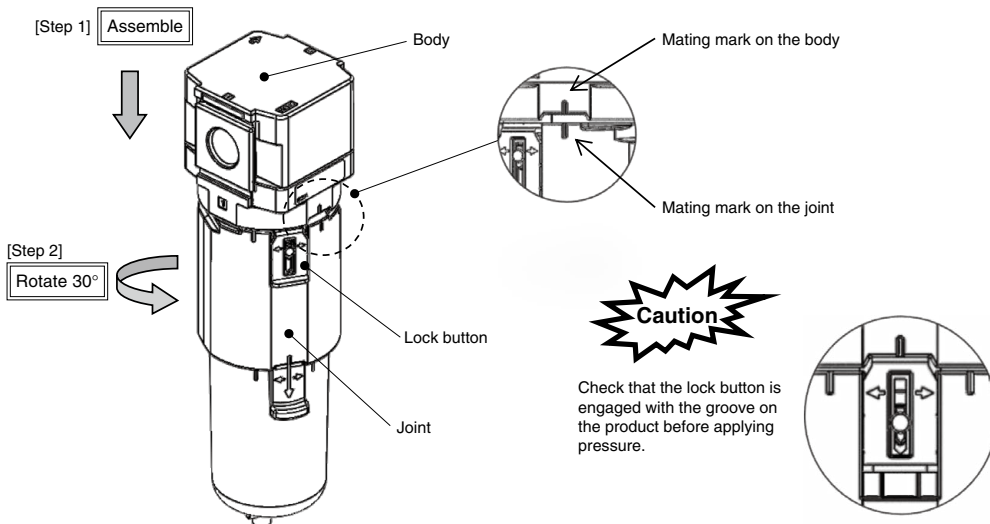
Step 2

Press the element downward until the element and joint come into contact with each other completely. If they are forced to be inserted without aligning, the element will break.



Step 3

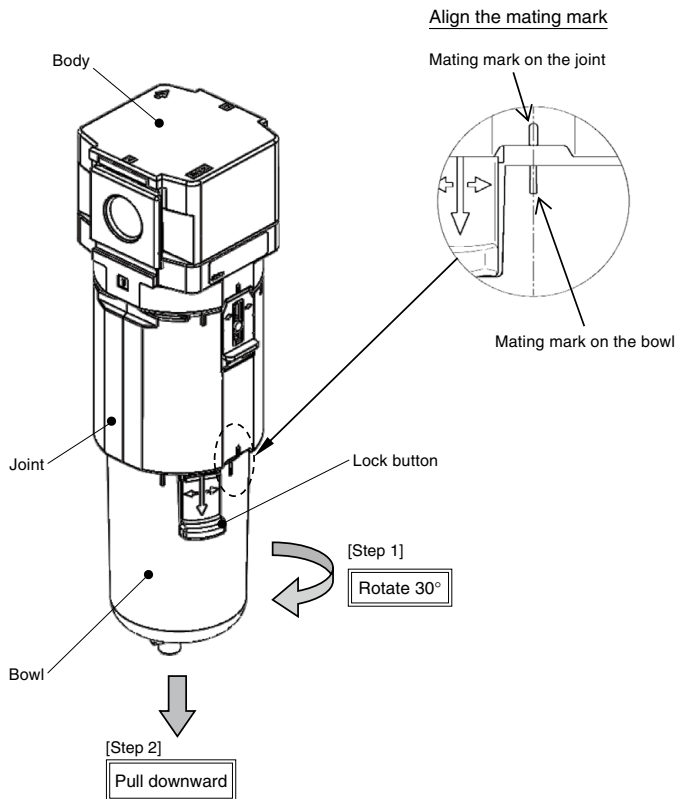
While the lock button is held down, mount the body and joint where their marks meet. Rotate the joint until the lock button meets the body groove (approx. 30 degrees).



6. Bowl — Disassembly [AFF/AM/AMD30, 40]

Step 1

To remove the bowl from the product, rotate for approx. 30 degrees while the lock button is held down. Align the mating mark of the joint and bowl and pull the bowl down to remove it.



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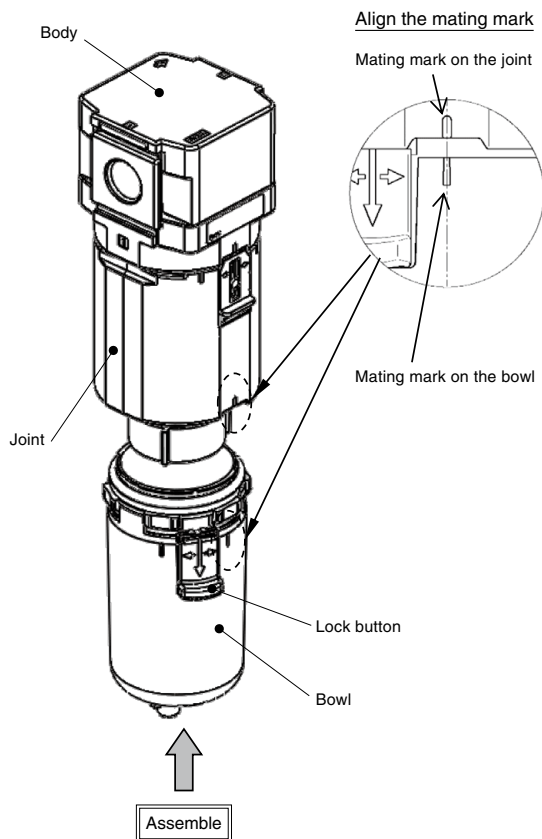
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7. Bowl — Assembly [AFF/AM/AMD30, 40]

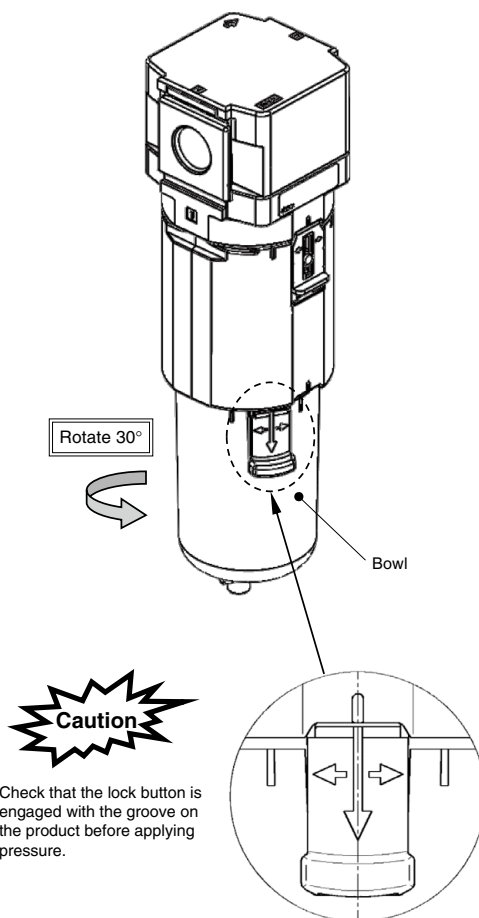
Step 1

Mount the bowl at the position where the mating mark of the joint and bowl assembly meet.



Step 2

While the lock button is held down, rotate the bowl assembly so that the lock button meets the groove of the joint (approx. 30 degrees).



8. Replacement of the Bowl [AFF/AM/AMD50, 60]

Step 1

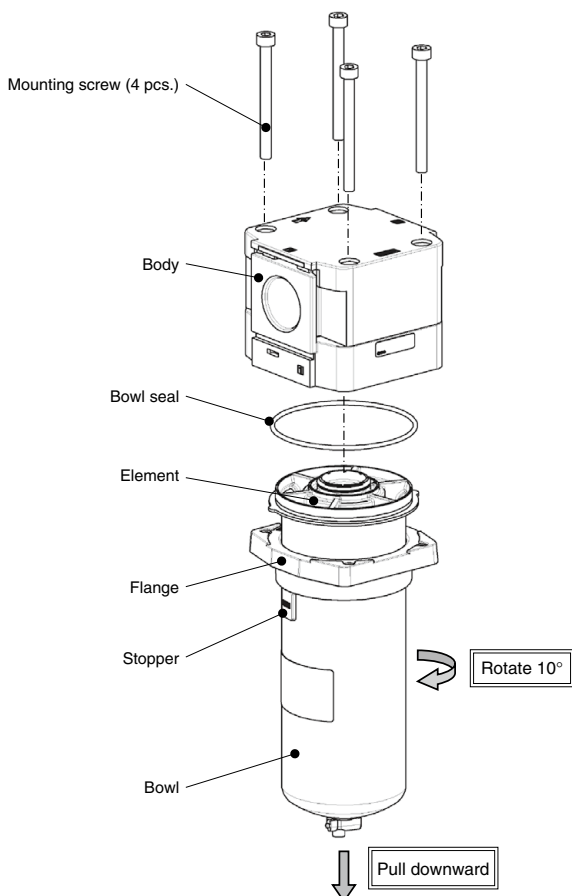
Remove the bowl from the product.
Remove four mounting screws while supporting the flange by hand, and lower the flange up to the stopper.
(Hexagon wrench key Nominal size: 5)

Step 2

Rotate bowl by around 10° in the arrow direction, then remove the bowl from the body.

Step 3

Remove the bowl seal and element.



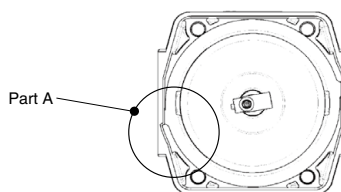
Step 4

Install the element and bowl seal in the bowl.

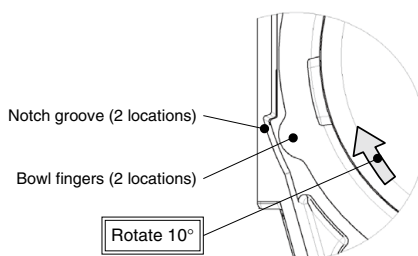
Step 5

Insert the fingers (2 locations) of the bowl into the notches (2 locations) of the body by aligning them with each other, and turn the bowl by around 10° in the arrow direction. Engage both fingers (2 locations) of the bowl with the body.

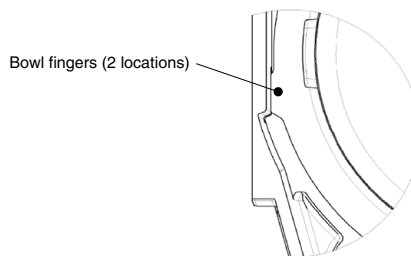
Engagement condition of the finger part of bowl



Align the notch groove with the finger of the bowl (Part A).



Engage the fingers of the bowl with the body (Part A).



Step 6

Install the flange to the body, temporarily tighten the 4 mounting screws, and then tighten them diagonally and evenly to secure the flange.
(Hexagon wrench key: Nominal size: 5)

Tightening torque:

AM50	3.5 ± 0.3 N·m
AM60	

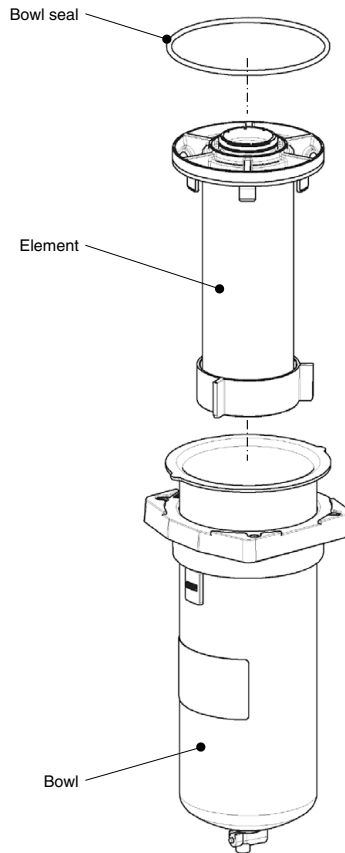
9. Replacement of the Element [AFF/AM/AMD50, 60]

Step 1

Remove the bowl by referring to the section [8. Replacement of the Bowl] (P.728).

Step 2

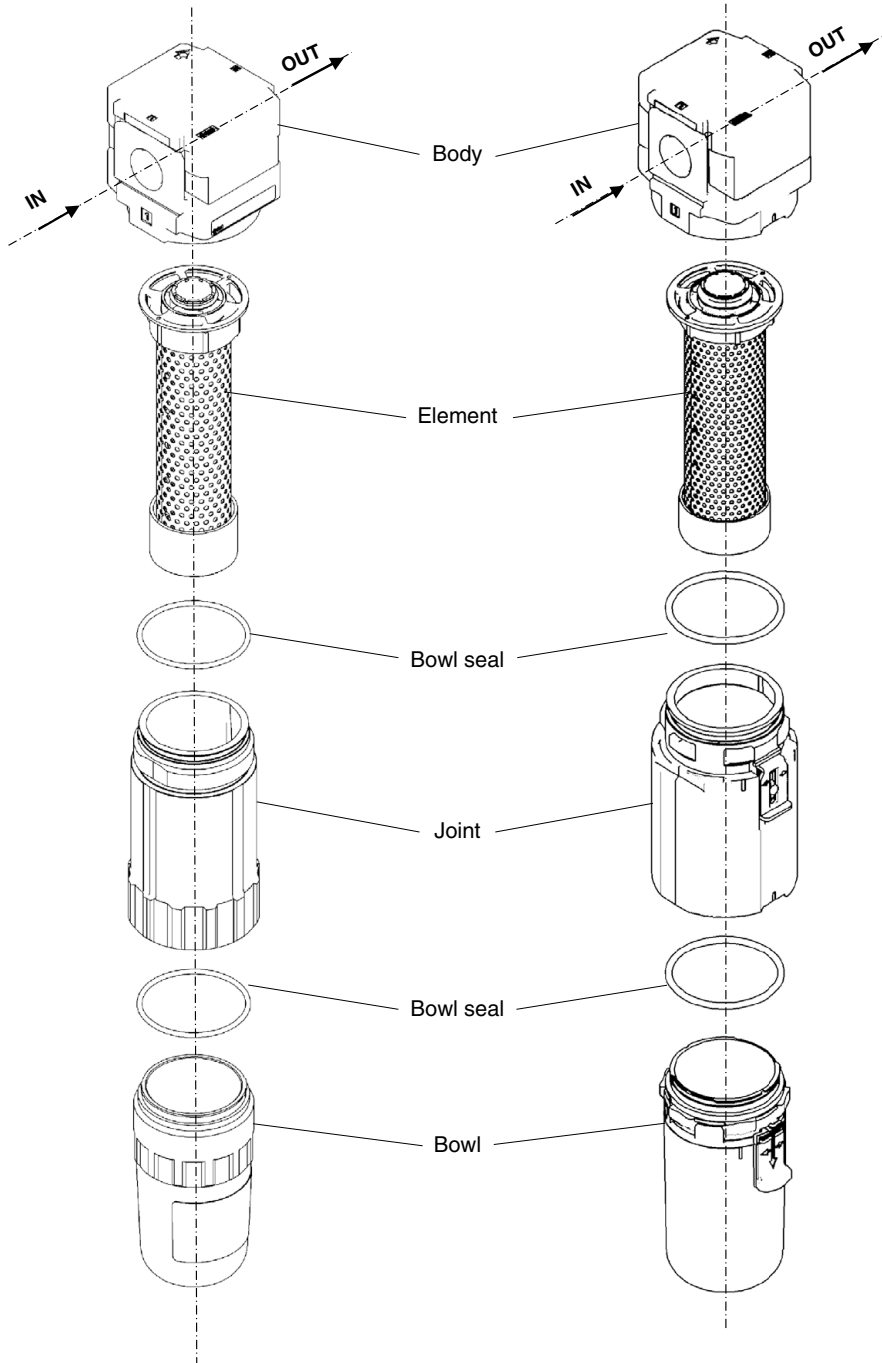
Install the replacing element and bowl seal in the bowl. Mount the bowl by referring to the section [8. Replacement of the Bowl] (P.728).



AMK-D Series Exploded View

1) AMK20

2) AMK30, AMK40



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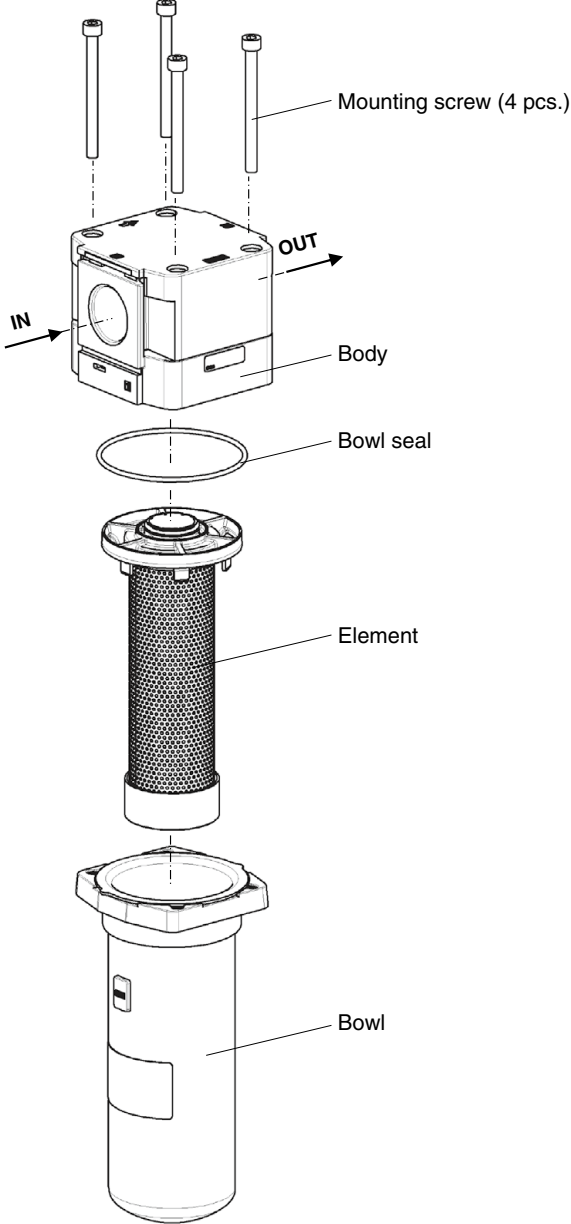
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AMK-D Series Exploded View

3) AMK50, AMK60



AMK-D Series Replacement Procedure 1

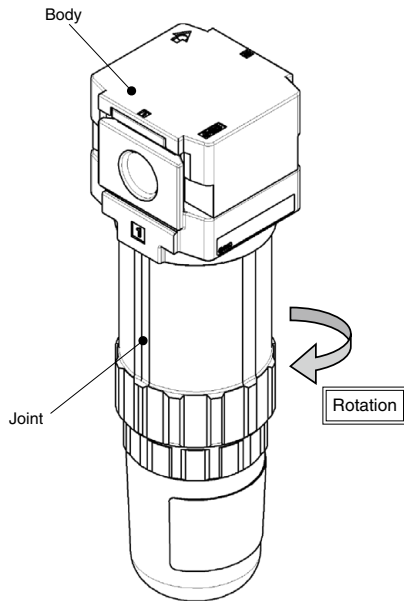
⚠ Warning

Before replacement, ensure that the regulator is not pressurized.
After replacement, ensure that the specified function is satisfied and that no external leakage is found before resuming operation.

1. Element — Disassembly [AMK20]

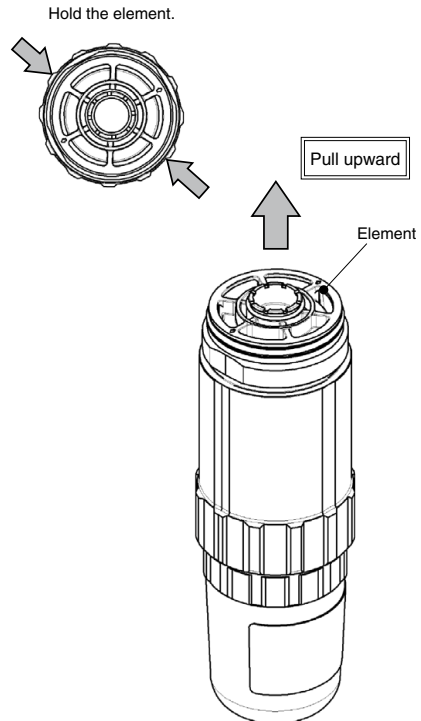
Step 1

Remove the joint from the product.



Step 2

Remove the element by the holding part of the element (shown by the arrows below).

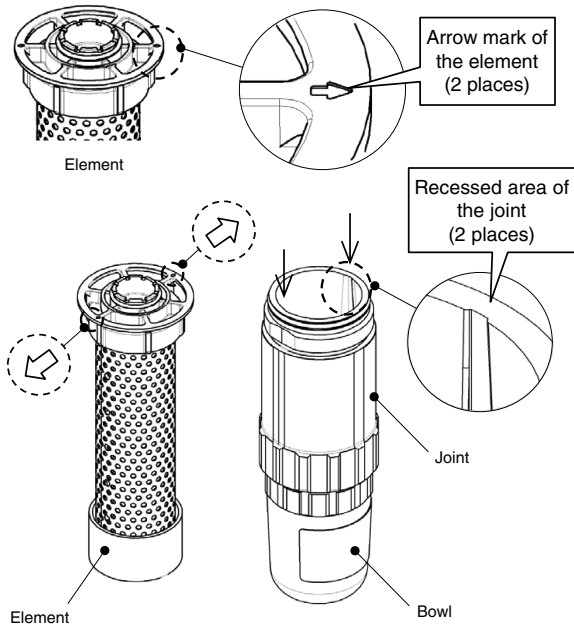


AMK-D Series Replacement Procedure 2

2. Element — Assembly [AMK20]

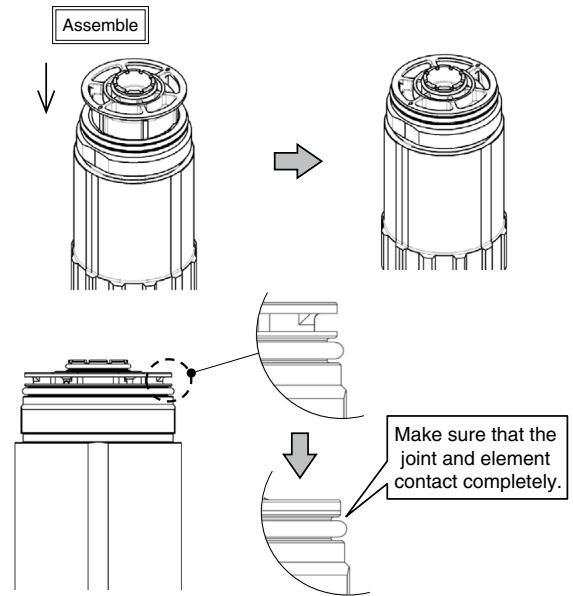
Step 1

Align 2 arrow marks and 2 recessed areas of the joint.



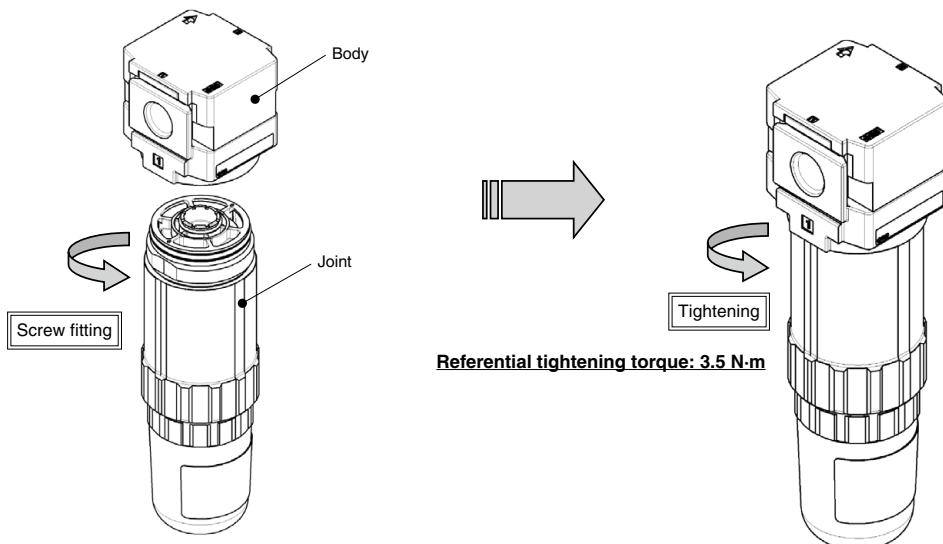
Step 2

Press the element downward until the element and joint come into contact with each other completely. If they are forced to be inserted without aligning, the element will break.



Step 3

Screw the bowl into the product.
Tighten it referring to the specified torque below.



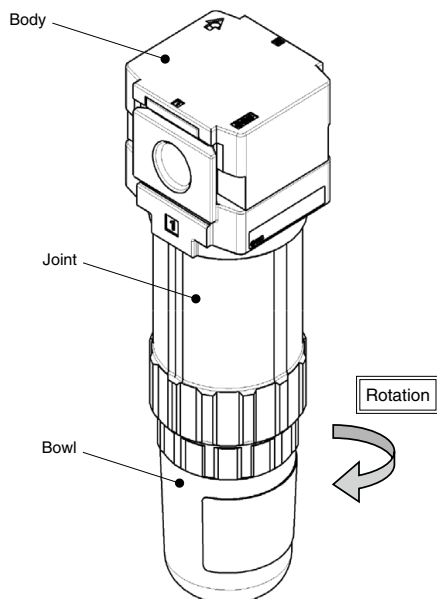
Referential tightening torque: 3.5 N·m

AMK-D Series Replacement Procedure 3

3. Bowl Assembly — Disassembly [AMK20]

Step 1

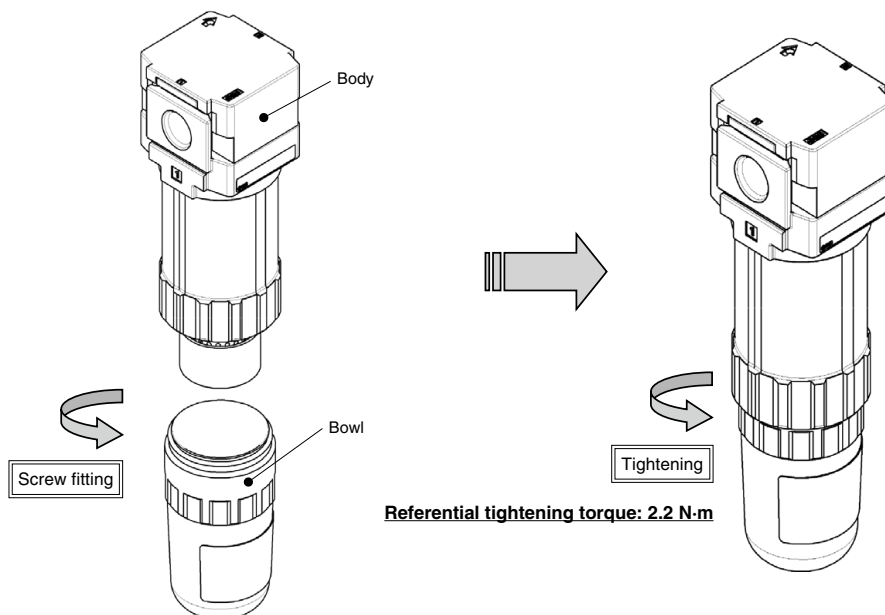
Remove the bowl from the product.



Step 2

Screw the bowl into the product.

Tighten it referring to the specified torque below.



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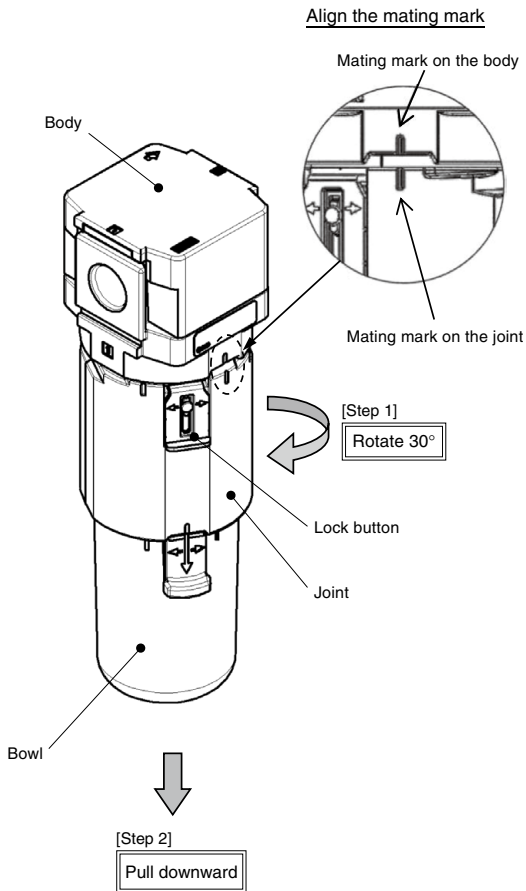
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AMK-D Series Replacement Procedure 4

4. Element — Disassembly [AMK30, AMK40]

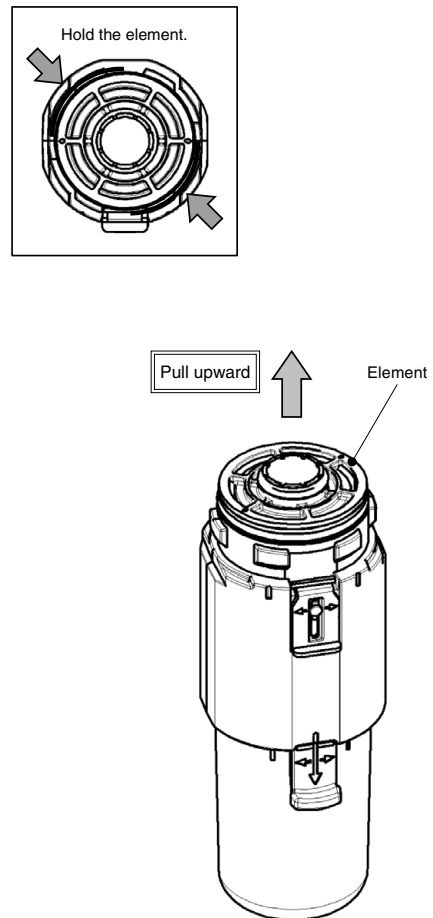
Step 1

To remove the joint from the body, rotate for approx. 30 degrees with the lock button held down. Align the mating mark of the body and joint and pull down the bowl assembly to remove it.



Step 2

Hold the element as shown below and pull upward to remove the element.

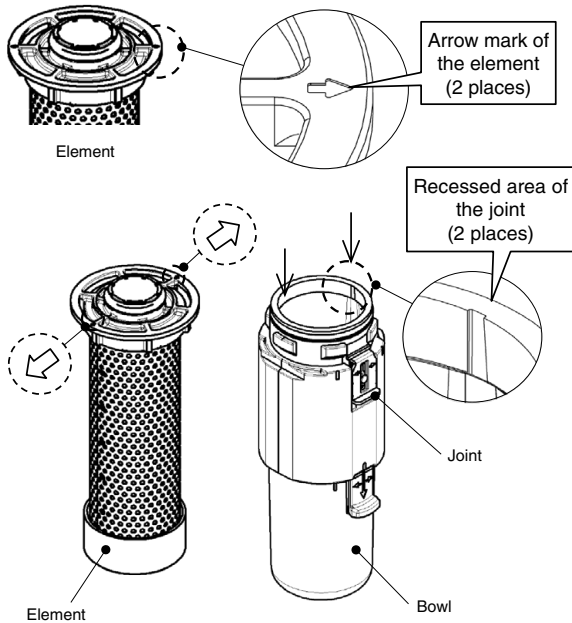


AMK-D Series Replacement Procedure 5

5. Element — Assembly [AMK30, AMK40]

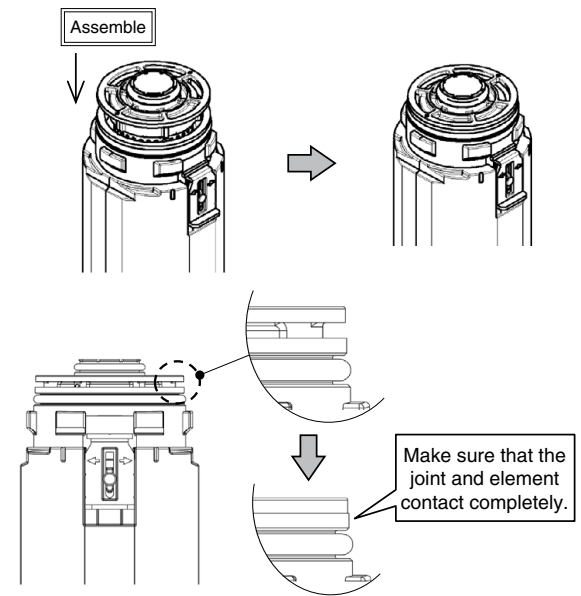
Step 1

Align 2 arrow marks and 2 recessed areas of the joint.



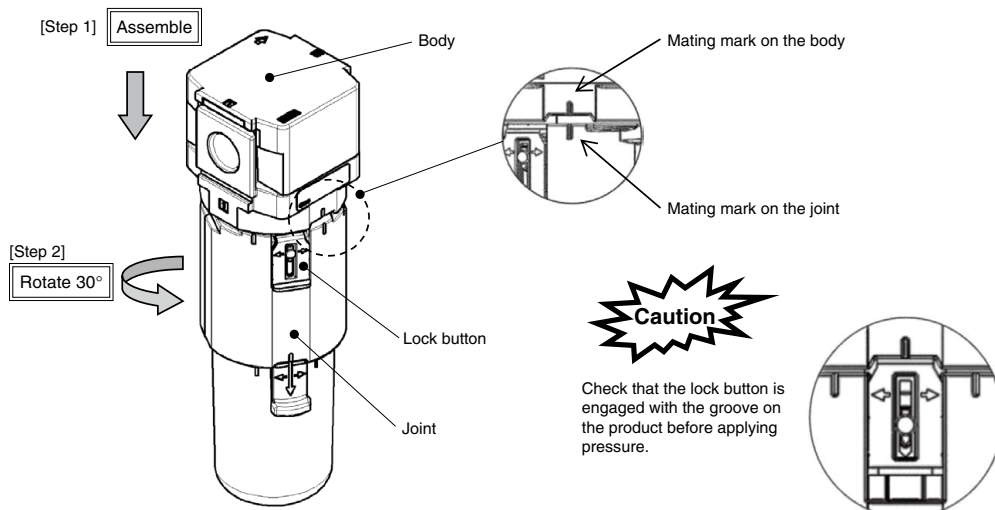
Step 2

Press the element downward until the element and joint come into contact with each other completely. If they are forced to be inserted without aligning, the element will break.



Step 3

While the lock button is held down, mount the body and joint where their marks meet. Rotate the joint until the lock button meets the body groove (approx. 30 degrees).

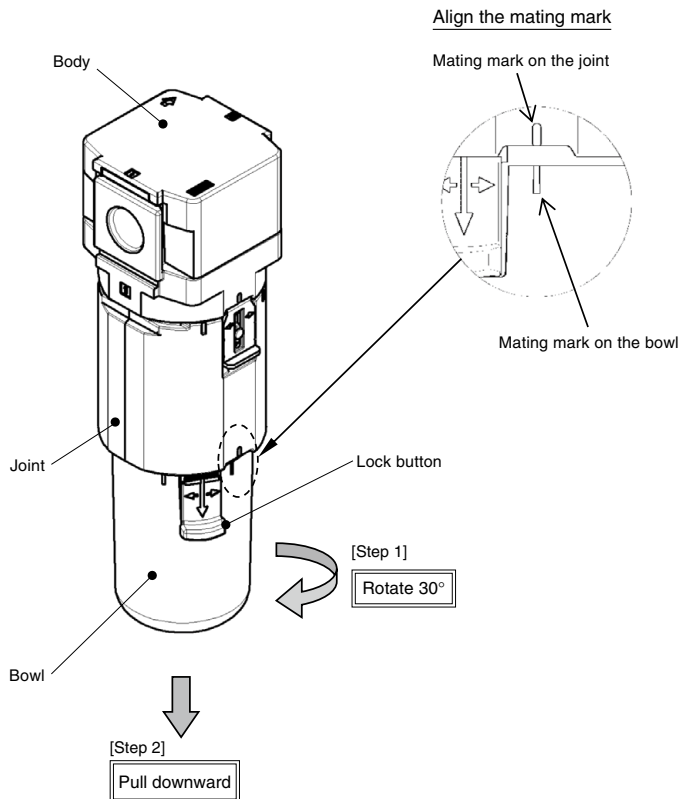


AMK-D Series Replacement Procedure 6

6. Bowl — Disassembly [AMK30, AMK40]

Step 1

To remove the bowl from the product, rotate for approx. 30 degrees while the lock button is held down. Align the mating mark of the joint and bowl assembly and pull the bowl assembly down to remove it.

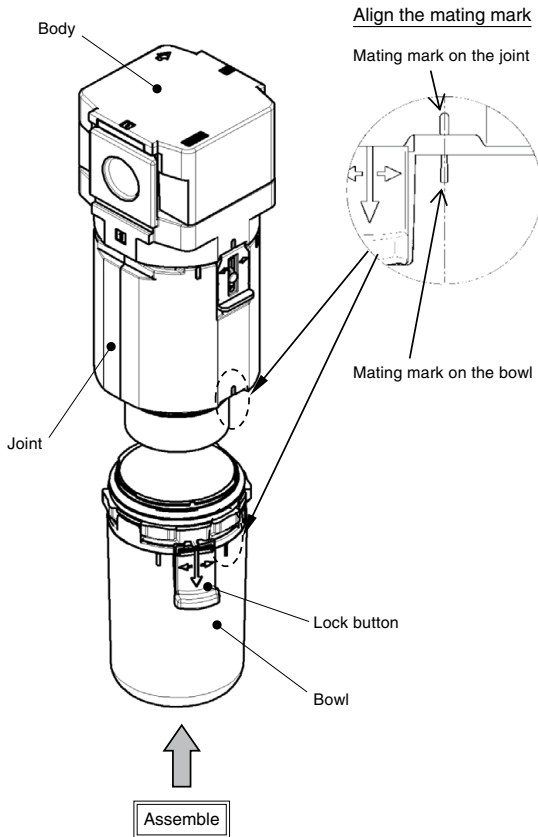


AMK-D Series Replacement Procedure 7

7. Bowl — Assembly [AMK30, AMK40]

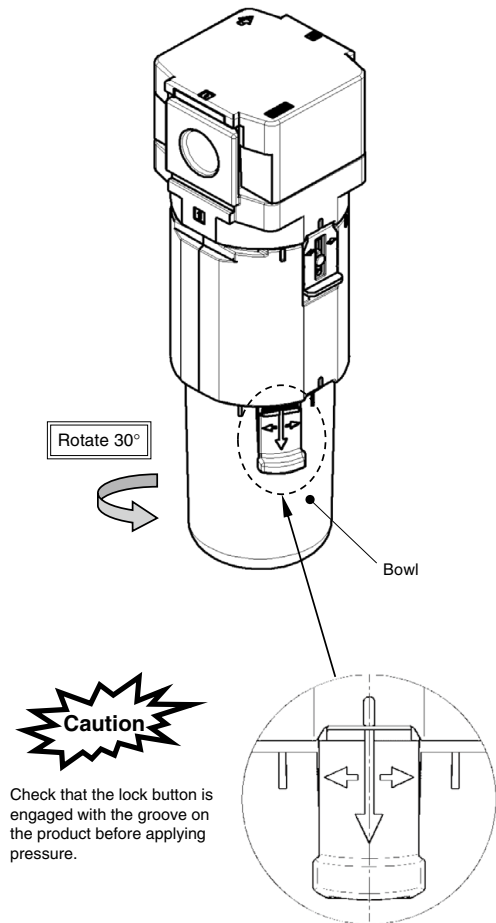
Step 1

Mount the bowl assembly at the position where the mating mark of the joint and bowl assembly meet.



Step 2

While the lock button is held down, rotate the bowl assembly so that the lock button meets the groove of the joint (approx. 30 degrees).



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AMK-D Series Replacement Procedure 8

8. Replacement of the Bowl [AMK50, 60]

Step 1

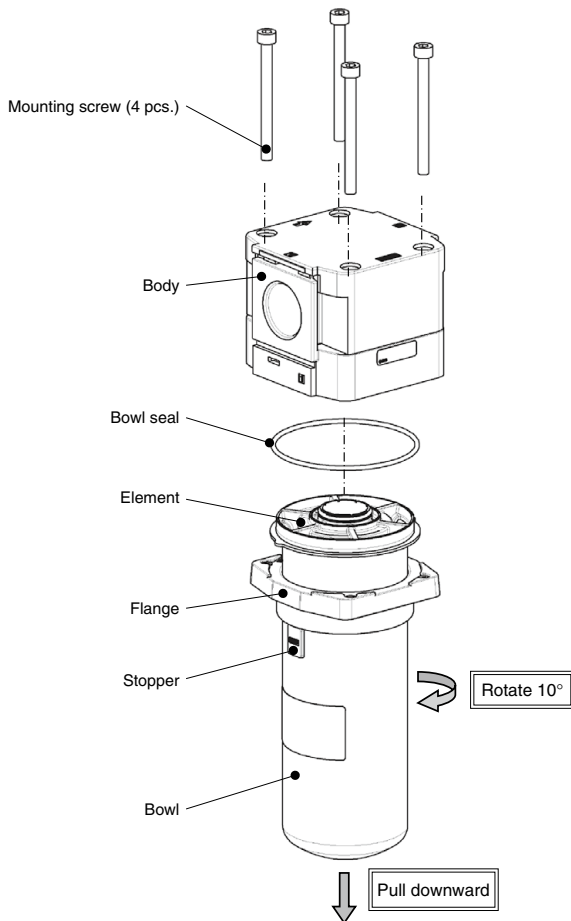
Remove the bowl from the product.
Remove the 4 mounting screws while supporting the flange by hand, and lower the flange up to the stopper.
(Hexagon wrench key Nominal size: 5)

Step 2

Rotate the bowl by around 10° in the arrow direction, then remove the bowl assembly from the body.

Step 3

Remove the bowl seal and element.



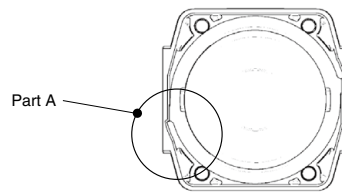
Step 4

Install the element and bowl seal in the bowl.

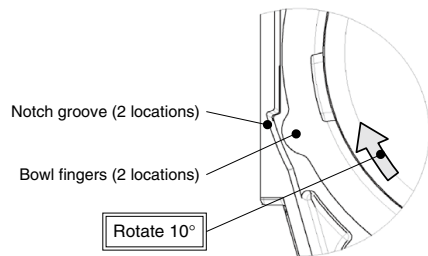
Step 5

Insert the fingers (2 locations) of the bowl into the notches (2 locations) of the body by aligning them with each other, and turn the bowl by around 10° in the arrow direction. Engage both fingers (2 locations) of the bowl with the body.

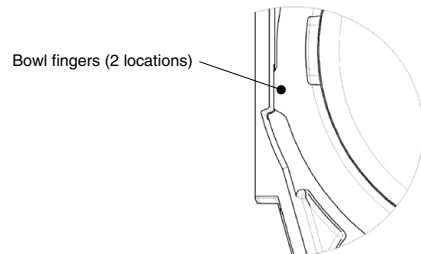
Engagement condition of the finger part of bowl



Align the notch groove with the finger of the bowl (Part A).



Engage the fingers of the bowl with the body (Part A).



Step 6

Install the flange to the body, temporarily tighten four mounting screws, and then tighten them diagonally and evenly to secure the flange.

Tightening torque:

AMK50	3.5 ± 0.3 N·m
AMK60	

AMK-D Series Replacement Procedure 9

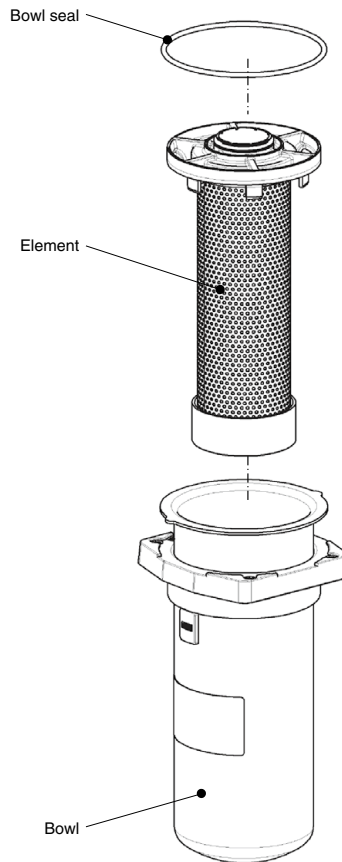
9. Replacement of the Element [AMK50, 60]

Step 1

Remove the bowl by referring to the section [8. Replacement of the Bowl] (P.739).

Step 2

Install the replacing element and bowl seal in the bowl. Mount the bowl by referring to the section [8. Replacement of the Bowl].



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⚠ Warning

Be sure to set the pressure to zero before work.

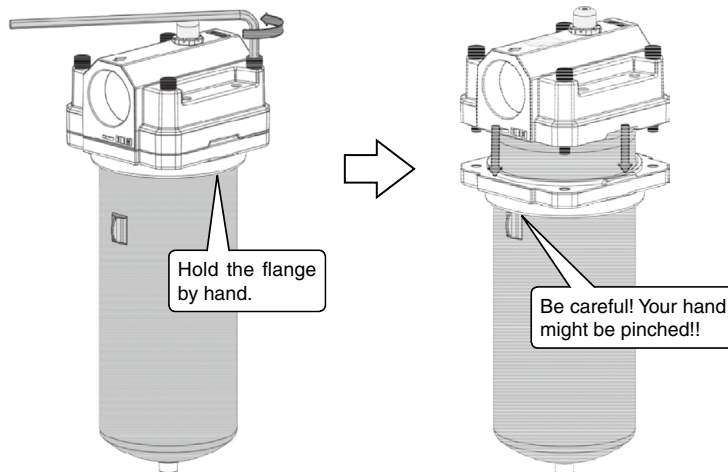
1. Element Replacement

1-1. Remove the bowl from the body.

1-2. Loosen the hexagon socket head cap screws with a hexagon wrench key while holding the flange by hand.

After loosening all the bolts, lower the flange to the stopper slowly.

In this operation, fingers should not be pinched between the flange and the stopper.



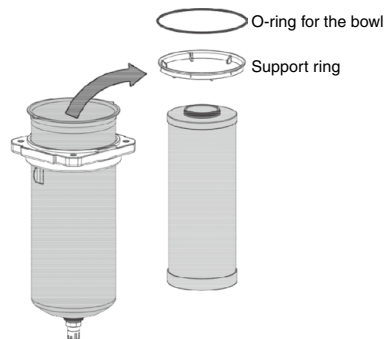
1-3. When the bowl is rotated in the direction shown by the arrow below, by approx. 10 degrees, the bowl is removed from the body.

At this time, be careful not to drop the bowl.

* The O-ring for bowl can easily fall off, so replacement should be performed while the bowl is held upright.

1-4. Remove the used element and the element O-ring.

In this operation, remove the support ring to make the replacement easier.

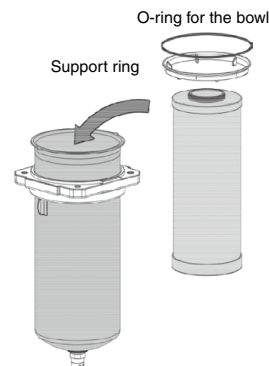


1-5. Insert an element (new) into the bowl and mount an O-ring (new) for the bowl.

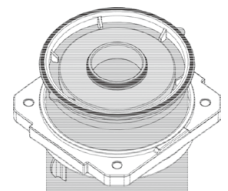
If the support ring was removed, mount the support ring before the O-ring for bowl.

* Ensure that the element inserting direction is correct.

1-6. Mount the bowl to the body.



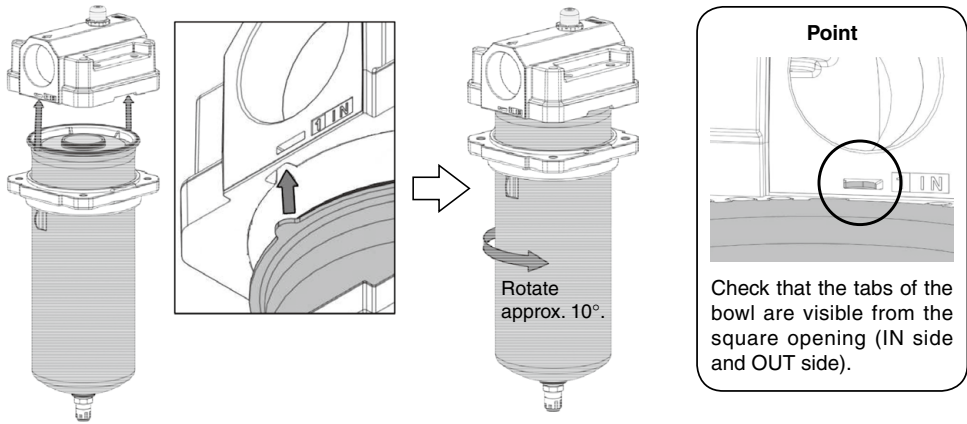
Point
Make sure that the O-ring for the element is facing upward.



AFF□D/AM□D/AMD□D Series Replacement Procedure 2

1-7. Insert the bowl locating tabs (2 parts) into the slots (2 parts) of the body, and rotate the bowl in the direction shown by the arrow below by approx. 10 degrees.

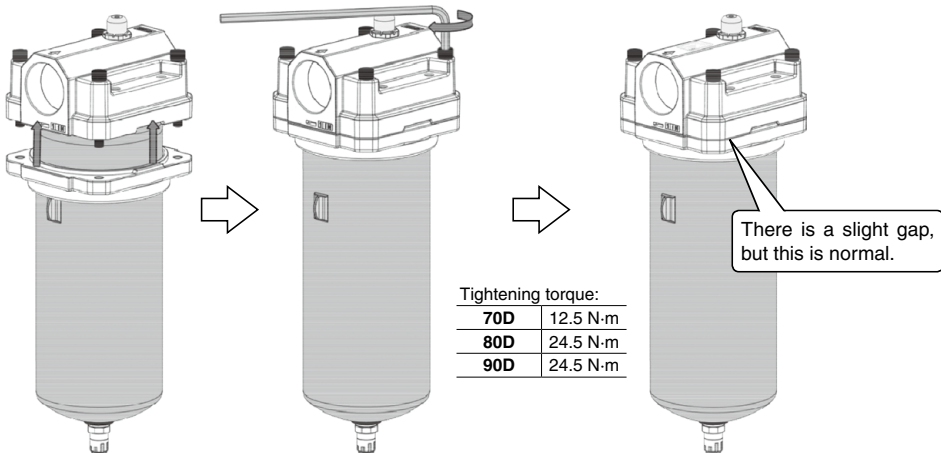
* Check that the tabs of the bowl are visible from the square opening at the lower part of the piping port.



1-8. Pull up the flange and tighten the hexagon socket head cap screws with a hexagon wrench.

Tightening torque is 12.5 N·m for 70D, and 24.5 N·m for 80D and 90D.

Although there will be a slight gap between the body and flange even after tightening with the tightening torque above, this is normal.

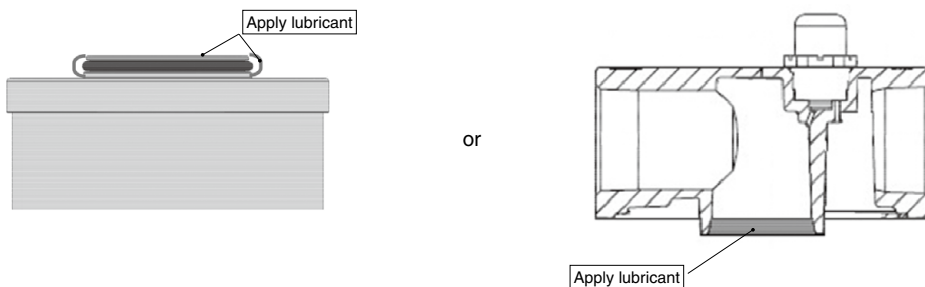


[When it is difficult to insert the new element into the body.]

Please apply lubricant to the connection (body) of the O-ring for the element.

At this time, pay attention that lubricant is not stuck to the element surface and internal surface of the bowl and body (parts other than the element connection). Select the lubricant which is applicable to the user application.

O-ring material...NBR, initial lubricant...White Vaseline



FGD Series Replacement Procedure for Elements

1. Removal of the Element (See Fig. 1)

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

⚠ Caution

- 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.

- 1-3. After closing the piping valve on the IN side of the filter, close the piping valve on the OUT side of the filter.
- 1-4. Discharge the residual fluid inside from the drain port.
- 1-5. Loosen the nut and remove the element.
- 1-6. Move the case downward to remove it.
- 1-7. Remove the element.
 - * When 2 elements (250 mm) are used, be careful not to lose the joint which seals the elements. It will be reused later.
- 1-8. Clean the inside of the case, gasket, seals and plug with a clean operation fluid or solution.

2. Mounting of the Element (See Fig. 1)

- 2-1. Assemble in the reverse order of [1] Removal of the Element.
- 2-2. Replace any deteriorated or swollen gasket or seals with new ones.
- 2-3. Put the tension bolt through the hole of the element, and insert the element into the case.

[When 2 elements (250 mm) are used.]

- * When inserting the element, do not drop the element until the lower end reaches the element guide.
 - * Insert the joint between the elements.
- 2-4. Align the tension bolt with the center hole of the cover, and insert the case, in which the element has been inserted, into the cover.
 - 2-5. Push the case from the bottom and tighten the nut from the top of the cover with tightening torque below.
(Control the torque to avoid leakage.)
 - * Tightening torque control value: FGDT/F 25 N·m, FGDC/E 15 N·m

3. Restart the Operation

- 3-1. 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.
- 3-2. 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 the operation.

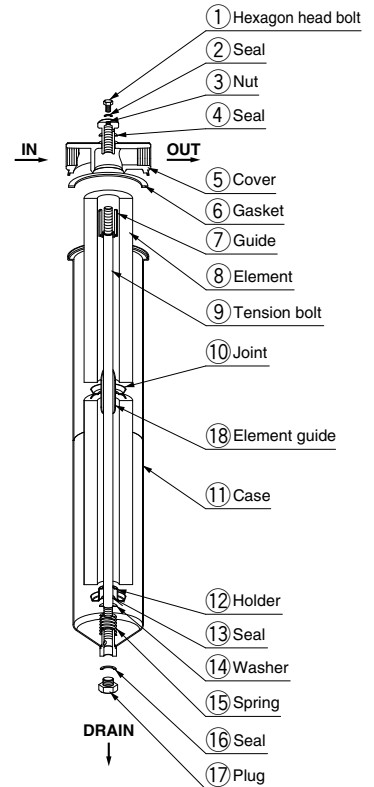
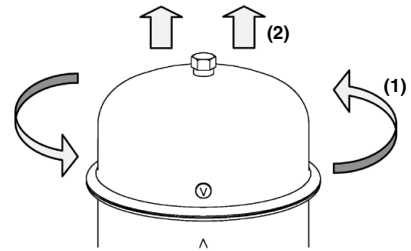
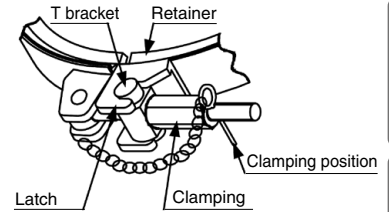


Figure 1 Parts descriptions and functions
(Figure shows the product with the 2 FGD□B elements.)

FGE Series Replacement Procedure for Elements 1

1. Removal of the Cover

- 1-1. Stop the operation.
- 1-2. Close the valve in order of INLET, then, OUTLET.
- 1-3. Zeroes the pressure in the filter.
- 1-4. Open the drain valve for inlet and outlet to discharge all fluid inside.
- 1-5. Pull out the V-band clamping position check pin.
- 1-6. Loosen the V-band tightening nut and remove the latch. Then, remove the cover and O-ring for checking.
- 1-7. Rotate the cover counterclockwise and lift it to remove the cover. (In order of (1)(2) in drawing on the right)
- 1-8. If the O-ring is swollen, replace it with a new O-ring.



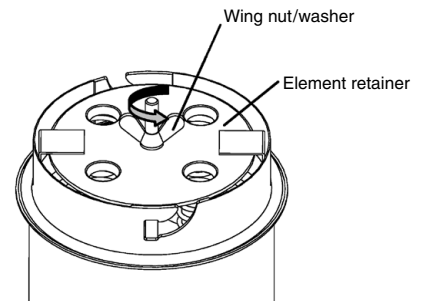
[O-ring for replacement] Part no.: JISB2401-1A-P185 (NBR)
Part no.: JISB2401-4D-P185 (FKM)

⚠ Warning

Remove V-band/cover after confirming the pressure in the filter is zero.

2. Removal of the Element

- 2-1. Remove the wing nut and the washer.
- 2-2. Remove the element retainer.
- 2-3. Remove the element mounting bracket (a part integrating the element holder and the spring).
- 2-4. Take out parts in order of the element, joint (element guide).
* It is not a must to take out the element guide.
Element, and joint can be taken out together by taking out the element guide.
Note) Joint may not be necessary depending on filter and element type.



⚠ Caution

Attention should be taken to avoid burning for high temperature.

3. Mounting of the Element

- 3-1. To recycle the micro mesh element and sintered element, eliminate any dust between the end plate and the seal completely.

⚠ Caution

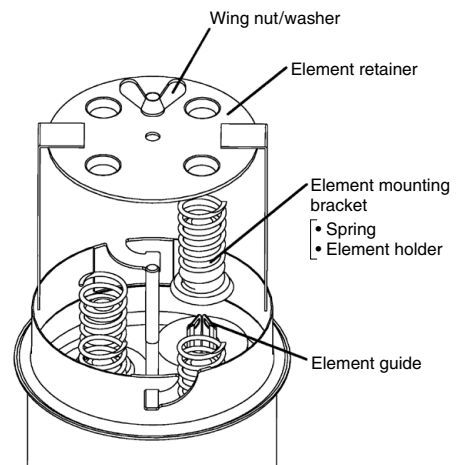
Replace all equipment using fluoropolymer seal. Recycle of used seal leads to cause sealing leakage.

- 3-2. Mount the element guide if it is removed.
- 3-3. Insert parts in order of the element, joint, element, then, element mounting bracket so that they are concentric.

Note) The joint may not be necessary.

⚠ Caution

When element is mounted, do not drop the parts from the top of the element guide for mounting.



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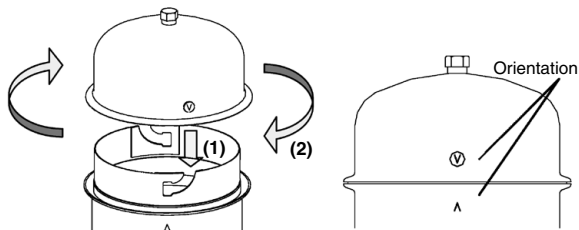
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FGE Series Replacement Procedure for Elements 2

- 3-4. When 2 to 3 elements are placed on top of the other, a set in which the element and joint are prepared can be mounted to the element support.
- 3-5. Assemble the element mounting bracket.
- 3-6. Mount the element retainer carefully.

4. Mounting of the O-ring and Cover

- 4-1. Set the O-ring to the case.
- 4-2. Rotate the cover clockwise while pushing till the end so that the orientation mark of the case and the cover match. [In order of (1) and (2) on drawing on the right]



5. Mounting and Tightening of the V-band

- 5-1. Mount the V-band to the collar of the cover and the case correctly. [Refer Fig. (a), (b)]

⚠ Warning

The cover may be fallen off due to incorrect mounting. Mount the cover properly.

- 5-2. Hit the circumference of the V-band lightly with a plastic hammer for secure mounting.
- 5-3. Mount the T-bracket to the latch correctly. [See Fig. (c)]
- 5-4. Tighten the clamping nut to specified position (position from where the clamping position check pin can be inserted), and insert the clamping position check pin. [See Fig.(c)]
- 5-5. When the clamping nut cannot be tightened to the specified position (position where the clamping position check pin can be inserted), replace the V-band and O-ring to new ones. (See Table 1).

⚠ Caution

Clean the V-band and the contact surface between the cover and the case before mounting. Dirty contact surface lead to cause leakage.

⚠ Warning

Replace with a new V-band when deformation or worn out by screw is found on the band.

[V-band for replacement] Part no. : CY-24S

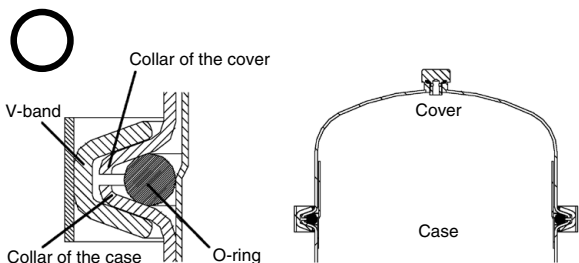


Fig. (a) Correct mounting of the V-band

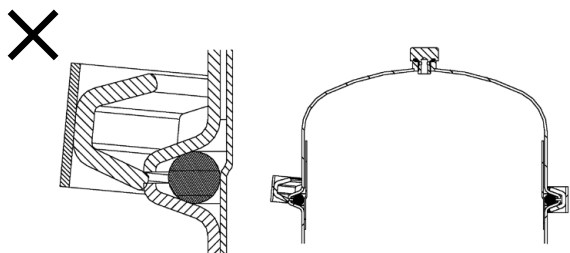


Fig. (b) Incorrect mounting of the V-band
(Not correctly with the collar of the cover)

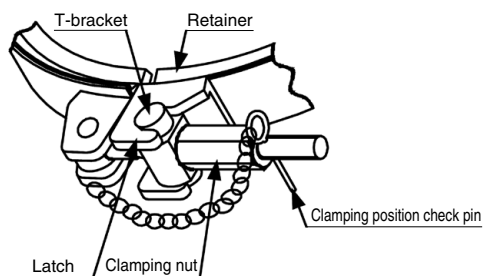


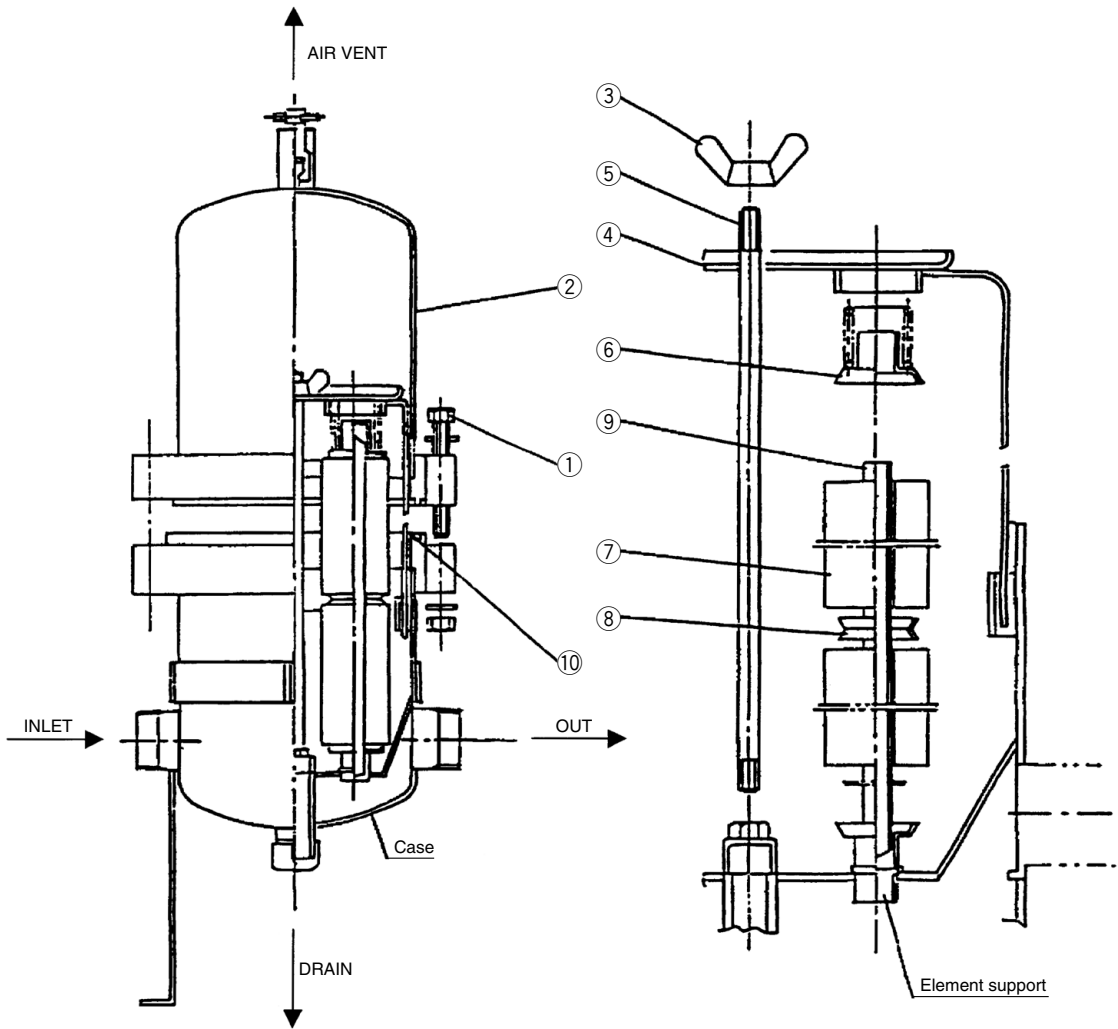
Fig. (c) V-band tightening

6. Restart and Air Discharge

- 6-1. When restart the operation after the replacement of the element, mount the V-band to the specified position. Confirm connecting parts and seal do not leak before starting the operation.
- 6-2. When restarting the operation, open the upper air relief port to **discharge air**.

FGET Series Replacement Procedure for Elements 1

1. Instruction Drawing for Disassembly & Reassembly of the Filter



- | | |
|----------------------------------|----------------------------|
| ① Hexagon head bolt, Nut, Washer | ⑥ Element mounting bracket |
| ② Cover | ⑦ Element |
| ③ Wing nut | ⑧ Joint |
| ④ Element retainer | ⑨ Element guide |
| ⑤ Tension bolt | ⑩ Gasket |

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2. Removal of the Cover

- 2-1. Close the inlet and outlet valves.
- 2-2. Open the drain valve to make the pressure in the filter zero, and open the air vent valve to completely remove the inside fluid.
- 2-3. Loosen the hexagon head bolts and nuts fastening the filter cover to the filter case.
- 2-4. Remove the cover.

3. Removal of the Element

- 3-1. Remove the wing nut.
- 3-2. Remove the element retainer.
- 3-3. Take out parts in order of the element mounting bracket, element, joint, and element guide. The element guide may not necessarily be taken out. It is not a must to take out the element guide.

After removal of the element mounting bracket, the elements and joints can be taken out as a unit by taking out the element guide in accordance with instructions shown in Fig. 1.

Note) The joint may not be necessary.

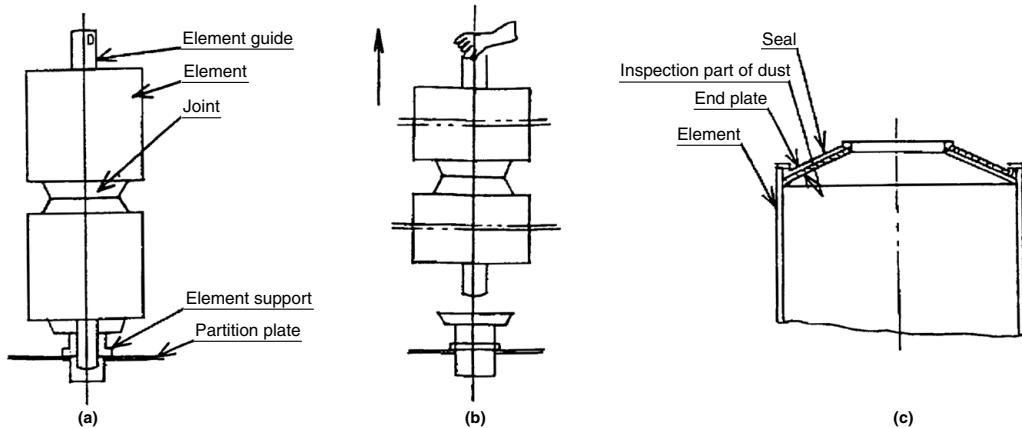


Fig. 1

4. Mounting of the Element

(Handle the elements under the clean atmosphere.)

4-1. For fitting a cylindrical or pleat type micromesh element (which does not use spherical seal) or a sintered element, remove dust between the end plate and the seal completely without fail, before fitting. (Refer to Fig. 1 c)

Note) Replace any PTFE seal if used. Be sure to exchange it for new one.

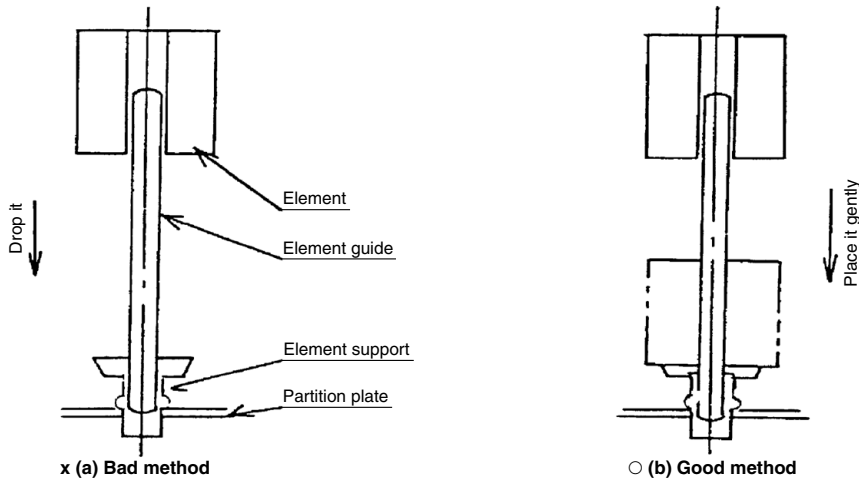
As it is hard, as the seal becomes imperfect, attention must be paid to it.

4-2. Mount the element guide if taken off.

4-3. Insert an element, joint, the other element, and element mounting bracket in this order and in such a way that they are exactly concentric.

Note) Some units may not require the joint, does not need according to circumstances.

In incorporating the element to the element guide, do not drop the element from the upper end of the element guide.



Note) When 2 or 3 elements are put one upon another, it is possible to firstly set elements and joints to the element guide and then mount the element guide assembly on the element support. (Refer to Fig. 1, reversely to the order of removal.)

4-4. Incorporate the element mounting bracket.

4-5. Fit the element retainer gently.

5. Mounting of the Cover

5-1. After making sure that the gasket is not damage, set it at the given place.

Damaged gasket requires replacement.

5-2. Set the cover at the given place.

5-3. Fasten the hexagon head bolts, nuts and washer.

6. Restart and Air Discharge

Make sure that no pressure-leak is exhibited from the seat surface. Then put the unit into regular operation in accordance with the procedure of operation described below.

6-1. Before starting the operation, make sure of the open or close position of each valve in the piping and of being perfectly sealed at the joining parts.

6-2. Open the air discharging valve and supply fluid. Upon air in the container is removed completely, close the air discharging valve. Then start a regular operation.

Note) Since this filter consists of many thin press-formed parts, it must be handled using clean gloves.

FGG Series Replacement Procedure for Elements 1

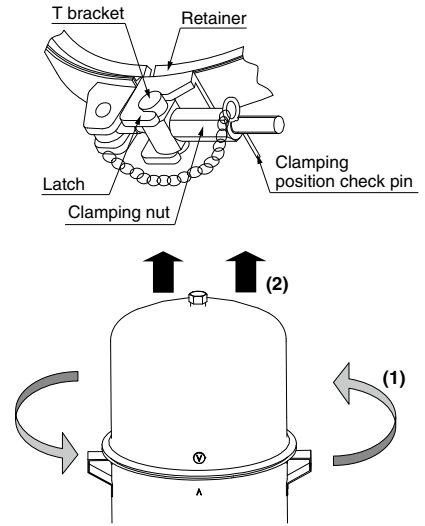
1. Removal of the Cover

- 1-1. Stop the operation.
- 1-2. Close the valve in order of INLET, then, OUTLET.
- 1-3. Zeroes the pressure in the filter.
- 1-4. Open the drain valve for inlet and outlet to discharge all fluid inside.
- 1-5. Pull out the V-band clamping position check pin.
- 1-6. Loosen the V-band tightening nut and remove the latch. Then, remove the cover and O-ring for checking,
- 1-7. Rotate the cover counterclockwise and lift it to remove the cover. [In order of (1)(2) in drawing on the right]
- 1-8. If the O-ring is swollen, replace it with a new O-ring.

[O-ring for replacement] Part no.: AL-25S (NBR)
Part no.: AL-22S (FKM)

⚠ Warning

Remove V-band/cover after confirming the pressure in the filter is zero.

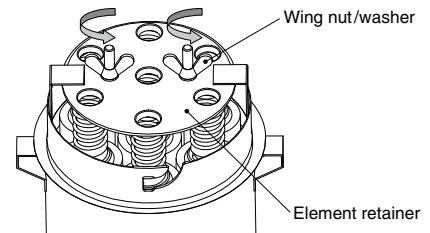


2. Removal of the Element

- 2-1. Remove the wing nut and the washer.

⚠ Caution

Please remove the 2 wing nuts at the same time. The element retainer might not be able to incline from one side when it is outside and to remove well.



- 2-2. Remove the element retainer.
 - 2-3. Remove the element mounting bracket (a part integrating the element holder and the spring).
 - 2-4. Take out parts in order of the element, then, joint (element guide).
 - * It is not a must to take out the element guide.
 - Element, and joint can be taken out together by taking out the element guide.
- Note) The joint may not be necessary depending on filter and element type.

⚠ Caution

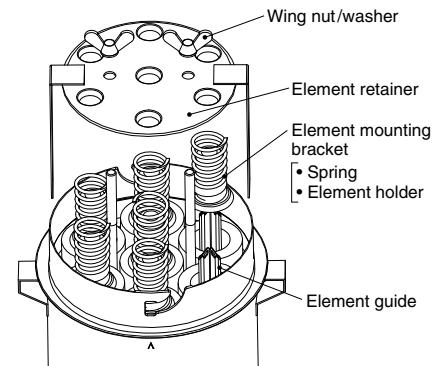
Attention should be taken to avoid burning for high temperature.

3. Mounting of the Element

- 3-1. To recycle the micro mesh element and sintered element, eliminate any dust between the end plate and the seal completely.
 - 3-2. Mount the element guide if it is removed.
 - 3-3. Insert parts in order of the element, joint, element, then, element mounting bracket so that they are concentric.
- Note) The joint may not be necessary.

⚠ Caution

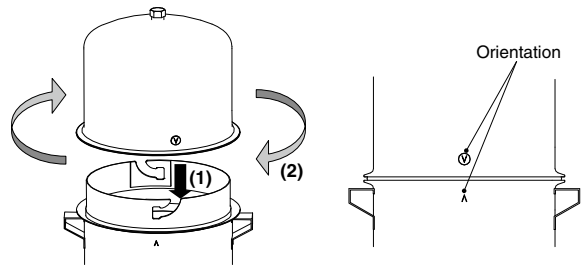
When element is mounted, do not drop the parts from the upper end of the element guide for mounting.



- 3-4. When 2 to 3 elements are placed on top of the other, a set in which the element and joint are prepared can be mounted to the element support.
- 3-5. Assemble the element mounting bracket.
- 3-6. Mount the element retainer carefully.

4. Mounting of the O-ring and Cover

- 4-1. Set the O-ring to the case.
- 4-2. Rotate the cover clockwise while pushing till the end so that the orientation mark of the case and the cover match. [In order of (1) and (2) on drawing on the right]



5. Mounting and Tightening of the V-band

- 5-1. Mount the V-band to the collar of the cover and the case correctly. [Refer Fig. (a), (b)]

⚠ Warning

The cover may be fallen off due to incorrect mounting. Mount the cover properly.

- 5-2. Hit the circumference of the V-band lightly with a plastic hammer for secure mounting.
- 5-3. Mount the T-bracket to the latch correctly. [See Fig. (c)]
- 5-4. Tighten the clamping nut to the specified position (position from where the clamping position check pin can be inserted), and insert the clamping position check pin. [See Fig. (c)]
- 5-5. When the clamping nut cannot be tightened to specified position (position where the clamping position check pin can be inserted), replace the V band and O-ring to new ones. (See Table 1).

⚠ Warning

Replace with a new V-band when deformation or worn out by screw is found on the band

[V-band for replacement] Part no: CY-27S

⚠ Caution

Clean the V-band and the contact surface between the cover and the case before mounting. Dirty contact surface lead to cause leakage.

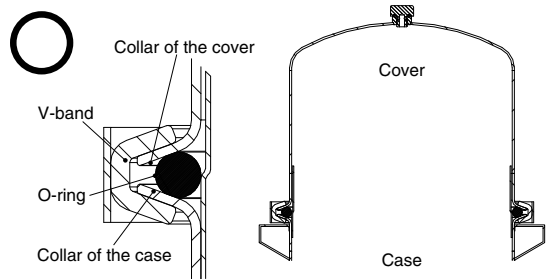


Fig. (a) Correct mounting of the V-band

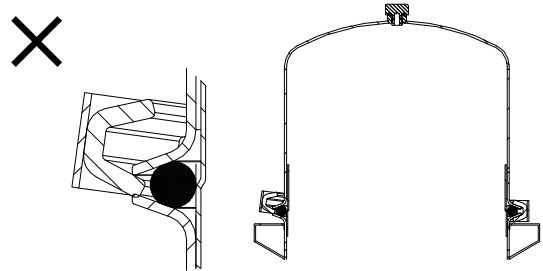


Fig. (b) Incorrect mounting of the V-band

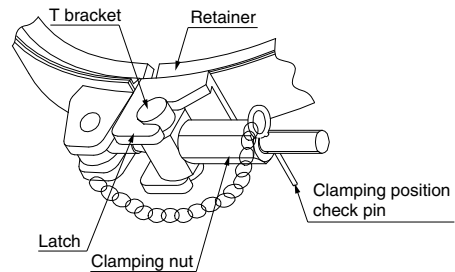


Fig. (c) V-band tightening

6. Restart and Air Discharge

- 6-1. When restarting the operation after the replacement of the element, follow the procedure of section 4 "Operation."
- 6-2. When restarting the operation, open the upper air relief port to **discharge air**.

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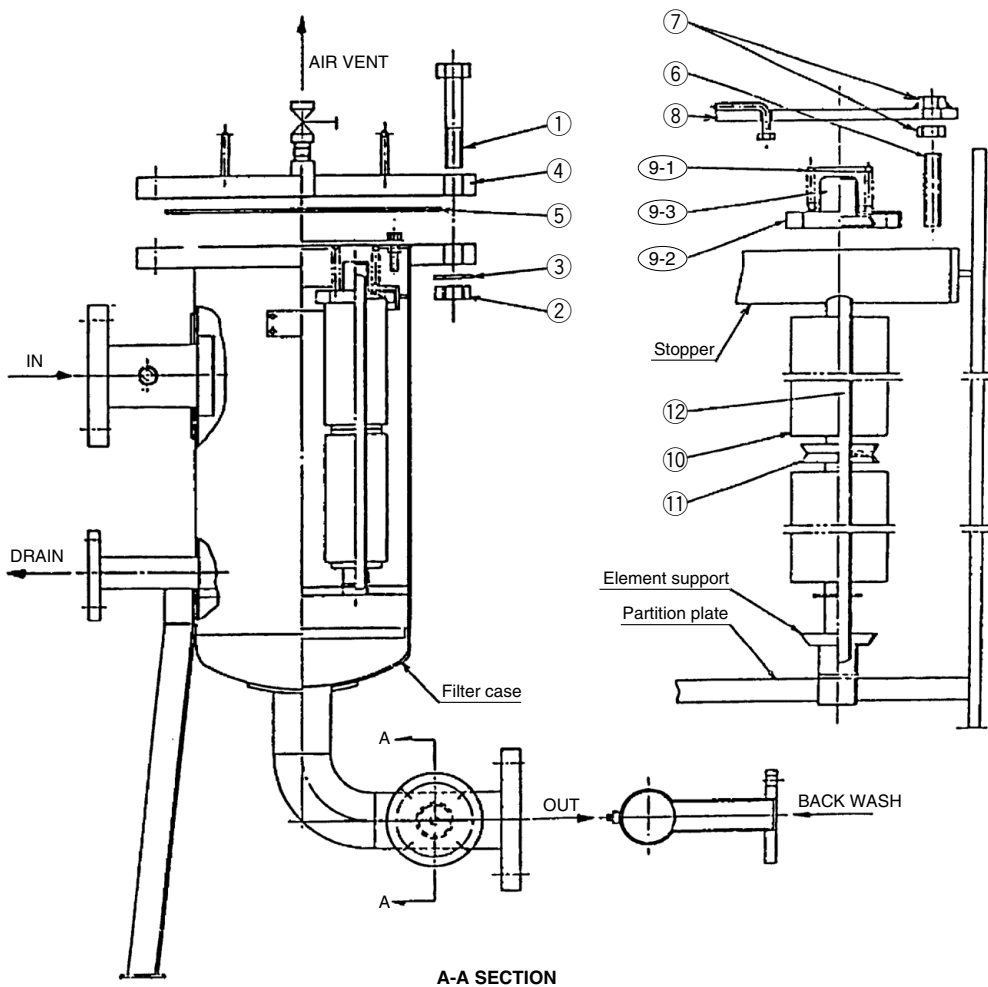
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FGA Series Replacement Procedure for Elements 1

1. Instruction Drawing for Disassembly & Reassembly of the Filter



- | | | |
|---------------------|----------------------------|--------------------|
| ① Hexagon head bolt | ⑥ Adjustment bolt | ⑨-2 Vibration stop |
| ② Hexagon nut | ⑦ Lock nut | ⑨-3 Element holder |
| ③ Washer | ⑧ Element retainer | ⑩ Element |
| ④ Cover | ⑨ Element mounting bracket | ⑪ Joint |
| ⑤ Gasket | ⑨-1 Spring | ⑫ Element guide |

2. Overhaul

- 2-1. If the differential pressure rises due to clogging and reaches the threshold for element replacement (0.1 MPa), replace the element with the new one.
- 2-2. The removal and mounting of the element at the time of overhauling shall be made in the following sequence.

4. Removal of the Element

- 4-1. Remove the element retainer.
Set the bolt ⑥ and nut ⑦ in the plate as it is.
Please note that it could cause deformation due to the incomplete sealing or overtightened element if it is mounted without any adjustment. For details, refer to section 7, "Adjustment Method for Mounting Other Elements."
- 4-2. Take them out in the element mounting bracket, element, joint, element guide in order.
The element guide is not required to be taken out forcibly.
After the element holder is taken out, if the element guide is taken out in such a manner as shown in Fig. 1, the element and joint can be taken out together.
(Note) In some cases, no joint is required.

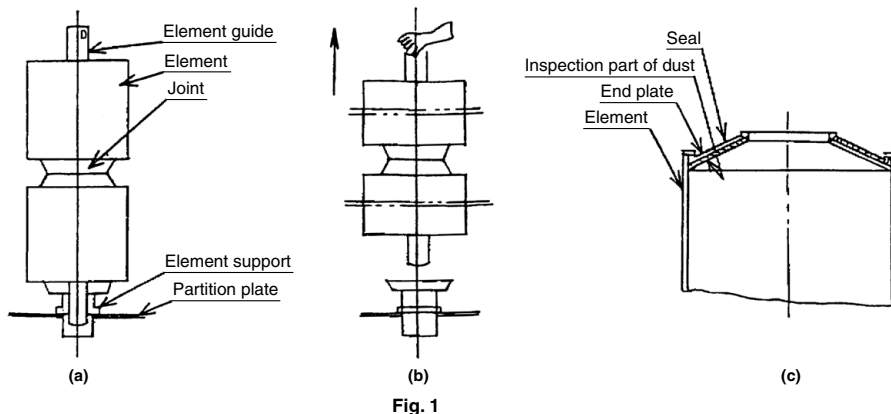


Fig. 1

5. Mounting of the Element

(Be sure to handle under the clean surrounding condition.)

- 5-1. In the case of the micro mesh element (cylindrical or pleat type (spherical seal is not used)) and sintered element, be sure to remove dust completely between end plate and seal completely. (Refer to Fig. 1 (c))

(Note) Replace any PTFE seal if used. Be sure to exchange it for new one.
As it is hard, as the seal becomes imperfect, attention must be paid to it.

- 5-2. Mount the element guide if taken off.
- 5-3. Insert them in the order of element, joint, element, element mounting bracket in order in such a way that they are concentric.
In some cases, no joint is required.

(Note) When the element is mounted, be sure to avoid building in it by dropping from the upper end of the element guide.

3. Removal of the Cover

- 3-1. Close the valves at inlet and outlet.
- 3-2. Open the air vent and drain valves and make the pressure inside the filter zero (0) in order to discharge all fluid inside.
- 3-3. Loosen the bolt ① and nut ② for tightening the filter cover and the filter case little by little uniformly.
When the nut can be turned with hand, remove them one after another in order from the end.
- 3-4. Remove the cover and gasket.

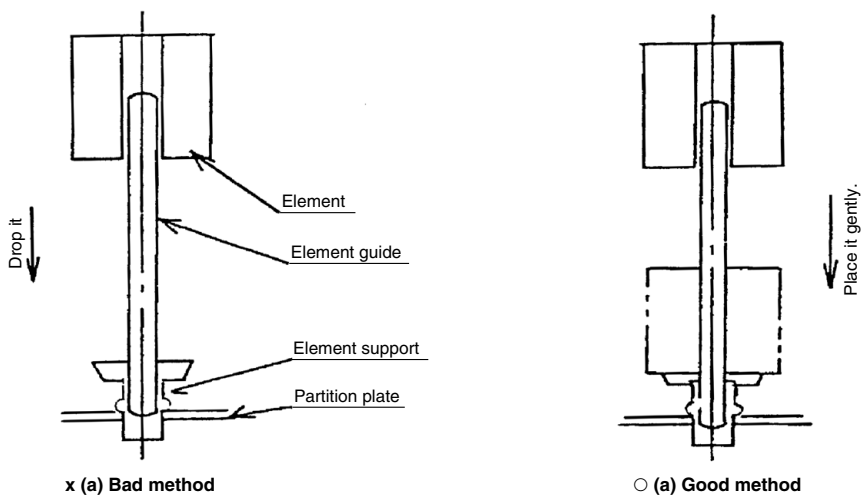
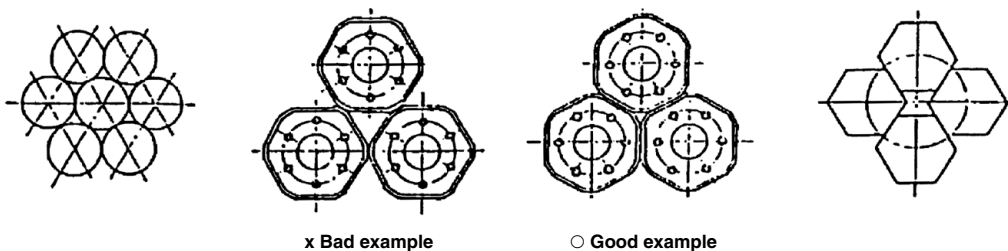


Fig. 2

* Incidentally, when the number of arrangements is many and the number of piling of elements is 3-4 stages, the one in which element and joint are set in the element guide can be set at element support. [Refer to Fig. 1 for the details: Procedure opposite to that for removal]

5-4. The element mounting bracket must be built in it by such a manner as shown in (b) and (c) of (Fig. 3).



(a) Arranging condition of element.

(b) Arrangement of 7 pcs. or more

(c) 4-pcs. arrangement

Fig. 3

Note) Fig. 3 (b) and (c) show the arranging condition of the element mounting bracket (spring, vibration stop, element holder) shown in Fig. 4

5-5. Fit the element retainer gently.

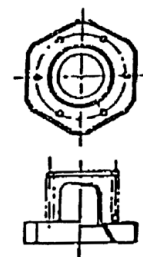


Fig. 4

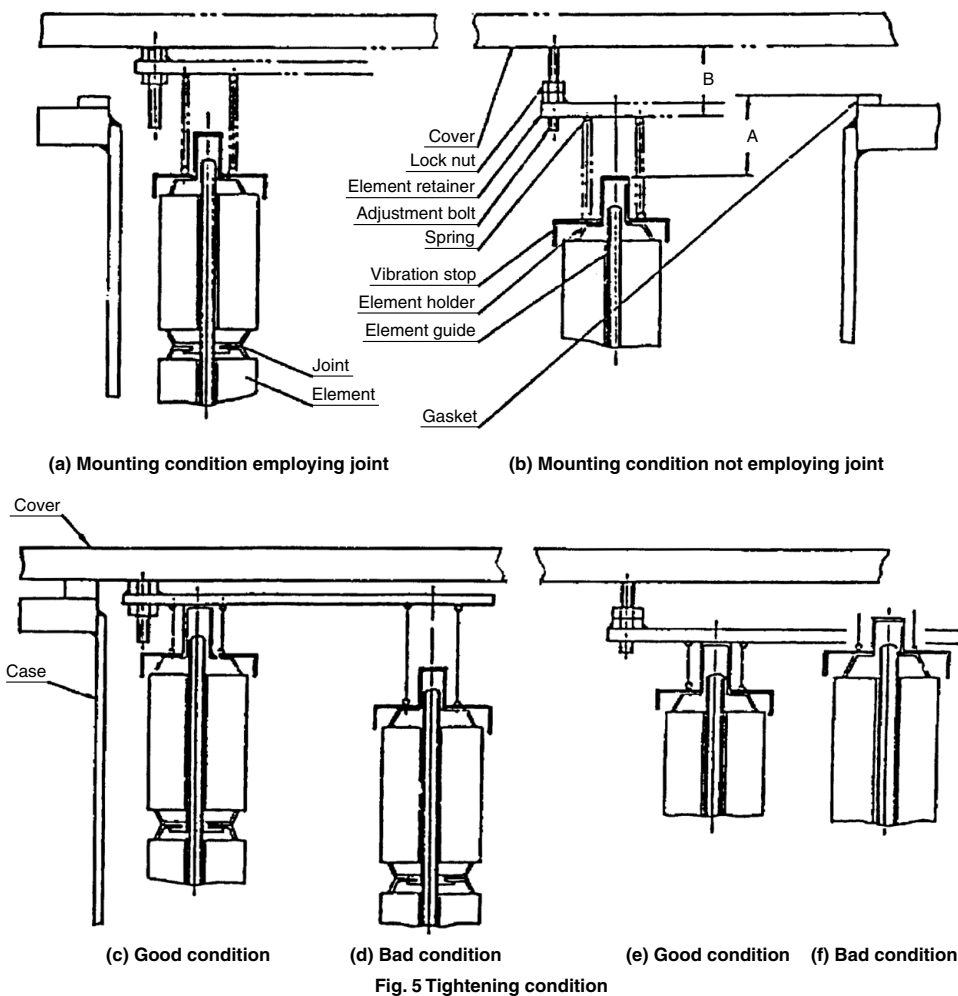
6. Mounting of the Cover

6-1. Ensure that the gasket is not damaged, and set it to the specified position. Also set the bolt ①, nut ② and washer ③ and tighten them uniformly diagonally.

When the gasket is damaged, exchange it for new one.

6-2. After confirmation that there is no leakage of pressure from the seat surface, start the normal operation.

(Method of operation, please refer to the operation manual.)



7. Adjustment Method for Mounting Other Elements

7-1. Adjust it in such a way that the element retainer and element are at a close contact condition when the filter cover is installed, employing the adjustment bolt and lock nut shown in (Fig. 5) [Refer to (c) and (e) of Fig. 5] when the element retainer is installed.

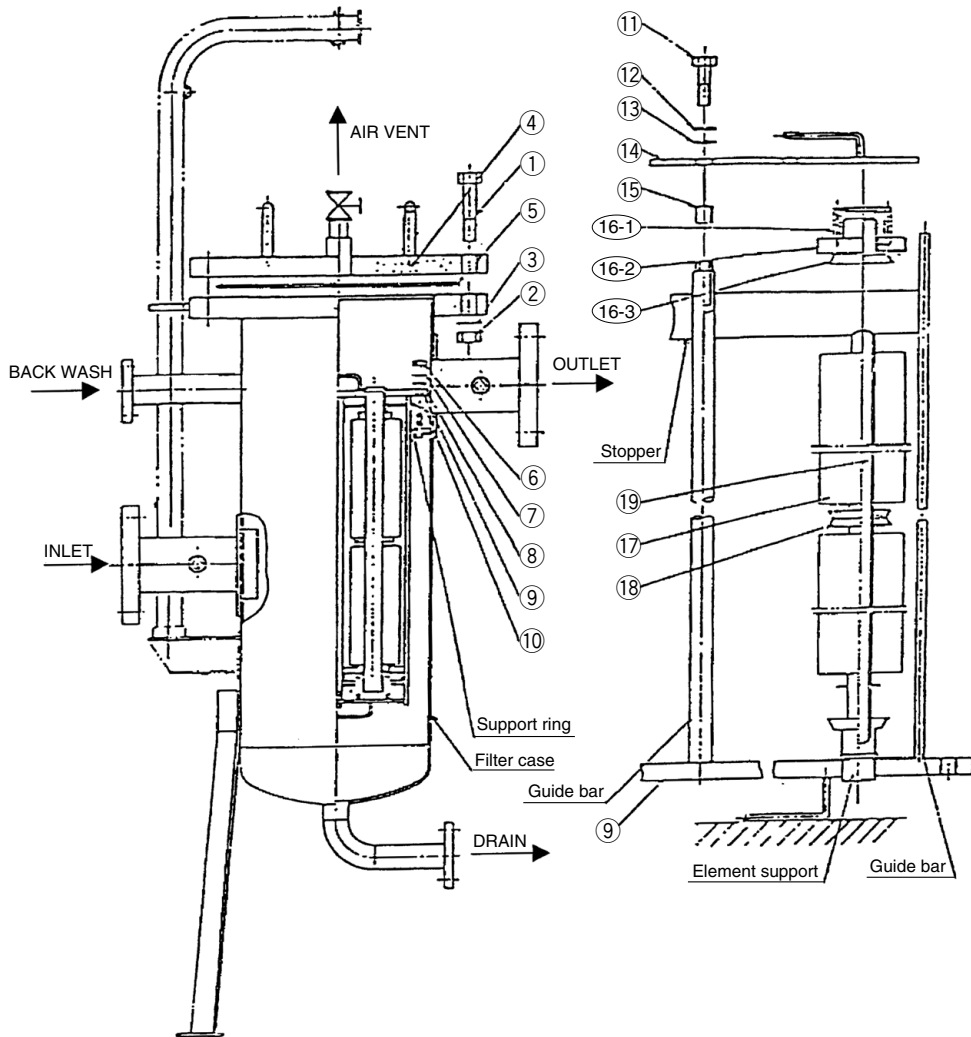
7-2. Adjustment must be made in the following manner.

Make measurement on dimensions A as shown in Fig. 5 (b) and adjust it in such a way that Dimensions A are equal to those B, resulting in being at such a condition as shown in (e) of Fig. 5.

As can be seen in Fig. 5 (a) and (b), the lock nut should be set to the bottom in the installation employing the joint. In the installation not employing the joint, set it to the top.

1. Instruction Drawing for Disassembly & Reassembly of the Filter

Element assembly exploded view



- ① Hexagon head bolt
- ② Hexagon nut
- ③ Washer
- ④ Cover
- ⑤ Gasket
- ⑥ Hexagon nut
- ⑦ Spring washer
- ⑧ Washer

- ⑨ Partition-plate
- ⑩ Gasket
- ⑪ Hexagon head bolt
- ⑫ Spring washer
- ⑬ Washer
- ⑭ Element retainer
- ⑮ Collar
- ⑯ Element mounting bracket

- ⑰ Spring
- ⑱ Vibration stop
- ⑲ Element holder
- ⑳ Element
- ㉑ Joint
- ㉒ Element guide

2. Overhaul

- 2-1. If the differential pressure rises due to clogging and reaches the threshold for element replacement (0.1 MPa), replace the element with the new one.
- 2-2. The removal and mounting of the element at the time of overhauling shall be made in the following sequence.

3. Removal of the Cover

- 3-1. Close the valves at inlet and outlet.
- 3-2. Open the air vent and drain valves and make the pressure inside the filter zero (0) in order to discharge all fluid inside.
- 3-3. Loosen the bolt ①, and nut ② for tightening the filter cover and the filter case little by little uniformly at first. When the nut can be turned with hand, remove them one after in order the end.
- 3-4. Remove the cover and gasket.

5. Removal of the Element

- 5-1. Loosen the hexagon head bolt ① little by little uniformly. Remove the spring washer and washer.
- 5-2. Remove the element retainer.
- 5-3. Take out the members in the order of collar, element mounting bracket, element, joint and element guide.
The element guide is not needed to be taken out forcibly. If the element guide is taken out in the procedure after taking out of the element holder (Fig. 1 (b)), both element and joint can be taken out at the same time.
(Note) The joint is not needed in some cases.

4. Method for Removal of the Element Assembly

- 4-1. Loosen the nut ⑥ little by little uniformly. Remove the nut, spring washer and washer.
- 4-2. Lift the element assembly from the container by means of a davit or any other lifting device out of the container. Then, lift it vertically so that the guide bar protecting the element does not touch the support ring too much.
- 4-3. Turn the element assembly taken out of the container upside down so that the partition plate is located downwards as illustrated in the disassembly drawing.

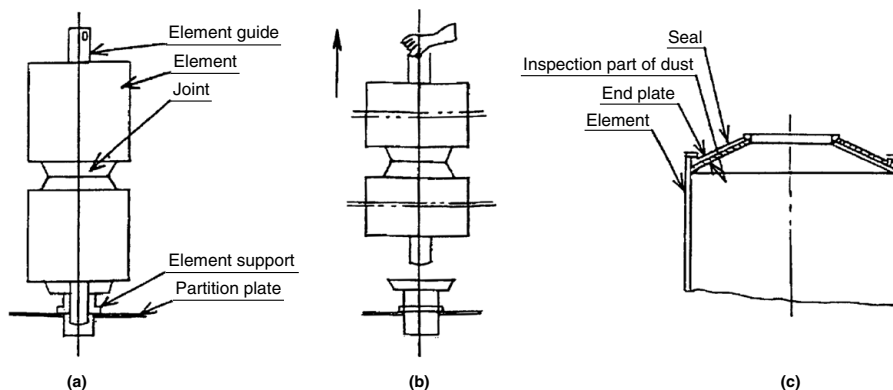


Fig. 1

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6. Mounting of the Element

(Be sure to handle it under the clean environmental condition.)

6-1. In the case of the micromesh element (cylindrical and pleat type (employing no seal)) and sintered element, be sure to remove the dust located between end plate and seal without fail. (Refer to Fig. 1 (c) for the details)

6-2. When the element guide is removed, fit it.

6-3. Insert the members correctly in the order of element, joint, element and element fitting hardware in such a way that concentricity may be obtained.

Note) No joint is needed sometimes.

When the element is installed, do not drop it from the upper end of the element guide and assemble it. (Fig. 2)

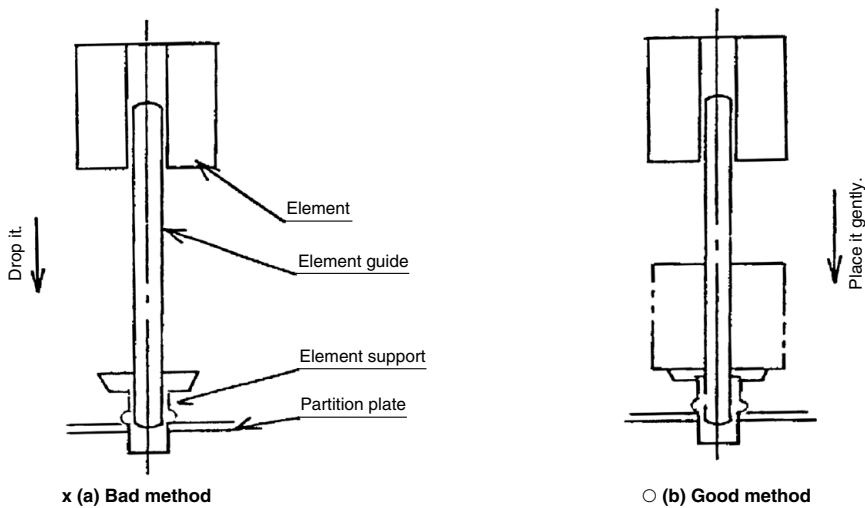


Fig. 2

Note) When the number of arranged ones is many and the number of stacking of elements is 3-4 stages, the element guide to which the element and joint are set can be set to the element support. (Refer to Fig. 1 for the details: Opposite procedure to that for taking out)

6-4. The fitting hardware for element shall be assembled in such a method as shown by (b) and (c) of (Fig. 3).

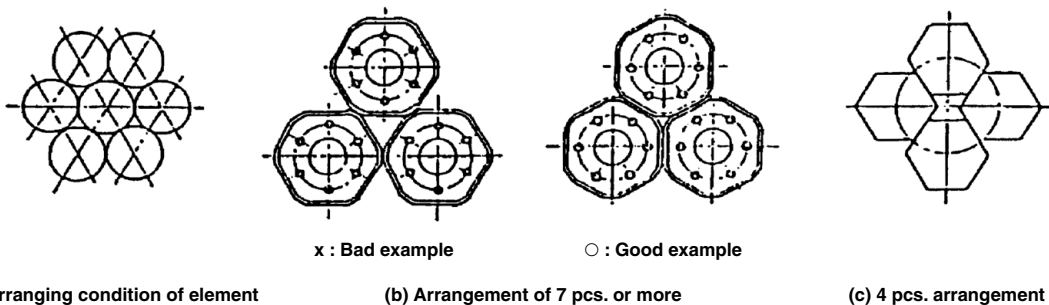


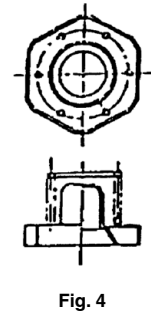
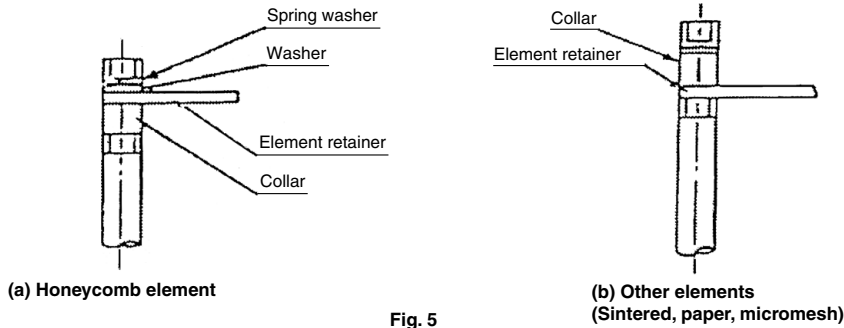
Fig. 3

Note) Fig. 3 (b) and (c) show the arranging condition of the element mounting bracket in Fig. 4 (spring, vibration stop, element holder).

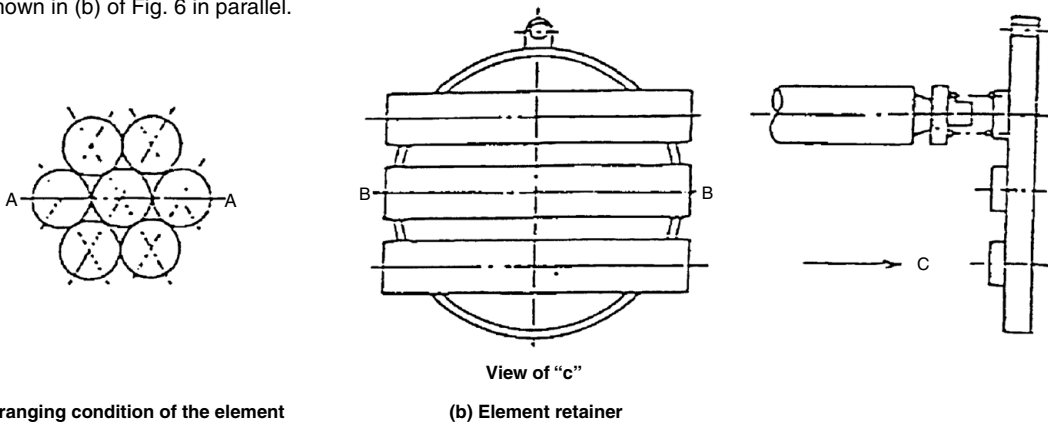
6-5. The collar should be set to the bottom of the element retainer only when the honeycomb element is used. For other elements, it should be set to the top of the retainer.

Note 1) The collar is not used for the single element assembly.

Note 2) The collar for honeycomb element cannot be used for other elements.



6-6. The element retainer shall be assembled in such a way that the symbol A-A in (a) of Fig. 6 is overlapped with symbol B-B of element retainer shown in (b) of Fig. 6 in parallel.



Note 1) When the element retainer is installed, place it correctly in such a way that the element mounting bracket is not moved.

Note 2) Fit the washer ⑬ and spring washer ⑫ and tighten the bolt ⑪ little by little uniformly. Then, tighten it to such an extent that the guide bar comes in close contact with bolt nut, spring washer, washer, element retainer.

7. Mounting of the Element Assembly

7-1. Turn the element assembly set at 4-2-4 upside down in such a way that the partition plate comes upside.

7-2. Before the element assembly is installed, be sure to install the gasket at specified position correctly.

7-3. Employing the davit and other lifting devices, assemble it in the same way that the element assembly is taken out.

7-4. Install the washer ⑧ and spring washer ⑦ and tighten them uniformly with nut ⑥.

8. Mounting of the Cover

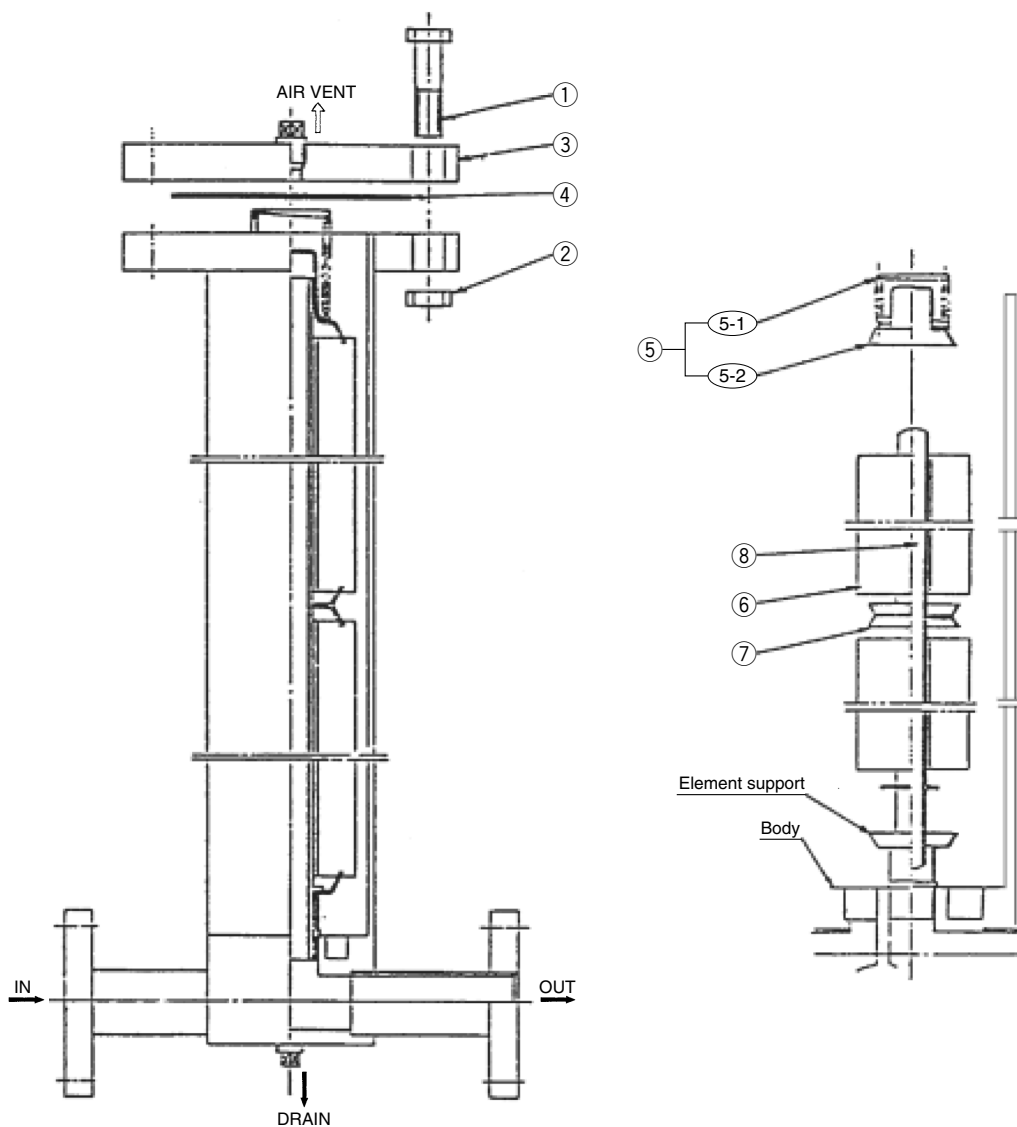
8-1. Ensure that the gasket is not damaged, and set it to the specified position. Also set the bolt ①, nut ② and washer ③ and tighten them uniformly diagonally.

If the gasket is damaged, replace it with the new one.

8-2. After ensuring that there is no pressure leakage, start the actual operation.

FGC Series Replacement Procedure for Elements 1

1. Instruction Drawing for Disassembly & Reassembly of the Filter



- | | | |
|---------------------|----------------------------|-----------------|
| ① Hexagon head bolt | ⑤ Element mounting bracket | ⑦ Joint |
| ② Hexagon nut | ⑤-1 Spring | ⑧ Element guide |
| ③ Cover | ⑤-2 Element holder | |
| ④ Gasket | ⑥ Element | |

2. Overhaul

- 2-1. If the differential pressure rises due to clogging and reaches the threshold for element replacement (0.1 MPa), replace the element with the new one.
- 2-2. Take out the element at the time of overhauling and carry out the mounting operation in the following sequence.

3. Removal of the Cover

- 3-1. Close the valves at inlet and outlet.
- 3-2. Open the air vent valve and drain valve in order make the pressure inside the filter zero (0) and discharge all fluid from the inside.
- 3-3. Loosen the bolt ① and nut ② for tightening the filter cover and the filter case little by little uniformly at first. When the nut can be turned with hand, remove them one after another in order from the end.
- 3-4. Remove the cover and gasket.

4. Removal of the Element

- 4-1. Take out the element mounting bracket, element, joint, element guide in order.
- 4-2. It is not required to take out the element forcibly.
- 4-3. After taking out the element holder, the element and joint can be taken out together if the element guide is taken out in such a manner as mentioned in (Fig.1).

Note) In some cases, no joint is required.

5. Mounting of the Element

(Handle it under the clean surrounding condition.)

- 5-1. As for the elements except the honeycomb and paper elements, check if there is no dust between the end plate and seal when taking them out. If there is any dust, clean it off. (See Fig. 1 (c).)
- 5-2. Mount it when the element guide is removed:
- 5-3. Insert them in the order of element, joint, element, element mounting bracket in such a way that they are concentric.

Note) No joint is needed in some cases.

When the element is installed, avoid building in it by dropping from the upper end of the element guide when the element is installed.

6. Mounting of the Cover

- 6-1. Ensure that the gasket is not damaged, and set it to the specified position. Also set the bolt ① and nut ② and tighten them uniformly diagonally. When the gasket is damaged, exchange it for new one.
- 6-2. After ensuring that there is no leakage of pressure from the seat surface, start the actual operation.

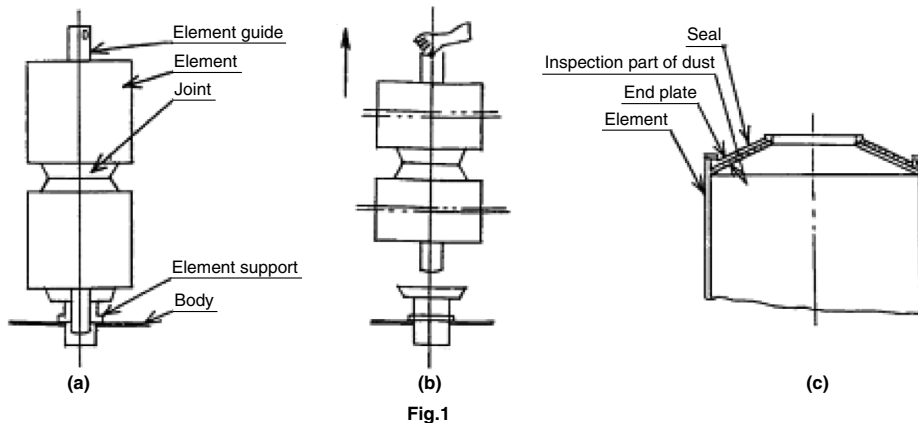


Fig.1

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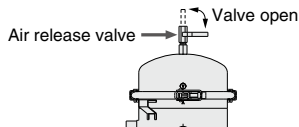
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FGF Series Replacement Procedure for Elements 1

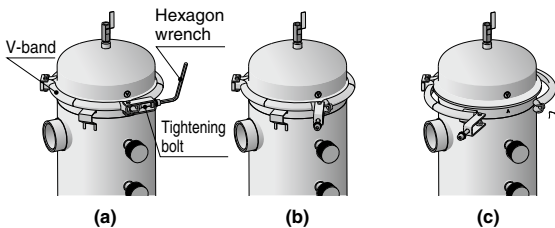
One element included type

1. Removal of the Element

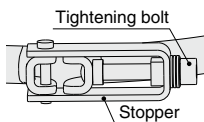
- 1-1. After stopping the operation, close the valve in the order of inlet and outlet.
- 1-2. Open the air release valve to let the internal pressure of a filter be zero, and open the liquid discharging valve to let out the internal fluid completely.



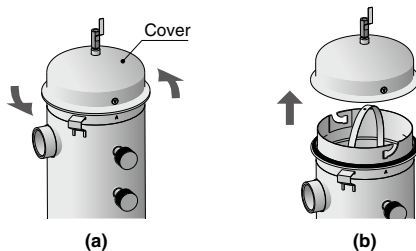
- 1-3. Loosen the tightening bolts of the V-band and remove the stopper.
(The tightening bolts can be loosened with a hexagon wrench [width across flats 6 mm].)



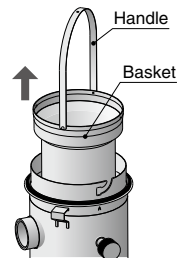
- * Check the O-ring and the V-band, and if there is any abnormality, replace it with a new one.
(Refer to "Replacement Parts" on page 365.)



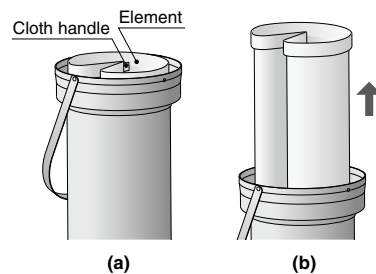
- 1-4. Remove the cover upward by turning it counterclockwise.



- 1-5. Using the handle, remove the basket vertically.
* Inspect the O-ring attached to the holder assembly in the case, and replace it with a new one if it is expanded or there is any abnormality.
(Refer to "Replacement Parts" on page 365.)

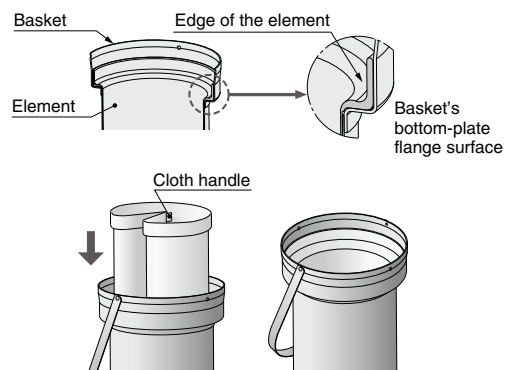


- 1-6. A handle made of cloth is attached to the element so that elements can be pulled out of the basket by fingers or using sticks, pulling them to the center.
(Element for replacement: Refer to "Part number of element for replacement" on page 365.)



2. Mounting of the Element

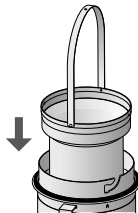
- 2-1. Pull a new element by the cloth handle toward the center, and put it inside the basket, folding the edge of an element. Further, push the edge of an element to the basket's bottom-plate flange surface thoroughly.



- * Set the handle avoiding attaching it to the notch (guide slit) of the case and INLET.

FGF Series Replacement Procedure for Elements 2

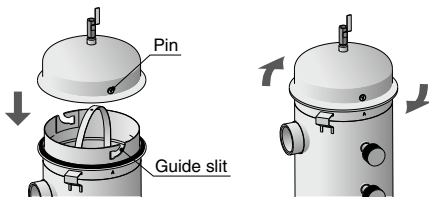
2-2. Grasp the handle and put the basket in the case.



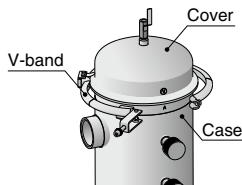
2-3. Set the O-ring to the case.

* Replace the O-ring with a new one if it is expanded or there is any abnormality. (Refer to "Replacement Parts" on page 365.)

2-4. Adjust the pins (2 locations) to the guide slit of the case inside the cover, and push them thoroughly and turning clockwise.

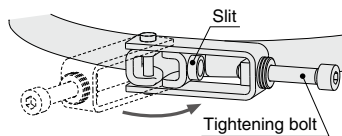


2-5. Install the V-band in the edge of the cover and case correctly.

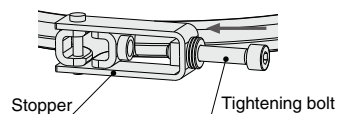


* Clean the contact surface of the V-band, cover and case prior to the attachment.

2-6. Align the tightening bolts with the slit and fasten properly.



2-7. Tighten the tightening bolts until the heads are tight against the surface.



* When restarting this product after replacing the elements, be sure to release the air by opening the release valve on the top.

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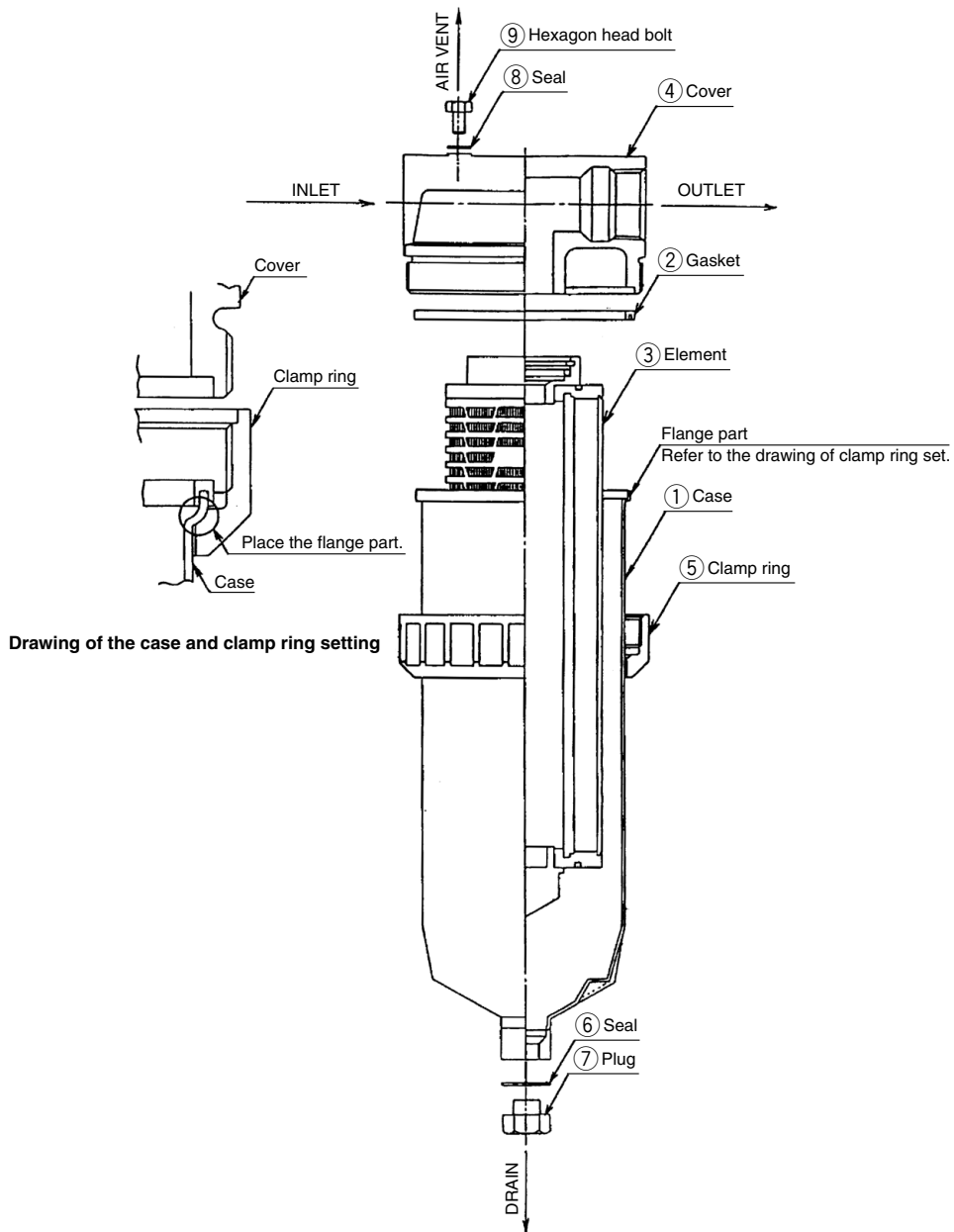
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FGH Series Replacement Procedure for Elements 1

1. Instruction Drawing for Disassembly & Reassembly of the Filter



FGH Series Replacement Procedure for Elements 2

1. Removal of the Element

- 1-1. Stop the fluid sent to the filter. (If a valve is installed before or after the filter, close the valve.)
- 1-2. Loosen the air vent (hexagon head bolt ⑨) and completely discharge the pressure in the filter.
- 1-3. Remove drain (plug ⑦) and discharge the fluid from the filter.
- 1-4. A large force is required to loosen clamp ring ⑤. Use a commercially available belt wrench etc. to loosen clamp ring ⑤ so that the tool is not removed, so as to make it turnable by hand. Remove case ① by hand while supporting it, and remove the element together with case ①.
- 1-5. Pull out element ③ from cover ④. Since the PTFE seal is used, a certain amount of force may be necessary to pull out the element. If there is not enough space under case ①, lower case ① by about 100 mm, and remove the element together with case ①.
- 1-6. Dispose the removed element.
- 1-7. Clean the inside of case ①, gasket ②, seal ⑥ and plug ⑦ using a clean operation fluid or solvent.

2. Mounting of new Element

- 2-1. Check that the sealing surface of case ① is not scarred.
- 2-2. Check whether or not the gasket and seal are damaged or deformed.
Replace any abnormal one with a new one.
- 2-3. Since the PTFE seal is used for element ③, a certain amount of force is needed to set the element. Set the element in the following procedure. Handle element ③ carefully to keep it clean, for example, open the element package only when the element is mounted.
 - a. Fit the grooved part of gasket ② into the flange part of case ①.
 - b. Place element ③ in case ①. Element ③ must be positioned at the center of case ①.
 - c. Set clamp ring ⑤ to case ①. The tapered part of clamp ring ⑤ must be facing downward.
 - d. Set the seal part of the element ③ to the cover ④ while the flange part of case ① is being placed on clamp ring ⑤.
 - e. Since the PTFE is used for the material of gasket ②, a large force is required to tighten clamp ring ⑤. After screwing clamp ring ⑤ into cover ④ by hand, use a commercially available belt wrench etc. to tighten the clamp ring so that the tool is not removed and no leakage occurs. (Reference tightening rotation angle: approx. 1/4 to 1/2 turn after tightening by hand)
* This makes the element ③ be pushed up as a whole, and the element seal will be installed to the case ① sealing. The element ③ can also be pushed hard by hand to be surely installed before setting the case ①.
- 2-4. Set seal ⑥ on plug ⑦ of drain and tighten hexagon head bolt ⑨ of the air vent so that no leakage occurs.
- 2-5. Start the operation.

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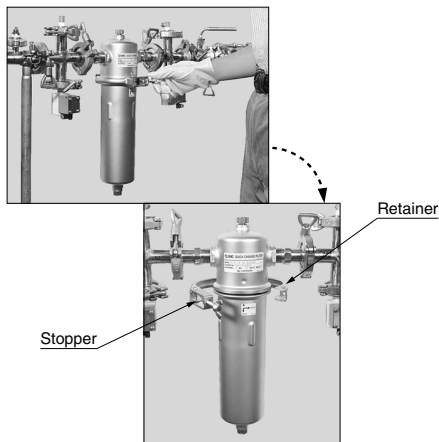
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FQ1 Series Replacement Procedure for Elements

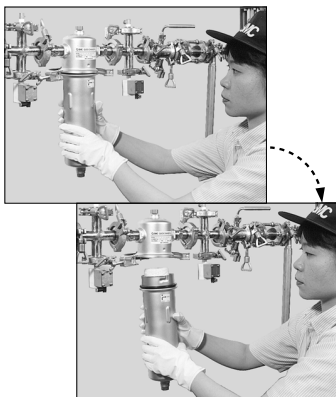
1. Removal of the Element

- 1-1. Stop liquid flowing into the filter. (If there are valves before and after the filter, close these valves.)
- 1-2. Release pressure inside the filter completely by loosening the air vent plug.
- 1-3. Discharge fluid inside the filter by removing the drain plug.
- 1-4. Remove the stopper from the retainer by loosening the wing bolt on the V-band.



- 1-5. To extract the element from the case, rotate the case counterclockwise about 20 degrees until it stops, then lower it by about 40 mm and remove it from the cover.

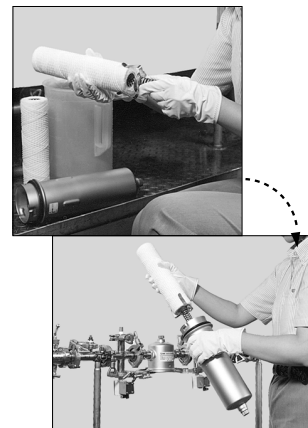
Note) When using the 2 L250 elements, do not discard the intermediate holder since it is used.



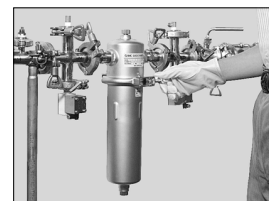
- 1-6. Clean the inside of the case, gaskets, seals, holders, plugs, etc., using a clean operation fluid or solvent.

2. Installing the Element

- 2-1. Ensure that the O-rings are not damaged or deformed. If needed, replace with new ones.
- 2-2. Check that the lower holder inside the case is not inclined, and then insert the element.
[When using the 2 L250 elements]
Insert the intermediate holder into the lower part of the second element (upper level), and then place one side of the intermediate holder into the case by inserting it into the upper part of the first element (lower level).



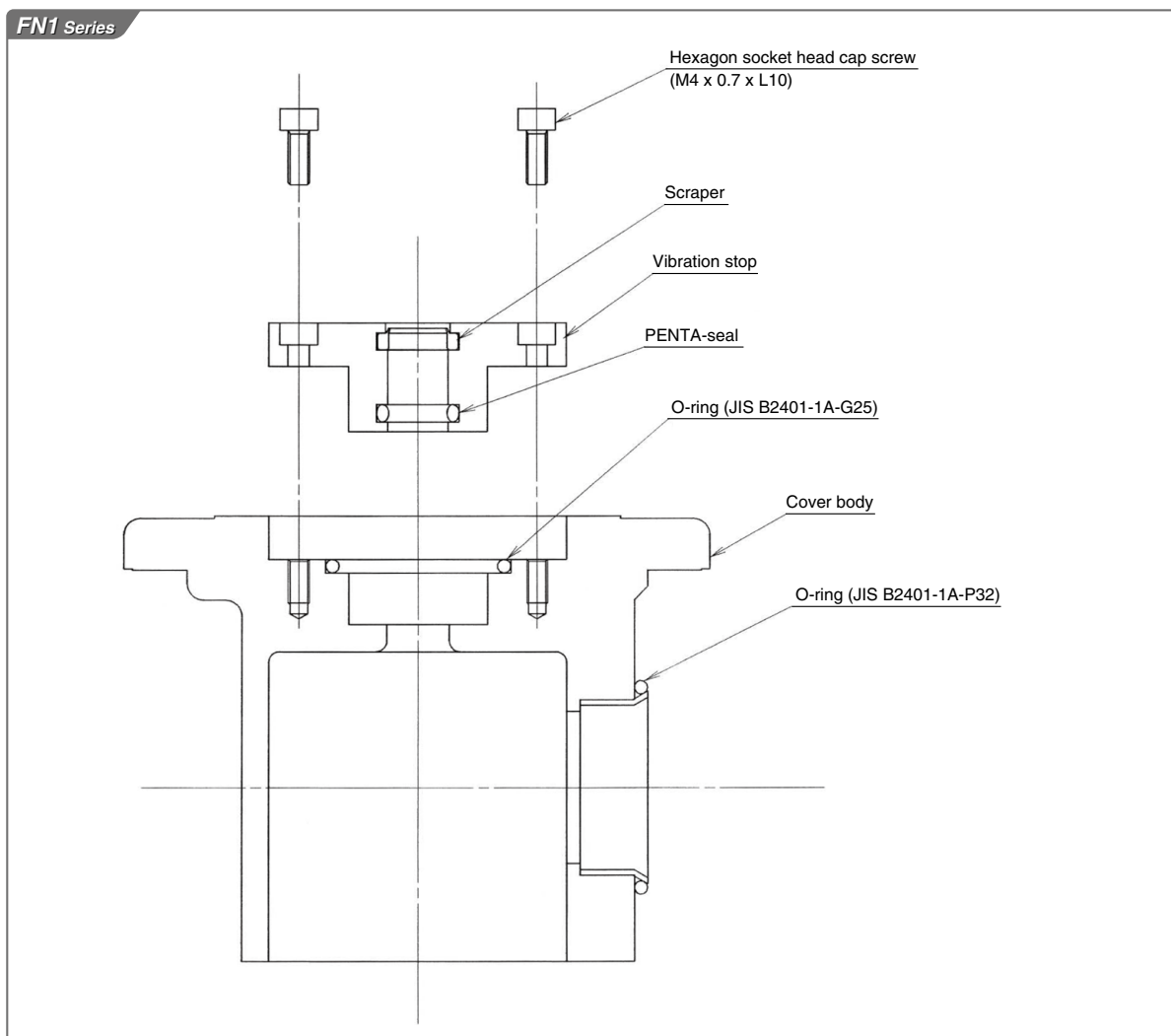
- 2-3. Align the indentations of the case with the projections of the cover, lift the case upward by about 10 mm and rotate it clockwise about 20 degrees.
- 2-4. Mount it in such a way that the entire flanged perimeter of the cover and case are held by the retainer of the V-band.



- 2-5. Set the stopper on the retainer while holding down the V-band outside perimeter, and then tighten the wing bolt to the prescribed position.
- 2-6. Tighten the drain plug.
- 2-7. When air release is completed, tighten the air vent plug.

FN1/FN4 Series Replacement Procedure for Elements 1

1. Instruction Drawing for Disassembly & Reassembly of the Cover Assembly



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2. Disassembly

FN1 Series

- 2-1. Remove the cover [2 M4 hexagon socket head cap screws
See Figure 1]
 - 2-2. Remove the cylinder flange fixing screws (four M8 hexagon socket head cap screws), and remove the entire body of the cylinder. [Slide the entire body of the cylinder in the horizontal direction, and remove the cylinder from the joint. See Fig. 2]
 - 2-3. Remove the 4 struts. [See Fig. 2]
 - 2-4. Pull the cover assembly upward. [Pull out the entire body of the element. See Fig. 3]
 - 2-5. Remove the mounting bracket inside the cover assembly. [Remove the set screw, and turn the mounting bracket. See Fig. 4]
- 2-6. The element can now be pulled out of the cover.
Do not disassemble the element any further.

Note) Reassembly should be performed by reversing the disassembly procedure.

Refer to the schematic drawings for the assembly and disassembly procedures for the cover, seals etc.

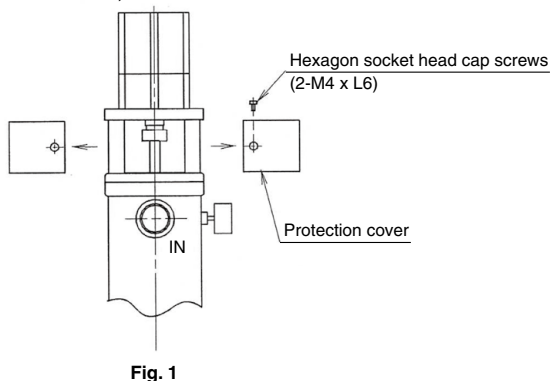


Fig. 1

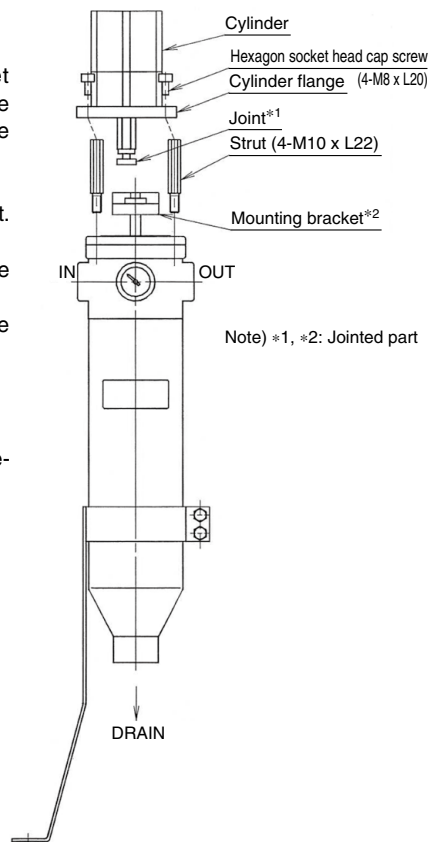


Fig. 2

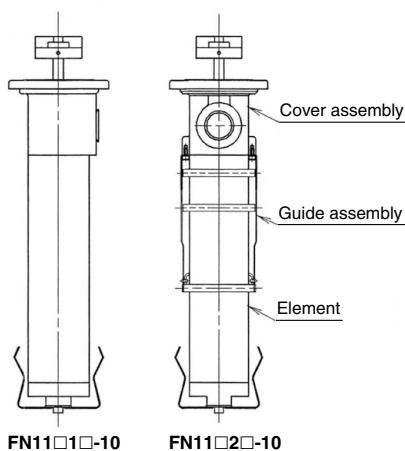


Fig. 3

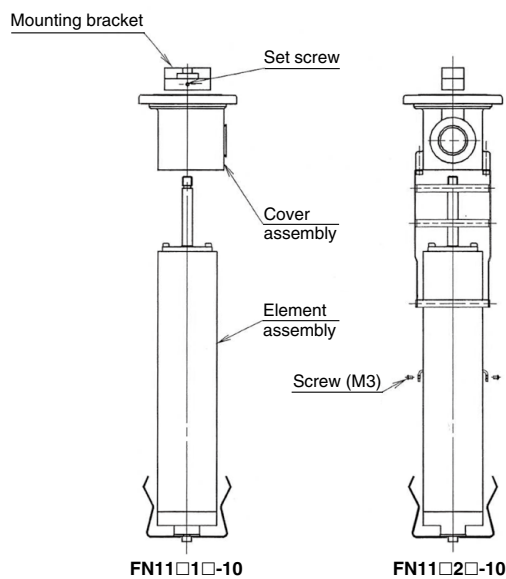


Fig. 4

FN1/FN4 Series Replacement Procedure for Elements 3

FN4 Series

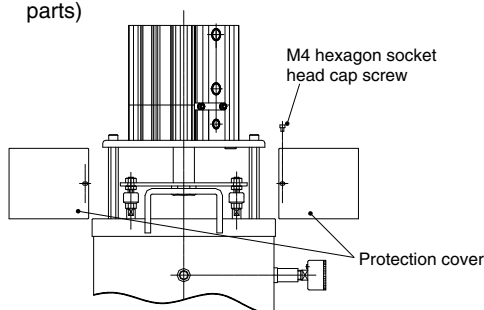
Basically, this filter does not need any maintenance, but if an element needs cleaning (differential pressure cannot be returned as dust adheres) or an element or a seal needs replacement, clean or replace the element by following the dismantling procedure below.

2-1. Stop the operation.

- a. Stop the operation of filter.
- b. Close the valves at IN and OUT.
- c. Open the DRAIN valve to make the internal pressure zero and to exhaust all the fluid inside.

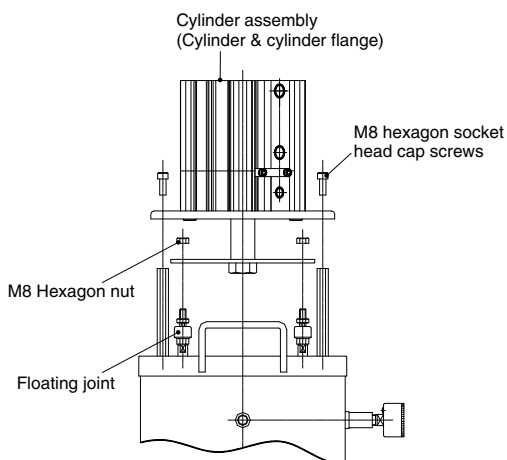
2-2. Remove the protection cover.

- a. Remove the set screws of a protection cover, and slide the cover to the side.
(M4 hexagon socket head cap screws at 2 parts)



2-3. Remove the cylinder assembly.

- a. Remove the M8 hexagon nut at four parts.
- b. Remove the cylinder flange holding bolts.
Holding bolt: M8 hexagon socket head cap screws at four parts up to the cylinder, and remove it.

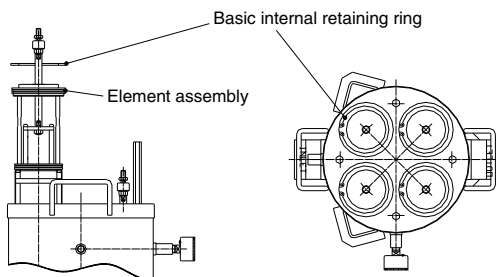


2-4. Take out the element assembly.

- a. Remove the basic internal retaining ring at four parts.
- b. Withdraw the element assembly upward from the case.
* Remove the O-ring to the new one if it has any problems such as swelling.

[O-ring for replacement]

KT-FN41N (JIS B2401-1A-G90 and G80) (Material: NBR)
KT-FN41V (JIS B2401-4D-G90 and G80) (Material: FPM)



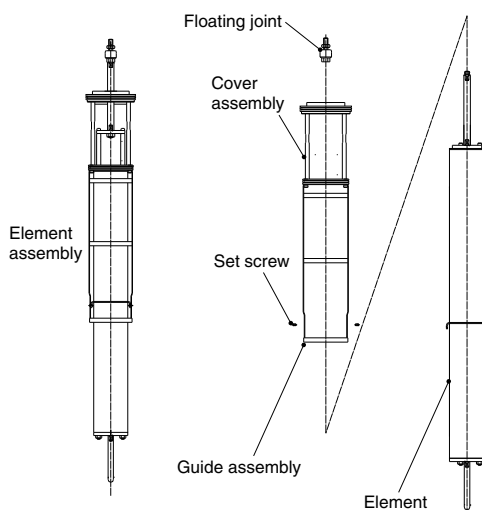
2-5. Remove the element.

- a. Remove the floating joint.
- b. Remove the intermediate screws of the guide assembly.
- c. Withdraw the element from the cover assembly.
* Do not dismantle the element further more.

[Replacement Element]

END400-005 (5 μ m Type)
END400-020 (20 μ m Type)

* 4 elements are required per unit.



2-6. Clean the element.

- a. Clean the element taken out.
[Cleaning method] Ultrasonic cleaning, solvent cleaning, blowing cleaning, etc
* Do not clean it with acid or a hard brush.

2-7. Assembly and Restart

- a. Assemble it by following the dismantling procedure backward.
- b. For restarting, follow Section 3 "Operation" in the Operation Manual.