



# Operation Manual

**PRODUCT NAME**

*Air preparation filter*

**MODEL / Series / Product Number**

Main Line Filter	AFF70D, AFF80D, AFF90D
Mist Separator	AM70D, AM80D, AM90D
Micro Mist Separator	AMD70D, AMD80D, AMD90D

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# Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.”

They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)\*1), and other safety regulations.

\*1) ISO 4414: Pneumatic fluid power -- General rules relating to systems.

ISO 4413: Hydraulic fluid power -- General rules relating to systems.

IEC 60204-1: Safety of machinery -- Electrical equipment of machines .(Part 1: General requirements)

ISO 10218: Manipulating industrial robots -Safety.

etc.



## 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 including our products must be performed by an operator who is appropriately trained and experienced.

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

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

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

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

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

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

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

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

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



# Safety Instructions

## Caution

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

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

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

If anything is unclear, contact your nearest sales branch.

## Limited warranty and Disclaimer/Compliance Requirements

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

Read and accept them before using the product.

### Limited warranty and Disclaimer

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

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

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

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

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

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

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

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

### Compliance Requirements

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

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

## Caution

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

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

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

# 1. Be sure to read before use.

## 1-1. Handling Precautions

### Warning

#### **Confirm the specifications.**

This product is designed for use in compressed air systems only.

Do not operate at conditions outside of the specification, as this could cause damage, malfunction or performance reduction. SMC does not guarantee against any damage if the product is used outside of the specification range.

#### **Model selection**

Carefully consider the application, required specifications, and operating conditions (pressure, flow rate, temperature, environment and power supply) in accordance with the latest catalog (SMC website), making sure not to exceed the specification range.

#### **Do not use in the following environments, as it may lead to a breakdown. It may lead to damage or malfunction.**

An environment where corrosive gases, organic solvents, chemical agents or solutions are present, or a location where these substances may come into contact, and locations where sea water, water or moisture are present. An area exposed to direct sunlight. (Block direct sunlight to the product to prevent deterioration due to ultraviolet rays or temperature rise.) Where the product is exposed to heat sources or in areas that the product is exposed to radiant heat.

Where impact or vibration is present.

In a location with high humidity and a large quantity of dust.

Outdoors

Mounting on vehicles or vessels (The product might be damaged due to vibration.)

#### **Air source**

##### **-Applicable fluid is compressed air.**

Do not use this product with a fluid other than compressed air (e.g. oxygen, hydrogen, inflammable gas, mixed gas, etc.).

##### **-Do not use compressed air which includes chemicals, organic solvents, or corrosive gases, etc.**

It may lead to damage or malfunction.

#### **Do not use for caisson shield, breathing, medical purposes, air blow to any medicines and foods that enter the human body.**

Air preparation equipment including this product is for exclusive use for industrial compressed air. Do not use for any other purposes.

#### **Do not disassemble (excluding maintenance parts) or alter (additionally machine) the product.**

It may cause injury or accident. SMC does not guarantee against any damage if the product is disassembled or altered.

 **Caution****Model selection**

Although it depends on the types or specifications of the compressor, compressed air generally contains particle contaminants. Please select the system construction in reference to the model selection of air preparation equipment in accordance with the user required cleanliness of the compressed air or applications.

**【Contaminants contained in the compressed air】**

- Moisture (water droplet, water vapor)
- Dust and chemicals which are sucked from the ambient air.
- Deteriorated oils coming out of the compressor (including deteriorated oil)
- Solid foreign matter or oils including rust in the piping.

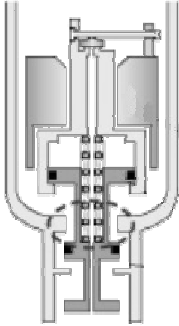
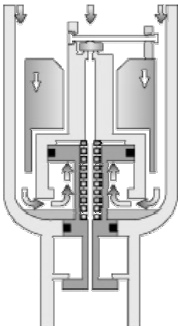
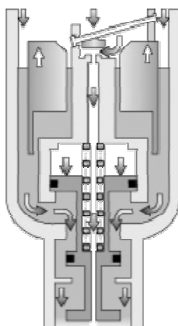
- **Select the model so that the maximum value (instantaneous) of the flow rate will not exceed the rated air capacity.**

When compressed air is used for air blow, calculate the maximum amount of the consumed air before selecting the size. If compressed air exceeding the rated air flow capacity is applied, the outlet compressed air cleanliness might be reduced or oil mist on the outlet side may leak out, which may damage the element.

- **Do not use the product with low air pressure (e.g. for blower).**

If it is used at the minimum operating pressure or less, pressure resistance or increase in pressure resistance due to clogging may reduce the performance or cause operation failure.

**Auto drain**

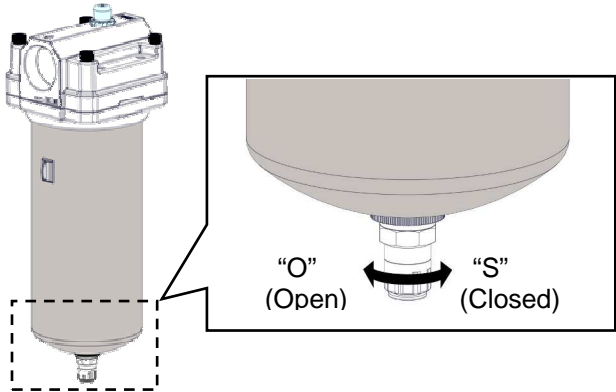
Not pressurized (After releasing residual pressure)	Pressurized (Pressure in the product: 0.1MPa or more)	
	Before drainage is accumulated.	When drainage is accumulated.
Drainage is released. (Open)	Drainage is not released. (Closed)	Drainage is released. (Open)
		

<Manual release>

The drain cock is usually tightened to the "S" side, but when it is rotated to the "O" side, drainage can be released manually.

If the drainage is released while pressure is left in the filter, drainage blows out from the drain port abruptly.

Note) Manual release is not available with the auto drain with 1.6MPa specification.



**The workpiece will be contaminated if ambient air enters the product.**

When compressed air is used for air blow, the compressed air blowing out of the blow nozzle may contain airborne floating foreign matter (solid particles, liquid particles) and blow it to workpiece. In that case, airborne floating foreign mater may stick to the workpiece.

**Do not put a heavy object on the product, or step on it.**

It may cause damage and dropping of the product, and injury or an accident.

## 1-2. Installation/Piping

### Warning

#### Installation location

- **Please install the product in a location where pulsation is unlikely to occur.**

When the difference between the inlet and outlet sides exceeds 0.1MPa, the element might be broken.

- **Install so that reverse pressure and back flow will not be generated.**

Otherwise, the element might be broken.

#### Piping

- **Connect piping/fittings using the recommended torque while holding the product tightly.**

Insufficient tightening torque can cause loose piping or sealing failure.

Excessive tightening torque can cause thread damage.

If the female side is not held while tightening, excessive force will be applied to the bracket directly, causing breakage.

#### Recommended tightening torque (N·m)

Connection thread Port size	1/8	1/4	3/8	1/2	3/4	1	1 1/2	2
Tightening torque	7 to 9 N·m	12 to 14 N·m	22 to 24 N·m	28 to 30 N·m	36 to 38 N·m	48 to 50 N·m		

- Avoid excessive torsional moment or bending moment other than those caused by the equipment's own weight as this can cause damage. External piping needs to be supported separately.

Piping materials without flexibility such as steel tube piping are prone to be effected by excess moment load and vibration from the piping side. Use flexible tubing in between to avoid such an effect.

**As a filter is a heavy object, please transfer or install it making sure that it will not be dropped or dented.**

### Caution

#### Installation location

**When installing, allow sufficient space for maintenance. (Refer to Dimension diagram on P.19.)**

- **The piping of this product should be horizontal (drain exhaust should vertically face downwards.)**

If it is mounted inclined, laterally or upward/downward, the separated drainage will be splashed over the outlet.

It may cause the operation failure of the auto drain.

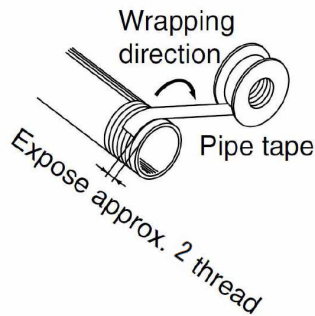
- **Pay attention to the dust generated from the air equipment which is mounted on the outlet.**

If the air equipment is mounted on the outlet of the filter, dust will be generated from the equipment and cleanliness of the compressed air might be reduced. Consider the mounting position of the air equipment in accordance with the required cleanliness of the compressed air.



## Piping

- Before piping is connected, it should be thoroughly flushed with air or washed to remove chips, cutting oil and other debris from inside the pipe.
- When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not enter the piping.
- Furthermore, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



- **Reverse connection is not available. IN and OUT should be connected correctly.**

The compressed air inlet is indicated with a flow direction symbol on the top of the product.

- **Drain piping of the auto drain should be performed with an appropriate tube diameter and length.**

Tube I.D.  $\phi 6.5$  ( $\phi 1/4$  inch) or more, length within 5m (200 inch)

- **Riser pipework of the auto drain should be avoided.**

It may cause the operation failure of the auto drain.

- **Be sure to connect piping for drain when the drain guide is mounted.**

As a valve function is not equipped, drainage or compressed air will be exhausted if piping is not connected.

Also, the piping should be performed with the drain guide held by a spanner.

Otherwise, the bowl might be broken.

## 1-3. Maintenance

### Warning

**Perform maintenance inspections according to the procedure indicated in the Operation Manual.**

Incorrect handling of the product may cause breakage or malfunction of the equipment or device.

#### **Maintenance work**

If handled improperly, compressed air can be dangerous. Assembly, handling, repair and element replacement of pneumatic systems should be performed by a knowledgeable and experienced person.

#### **Removal of equipment, and supply/exhaust of compressed air.**

When equipment is to be removed, first confirm that measures are in place to prevent losing control of the equipment or workpieces from falling, etc. Then, shut off the supply air and exhaust the compressed air in the system.

When machinery is restarted, turn off the power supply, stop the air supply and exhaust all compressed air from the system.

#### **If an error is generated, turn off the power supply and stop the compressed air supply.**

If smoke, abnormal smells or noises are generated, there is a possibility of fire. In that case, stop supplying the compressed air and reduce the pressure in the equipment to zero.

#### **When maintenance of the auto drain is performed, or filter element is replaced, be sure to reduce the compressed air to zero. Do not touch the high temperature section.**

Using this product at a high temperature (40 to 60 °C) may cause burns. Be sure to confirm that the temperature of the container or operating part is reduced to 40 degrees or less to prevent burns.

#### **Element service indicator**

Perform periodical check to find cracks, flaws or other deterioration. If any are seen, replace with new parts and review the operating condition. Otherwise, a malfunction may occur.

Please consult SMC if the review of the operating conditions is not possible.

### Caution

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

If an element is used even after exceeding the replacement timing, the outlet compressed air cleanliness might be reduced or oil mist may leak out, which may damage the element.

<Element replacement timing>

When the element service indicator operates or 2 year after starting operation, whichever comes first.

#### **2. Be sure to exhaust the drainage that has accumulated in the filter.**

Operation with condensate caught in the equipment or the piping may lead to operation failure of the equipment, splashing from the outlet, and unexpected accidents.

#### **Clean the bowl regularly.**

Clean inside of the bowl with tepid water in which detergent is dissolved (25 °C or less), and eliminate foreign matter and oil. If foreign matter or drain scale is accumulated, it could cause operation failure of the auto drain, so please clean it regularly.

If necessary, remove the auto drain from the bowl before cleaning. Please refer to Auto drain replacement on P14 for removal of the auto drain.

## 2. Application

Series	Aim
AFF	Separation of supersaturated water in compressed air and collection of solid foreign matter (1.0 $\mu\text{m}$ or more)
AM	Collection of solid foreign matter (0.1 $\mu\text{m}$ or more) in compressed air and separation of oil mist
AMD	Collection of solid foreign matter (0.01 $\mu\text{m}$ or more) in compressed air and separation of oil mist

## 3. Specifications

### 3-1.AFF Series

Model	AFF70D	AFF80D	AFF90D	
Port size	1, 1 1/2	1 1/2	1 1/2, 2	
Weight	3.4kg	4.7kg	5.0kg	
Scope	Fluid	Compressed air		
	Inlet air pressure range	0.1 to 1.0MPa (1.6MPa) <sup>Note1)</sup>		
	Operating fluid temperature	-5 to 60°C (No freezing)		
	Ambient temperature	-5 to 60°C (No freezing)		
	Proof pressure	1.5MPa (2.4MPa) <sup>Note1)</sup>		
Rated conditions	Air flow capacity m <sup>3</sup> /min(ANR) <sup>Note2)</sup>	7.0	11.0	14.5
	Flow capacity of the compressor intake condition m <sup>3</sup> /min <sup>Note3)</sup>	7.3	11.5	15.1
	Inlet air pressure	0.7MPa		
	Filtration <sup>Note4)</sup>	1.0 $\mu\text{m}$ (Filtration efficiency: 99%)		
	Water droplet elimination factor <sup>Note5)</sup>	99%		

Note 1) When selecting Option H, Option J

Note 2) Air flow capacity with 20 °C, atmospheric pressure and relative humidity of 65 %.

Note 3) Air flow capacity with 32 °C, and when calculated to atmospheric pressure.

Note 4) Filtration efficiency for conditions below in addition to the rated conditions above [Test condition ISO8573-4: 2010 compliant].

\* Flow capacity, inlet pressure and the amount of solid bodies at the filter inlet are stable.

\* New element

Note 5) Water droplet elimination ratio for conditions below in addition to the rated conditions above.

\* Water droplet on the filter inlet side = Approximately 33g/m<sup>3</sup>

【Compliant to test condition ISO8573-9:2010 and test method ISO12500-4:2009】

(Water droplet indicates condensed moisture. Water vapor which is not condensed is not included)

\* Inlet air temperature = 25 °C

\* Flow capacity, inlet pressure and the water droplet concentration at the filter inlet are stable.

\* New element

### 3-2.AM Series

Model		AM70D	AM80D	AM90D
Port size		1、 1 1/2	1 1/2	1 1/2、 2
Weight		3.4kg	4.7kg	5.0kg
Scope	Fluid	Compressed air		
	Inlet air pressure range	0.1 to 1.0MPa (1.6MPa) <sup>Note1)</sup>		
	Operating fluid temperature	-5 to 60°C (No freezing)		
	Ambient temperature	-5 to 60°C (No freezing)		
	Proof pressure	1.5MPa (2.4MPa) <sup>Note1)</sup>		
Rated conditions	Air flow capacity m <sup>3</sup> /min(ANR) <sup>Note2)</sup>	7.0	7.0	7.0
	Flow capacity of the compressor intake condition m <sup>3</sup> /min <sup>Note3)</sup>	7.3	7.3	7.3
	Inlet air pressure	0.7MPa		
	Filtration <sup>Note 4)</sup>	0.1μm (Filtration efficiency: 95%)		
	Oil mist density at outlet <sup>Note 5)</sup>	Max 1mg/m3 (ANR)(≒0.8ppm)		

Note 1) When selecting Option H, Option J

Note 2) Air flow capacity with 20 °C, atmospheric pressure and relative humidity of 65 %.

Note 3) Air flow capacity with 32 °C, and when calculated to atmospheric pressure.

Note 4) Filtration efficiency for conditions below in addition to the rated conditions above [Test condition ISO8573-4: 2010 compliant].

\* Flow capacity, inlet pressure and the amount of solid bodies at the filter inlet are stable.

\* New element

Note 5) Oil mist density at outlet for conditions below in addition to the rated conditions above.

【Compliant to test condition ISO8573-2:2010 and test method ISO12500-1:2007】

\* Oil mist concentration on the filter inlet side = 30mg/m3(ANR)

\* Flow capacity, inlet pressure and the Oil mist concentration at the filter inlet are stable.

\* New element

### 3-3.AMD Series

Model		AMD70D	AMD80D	AMD90D
Port size		1、 1 1/2	1 1/2	1 1/2、 2
Weight		3.4kg	4.7kg	5.0kg
Scope	Fluid	Compressed air		
	Inlet air pressure range	0.1 to 1.0MPa (1.6MPa) <sup>Note1)</sup>		
	Operating fluid temperature	-5 to 60°C (No freezing)		
	Ambient temperature	-5 to 60°C (No freezing)		
	Proof pressure	1.5MPa (2.4MPa) <sup>Note1)</sup>		
Rated conditions	Air flow capacity m <sup>3</sup> /min(ANR) <sup>Note2)</sup>	7.0	7.0	7.0
	Flow capacity of the compressor intake condition m <sup>3</sup> /min <sup>Note3)</sup>	7.3	7.3	7.3
	Inlet air pressure <sup>Note 4)</sup>	0.7MPa		
	Filtration	0.01μm (Filtration efficiency: 99.9%)		
	Oil mist density at outlet <sup>Note 5)</sup>	Max 0.1mg/m <sup>3</sup> (ANR)(≒0.08ppm) (Before saturated with oil,less than 0.01 mg/m <sup>3</sup> (ANR)≒0.008ppm)		

Note 1) When selecting Option H, Option J

Note 2) Air flow capacity with 20 °C, atmospheric pressure and relative humidity of 65 %.

Note 3) Air flow capacity with 32 °C, and when calculated to atmospheric pressure.

Note 4) Filtration efficiency for conditions below in addition to the rated conditions above [Test condition ISO8573-4: 2010 compliant].

\* Flow capacity, inlet pressure and the amount of solid bodies at the filter inlet are stable.

\* New element

Note 5) Oil mist density at outlet for conditions below in addition to the rated conditions above.

【Compliant to test condition ISO8573-2:2010 and test method ISO12500-1:2007】

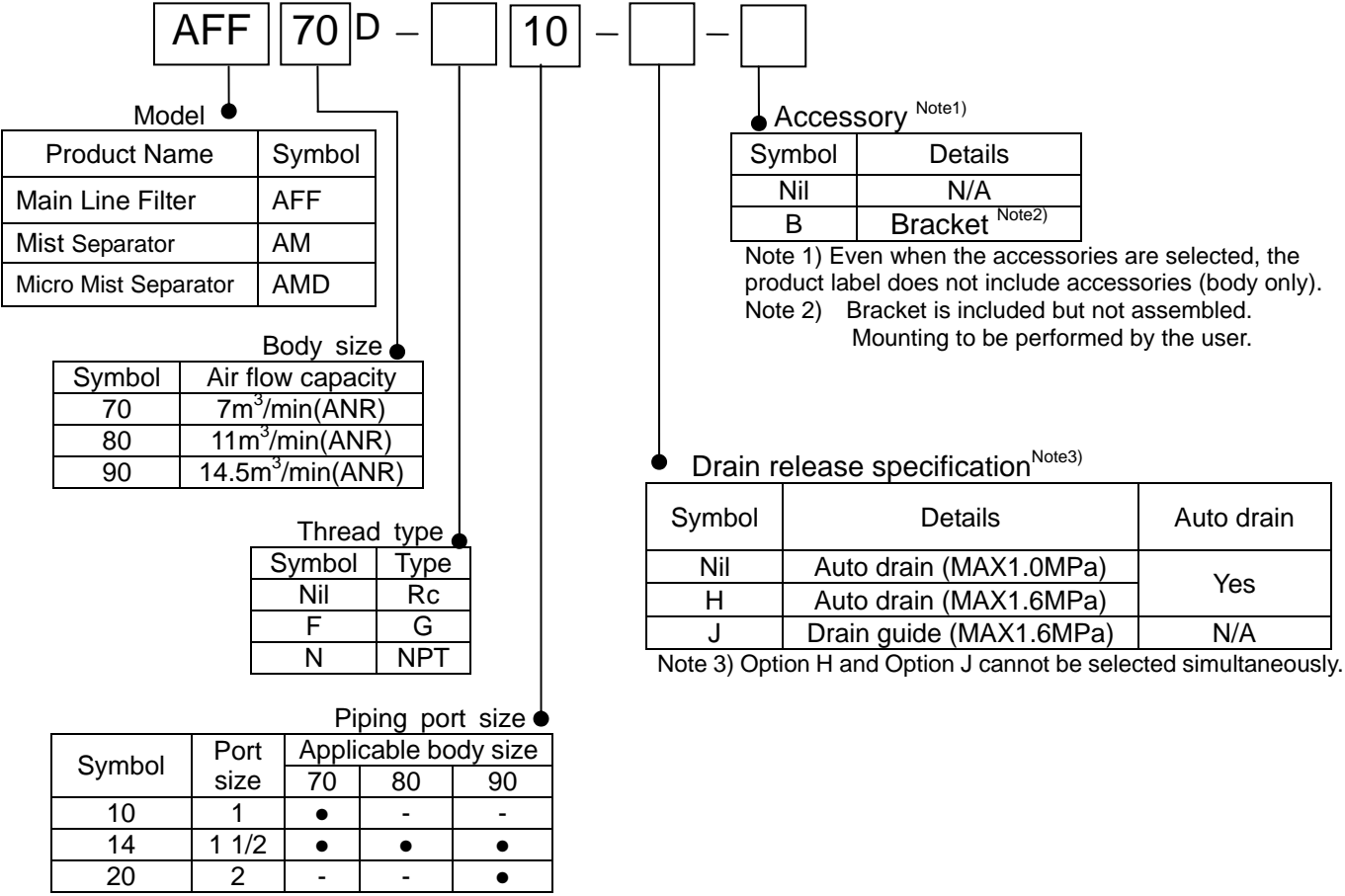
\* Oil mist concentration on the filter inlet side = 30mg/m<sup>3</sup>(ANR)

\* Flow capacity, inlet pressure and the Oil mist concentration at the filter inlet are stable.

\* New element

## 4 How to Order

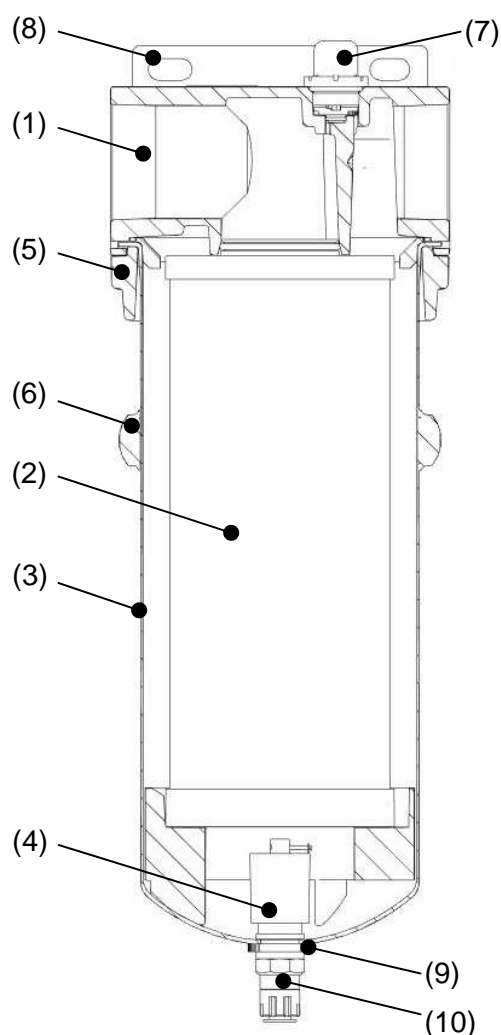
### <Air preparation filter>



## 5. Component name and spare parts list

### Component parts

No.	Part name
(1)	Body
(2)	Element
(3)	Bowl
(4)	Auto drain
(5)	Flange
(6)	Stopper
(7)	Element service indicator
(8)	Bracket
(9)	Drain port spacer
(10)	Drain cock



### Options and spare parts

No.	Description	70D	80D	90D	
		Part No.			
(2)	Element	AFF	AFF-EL70D	AFF-EL80D	AFF-EL90D
		AM	AM-EL70D	AM-EL80D	AM-EL90D
		AMD	AMD-EL70D	AMD-EL80D	AMD-EL90D
(8)	Bracket	AM-BM70D	AM-BM90D		

### Service parts

No.	Description	Part No.
(7)	Element service indicator	AM-SA072
(9)	Drain port spacer	AM-SA075
(4)	Auto drain <sup>Note1</sup>	Thread type Rc, G: AD43PA-D
(10)	(Including drain cock)	Thread type NPT : NAD43PA-D

Note1) Auto drain (MAX.1.6MPa) cannot be replaced.

Note2) All rubber materials are NBR.

## 6. Troubleshooting

Failure		Possible causes	Countermeasure
Category	Error		
Flow rate	As pressure drop is large, fluid does not flow.	Element is clogged.	Replace the element.
Air Leakage	Air leaks out from the gap between the bowl and body.	O-ring of the bowl is damaged.	Replace the O-ring. O-ring is included in the replacement element.
		Bolt is loosened.	Tighten the bolt. Air leakage still occurs even after tightening the bolt, please contact your SMC representative.
	Air is leaking out of the bowl.	Bowl is broken.	Please contact your SMC representative.
	Drainage or air continues blowing out of the drain exhaust.	Inlet air pressure is below 0.1MPa.	Use the product within the specified range (0.1MPa or more).
		The drain exhaust is assembled while inclined.	Install the drain exhaust so that it will face vertically downward.
		Foreign matter is caught at the main valve of the auto drain.	Remove the dust.
		Main valve of the auto drain is broken.	Replace the auto drain.
		Drain piping is long, or I.D. of the piping is small. (Back pressure is applied.)	Tube I.D. should be $\phi 6.5$ ( $\phi 1/4$ inch) or more and its length should be within 5m (200 inch). Riser pipework should be avoided.
		Drain exhaust and bowl seat were broken.	Replace the auto drain.
	Accumulated drainage is not discharged from the auto drain.	Auto drain is mounted inclined, which causes the float not to be operated.	Check the mounting orientation, and if the auto drain is inclined, correct the orientation.
Viscous substances left in the drain such as solid foreign matter and oils interrupt the float operation.		Clean inside of the bowl. If the auto drain does not operate even after cleaning, please replace it.	
Operation ability Others	Abnormal amount of drainage is coming out of the outlet piping.	When an auto drain is used, drain exhaust failure occurs.	Replace the auto drain.
		When drainage is exhausted manually, the liquid level is too high.	Exhaust the drainage and replace the element.



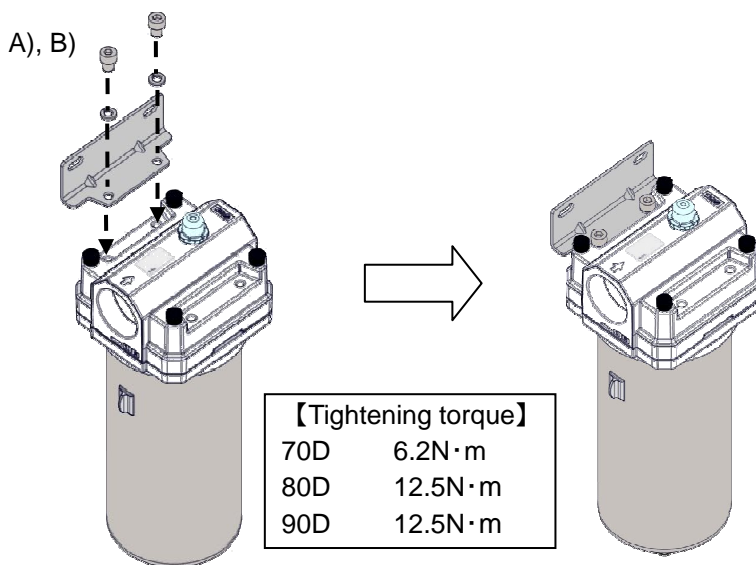
## 7. Assembly and replacement procedure

【Nominal No. of the tool】

Body size	Bolt		Auto drain Lock nut
	Nominal size	Size	Width across flats
70D	6	M8	24
80D	8	M10	
90D			

### 7-1. Bracket assembly

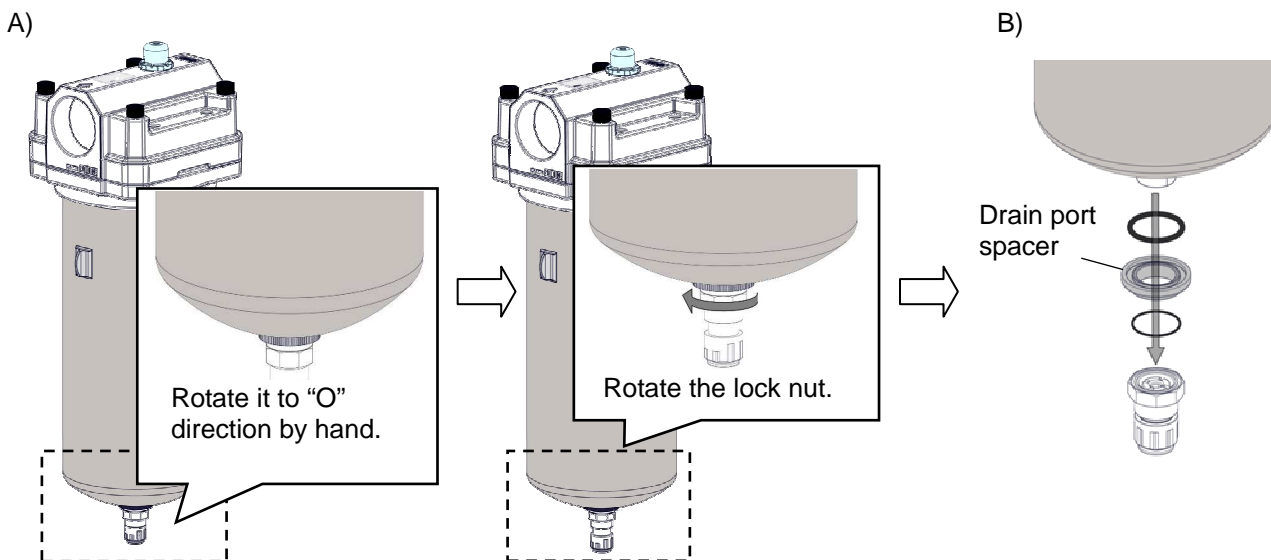
- A) Mount the bracket to the product.
- B) Mount a washer to the 2 mounting bolts respectively, and hold the bracket to the product.  
Tightening torque is 6.2N·m for 70D, and 12.5 N·m for 80D and 90D.



**⚠ Warning** Be sure to set the pressure to zero before work.

### 7-2. Auto drain replacement \* Auto drain (MAX.1.6MPa) cannot be replaced.

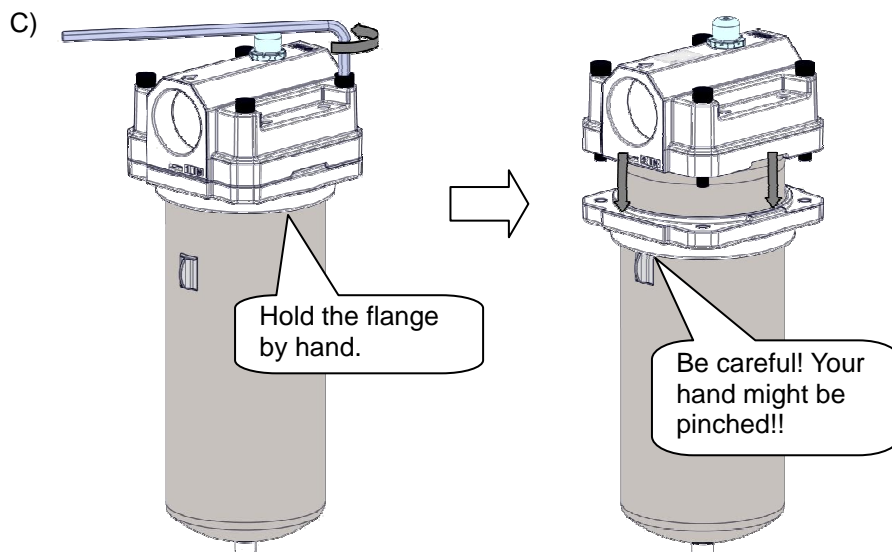
- A) Rotate the drain cock counterclockwise by hand and loosen it until it rotates freely.
- B) Apply a spanner or monkey wrench to the lock nut and rotate it counterclockwise. Then remove the lock and drain port spacer.



- C) 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 stopper.



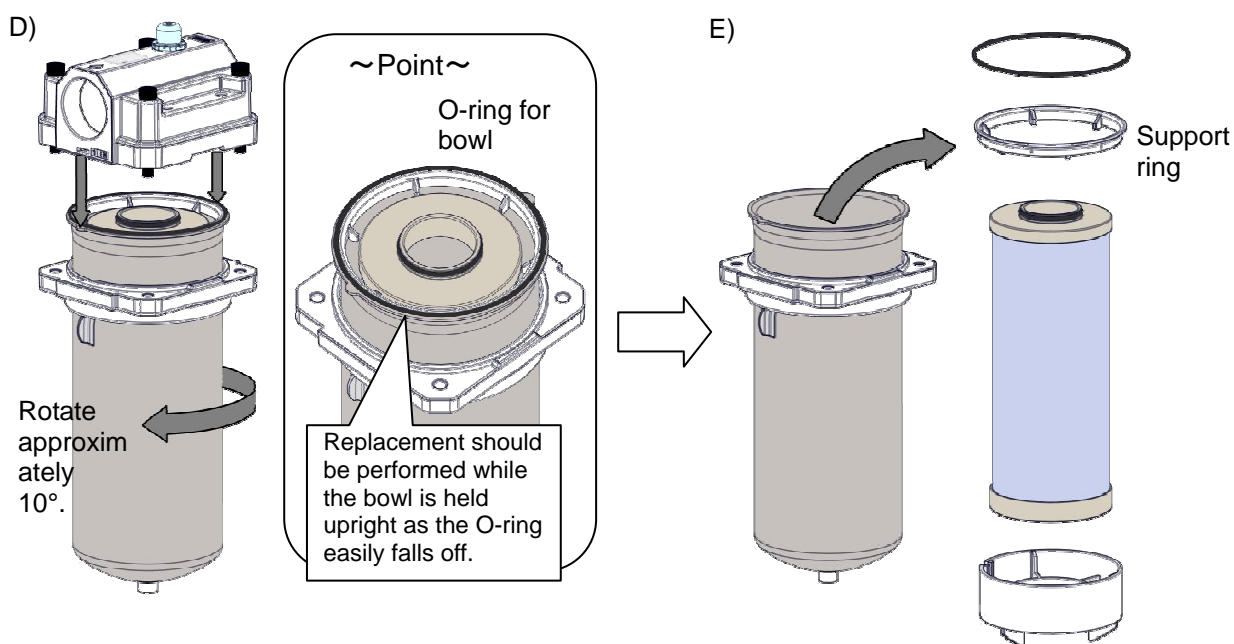
- D) When the bowl is rotated in the direction shown by the arrow below, by approximately 10 degrees, the bowl is removed from the body.

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

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

- E) Remove the used element and O-ring from the bowl.

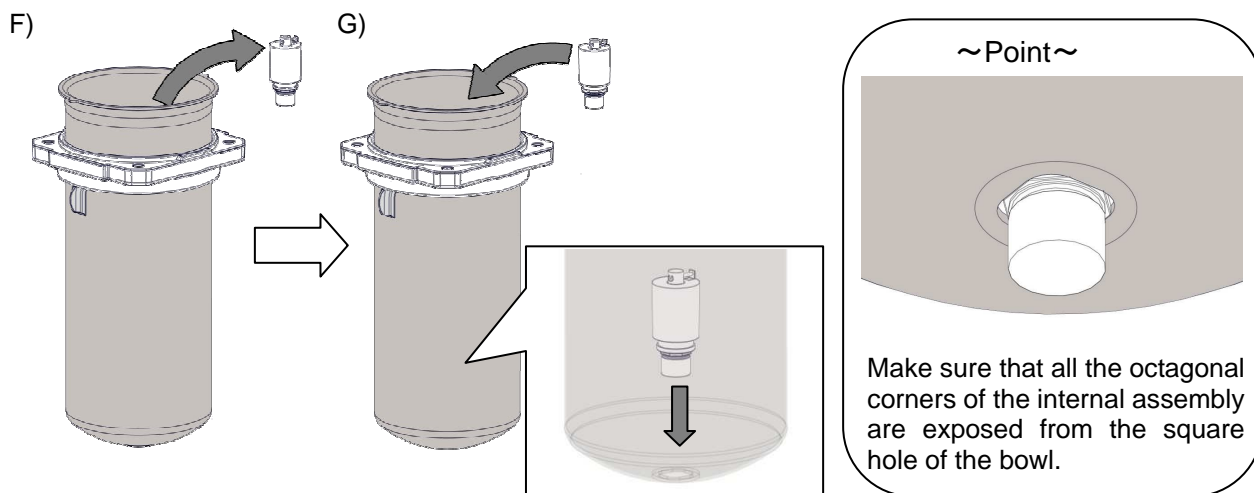
In this operation, remove the support ring to make the replacement easier.



F) Remove the internal assembly which is mounted in the bowl.

G) Mount a new internal assembly for auto drain to the bowl.

Note: Mount the internal assembly so that the octagonal corners are not stuck to the square hole of the bowl.

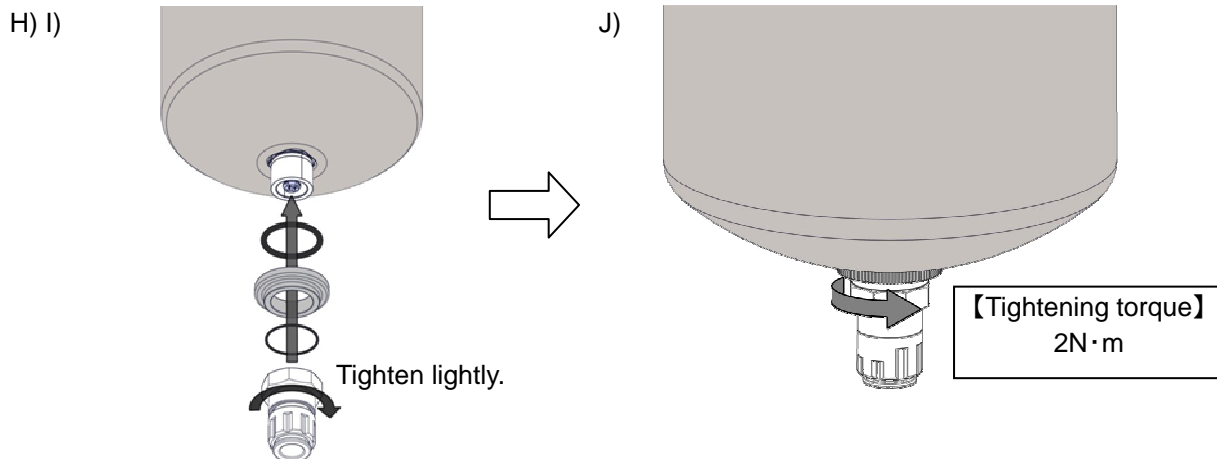


H) Mount the removed drain port spacer.

I) Rotate the new drain cock assembly in the direction shown by the arrow below by hand, and tighten it lightly.

J) Rotate the lock nut by using a spanner or monkey wrench while lightly holding the internal assembly (chamber head).

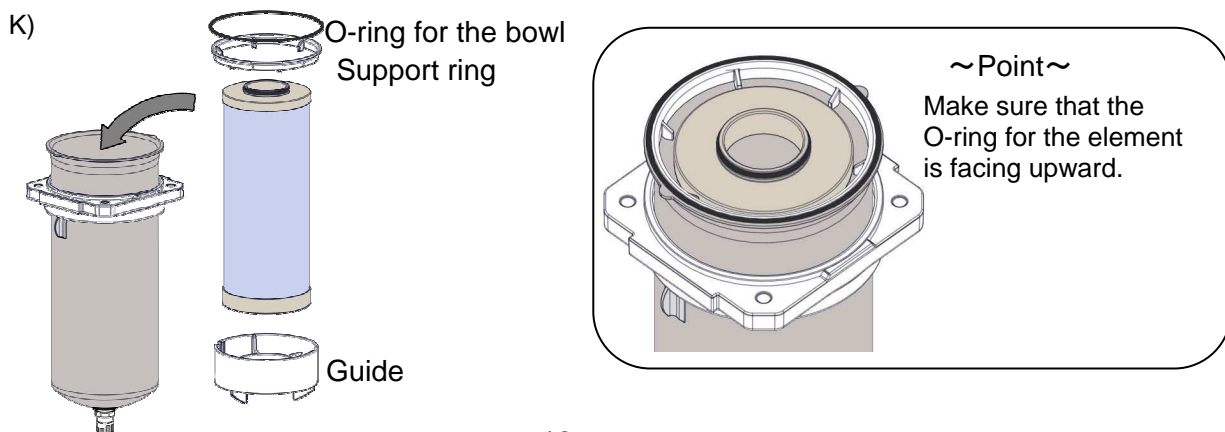
Tightening torque of the lock nut is  $2\text{N}\cdot\text{m}$ .



K) Insert the guide and element in order, and mount the O-ring for the bowl.

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

Note: Ensure that the element inserting direction is correct.

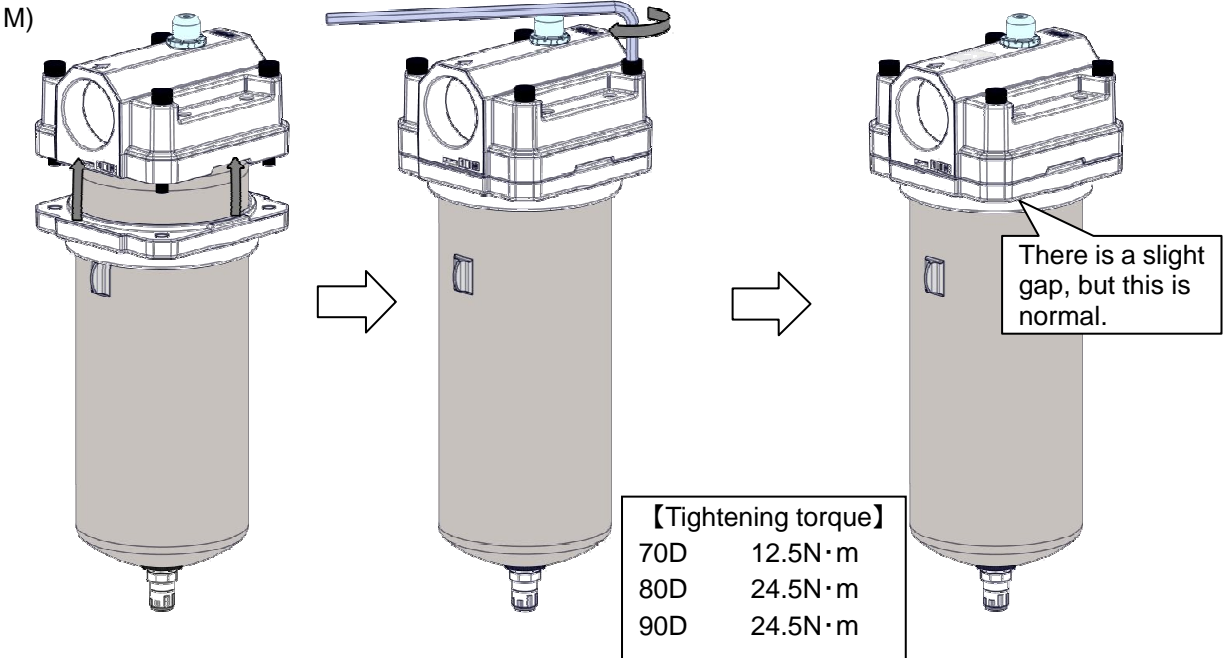
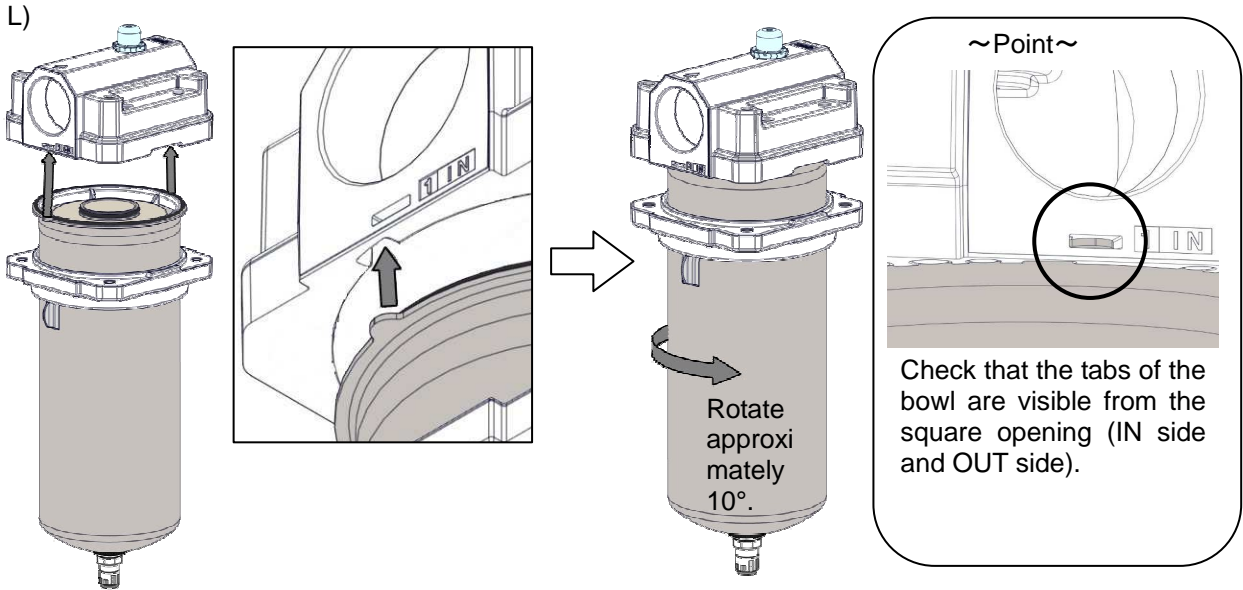


L) Insert the bowl locating tabs (2 parts) into the slots (2 parts) of the body, and rotate the bowl in the direction shown by the arrow below by approximately 10 degrees.

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

M) Pull up the flange and tighten the hexagon socket head cap screws with a hexagon wrench. Tightening torque is 12.5N·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.



### 7-3. Element replacement

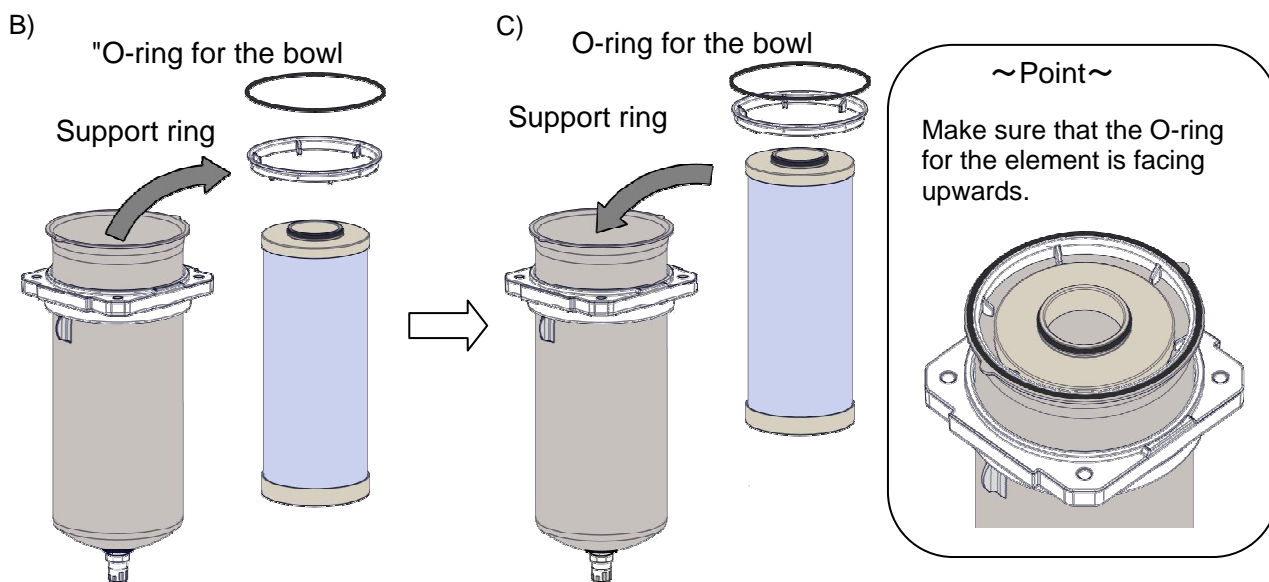
- A) Remove the bowl from the body [See Auto drain replacement C) to D)].
- B) Remove the element and used O-ring.  
At this time, remove the support ring for easier removal.
- C) Insert an element (new) into the bowl and mount an O-ring (new) for the bowl.  
If the support ring is removed, mount the support ring before the O-ring for the bowl.  
Note: Ensure that the element inserting direction is correct.
- D) Mount the bowl to the body. [See Auto drain replacement L) to M).]

【When it is difficult to insert the new element into the body.】

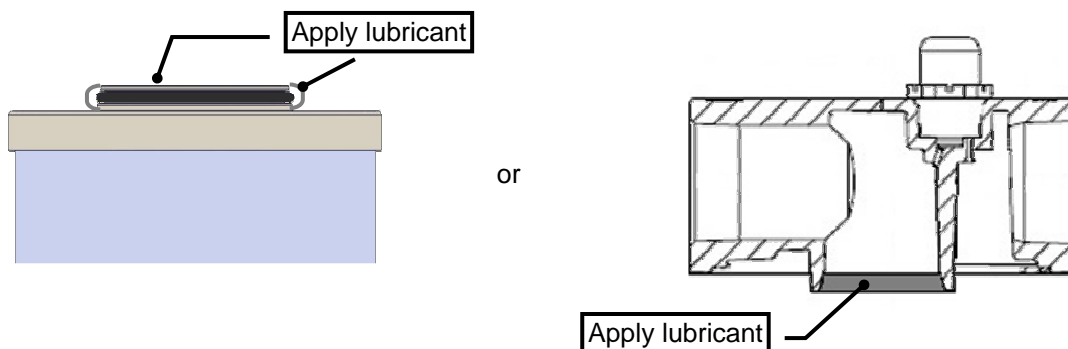
Please apply lubricant to the connection (body) of the O-ring for the element.

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.

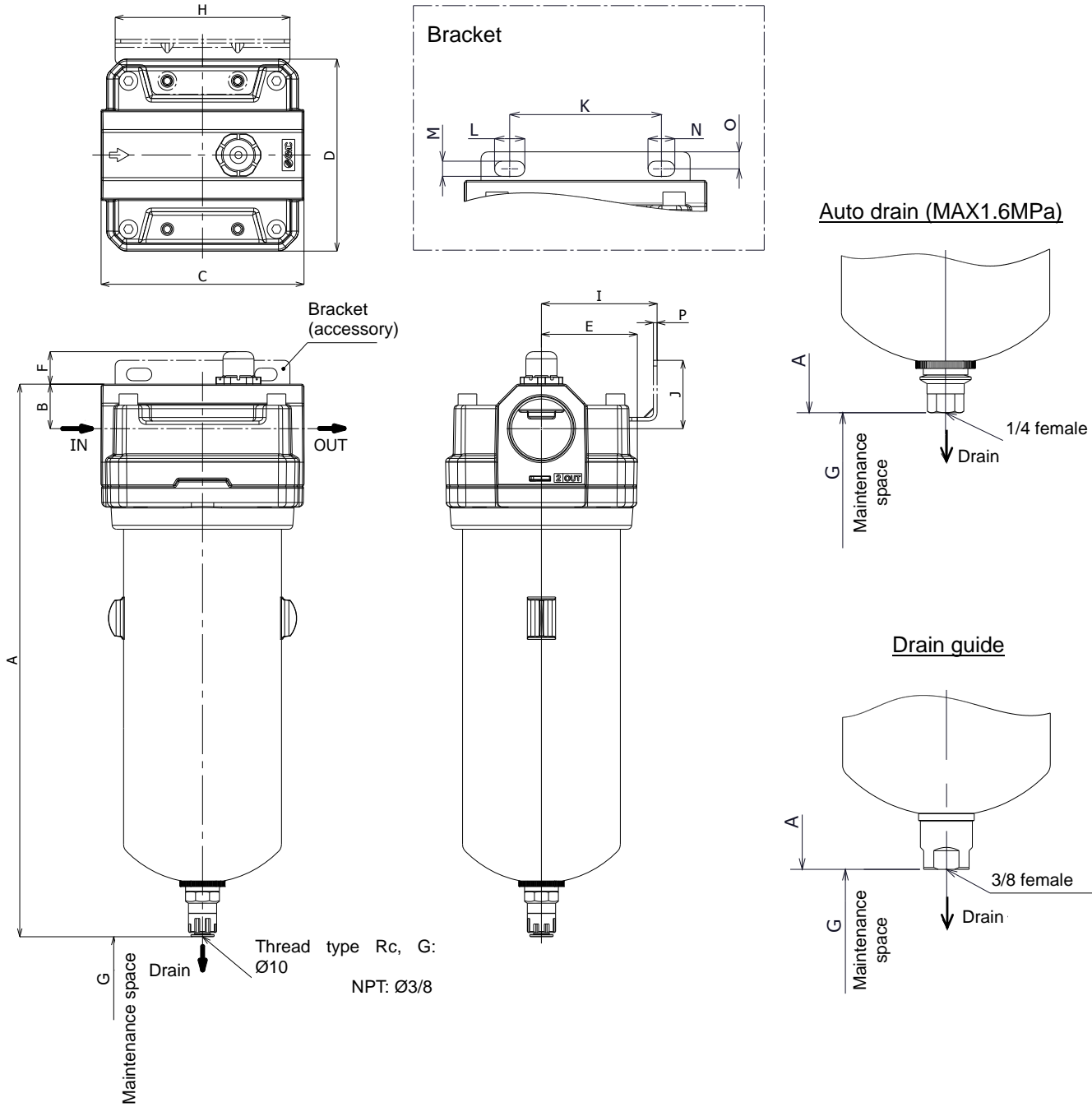
O-ring material...NBR, initial lubricant...White Vaseline



【When it is difficult to insert the new element



# 8. Dimensions



Model	Port size	Auto drain (MAX1.0MPa)	Auto drain (MAX1.6MPa)	Drain guide	B	C	D	E	F	G
		A								
AFF,AM,AMD 70D	1, 1 1/2	391.5	379.5	382	31.5	144	136	68	23	40
AFF,AM,AMD 80D	1 1/2	404	392	394.5	38	170	160	80	23	40
AFF,AM,AMD 90D	1 1/2, 2	470	458	460.5	38	170	160	80	23	40

Model	Bracket related dimensions								
	H	I	J	K	L	M	N	O	P
AFF,AM,AMD 70D	124	82	48.4	90	18	9	16	10	2.6
AFF,AM,AMD 80D	148	93.5	58.5	110	22	11	20	12	3.2
AFF,AM,AMD 90D	148	93.5	58.5	110	22	11	20	12	3.2

Revision history	
A	Service parts addition. October 2017
B	Change unit of water droplet. September 2018

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