Doc. no. DOC1107457

Operation Manual

PRODUCT NAME

Vacuum Water Separator

MODEL / Series / Product Number

AMJ30-(F,N)02～(F,N)03(B)(-2,6,J,R,Z)-D
AMJ40-(F,N)03～(F,N)04(B)(-2,6,J,R,Z)-D
AMJ50-(F,N)06～(F,N)10(B)(-2,6,J,R,Z)-D

SMC Corporation

Contents

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 and safety requirements for systems and their components
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1:Robots
etc.

Danger	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
Warning	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
Caution	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate 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. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

Safety Instructions

Caution
We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries. **Use in non-manufacturing industries is not covered.** Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act. The new Measurement Act prohibits use of any unit other than SI units in Japan.

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 regulations 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.

Precautions for Design

⚠ **Warning**

(1) Do not use the product if no leakage is allowed due to the environment, or if the fluid is not air.

(2) Polycarbonate resin is used for the external parts including the bowl. Organic solvents including thinner, acetone, alcohol and ethylene chloride; chemicals including sulphuric acid, nitric acid and hydrochloric acid; cutting oil, synthetic oils, ester-based compressor oil, alkali, kerosene, gasoline, lock material of screw are harmful. Do not use the product where these are present.

Chemical resistance of polycarbonate and nylon bowl

Type	Chemical name	Application examples	Material	
			Polycarbonate	Nylon
Acid	Hydrochloric acid Sulfuric acid Phosphoric acid Chromic acid	Acid washing liquid for metals	△	×
Alkaline	Sodium hydroxide (Caustic soda) Potash Calcium hydroxide (Slack lime) Ammonia water Carbotane of soda	Degreasing of metals Industrial salts Water-soluble cutting oil	×	○
Inorganic salts	Sodium sulfide Potassium nitrate Sulfate of soda	-	×	△
Chlorine solvents	Carbon tetrachloride Chloroform Ethylene chloride Methylene chloride	Cleaning liquid for metals Printing ink Dilution	×	△
Aromatic series	Benzene Toluene Paint thinner	Coatings Dry cleaning	×	△
Ketone	Acetone Methyl ethyl ketone Cyclohexane	Photographic film Dry cleaning Textile industries	×	×
Alcohol	Ethyl alcohol IPA Methyl alcohol	Antifreeze Adhesives	△	×
Oil	Gasoline Kerosene	-	×	○
Ester	Phthalic acid dimethyl Phthalic acid diethyl Acetic acid	Synthetic oil Anti-rust additives	×	○
Ether	Methyl ether Ethyl ether	Brake oil additives	×	○
Amino	Methyl amino	Cutting oil Brake oil additives Rubber accelerator	×	×
Others	Thread-lock fluid Sea water Leak tester	-	×	△
○: Essentially safe. △: Some effects may occur. ×: Effects will occur.				

Note1) When the above factors are present or there is some doubt, use a metal bowl for safety.

(3) Shield from ultra violet light and radiation with protective cover.

⚠ **Caution**

(1) Do not use the product under pressure except momentary pressure (0.5 MPa or less) such as pressure release.

Selection

⚠ **Warning**

(1) This product can eliminate water droplets (condensed moisture) in the air line for vaccum, but it cannot eliminate moisture (water vapor), oil, and solid foreign material.

(2) Grease used on the internal sliding parts and seals may flow to the outlet side.

Installation

⚠ **Warning**

(1) Do not drop or apply impact during transportation or installation. It will cause damage to the product and result in operation failure.

(2) Do not install in areas of high humidity or high temperature. Operation outside of the product specification range may cause damage to the product or operation failure, or shorten the product life.

(3) Connect the product ensuring the direction of "1"(IN) and "2"(OUT) for air direction and indicated arrow. Incorrect connections may cause malfunction.

(4) Install with adequate space for maintenance beneath the product. Refer to the section [12. Dimensions] (P20) for necessary space.

(5) Install vertically so that outlet of drain is downward. It cannot be used in horizontal or upward direction as it may cause operation failure.

Piping

⚠ **Warning**

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and solid foreign material from inside the pipe. Contamination of piping may cause damage or malfunction.

(1) When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealant do not get inside the pipe. When a sealant tape is used, leave 1 thread ridges exposed at the end of the threads.

(2) Connect piping/fittings using the recommended torque while holding the female thread side tightly. Insufficient tightening torque leads to cause of loosening or sealing failure, and excessive tightening torque leads to cause of breakage of screws. Tightening without holding female thread applies an excessive force to the bracket directly, leading to breakage.

Recommended tightening torque Unit: N・m

Thread size	1/4	3/8	1/2	3/4	1
Torque	8 to 12	15 to 20	20 to 25	28 to 30	36 to 38

(3) Before using an SMC fitting and S coupler, please refer to "Tightening the threaded portion of the connection thread" of the Fittings & Tubing Precautions.

(4) Do not apply torsion or bending moment other than the weight of the product itself. External piping needs to be supported separately as it may cause breakage. Non-flexible piping like steel tube is susceptible to excessive moment load or vibration. Insert flexible tubes to prevent this.

(5) Drain guide is not equipped with valve function. Be sure to connect piping for drain. No piping for drain allows the outside air to flow back into the bowl. Also, the piping installation should be performed with drain guide held by spanner to prevent breakage of bowl.

Air Source

⚠ **Warning**

(1) Use clean air. Do not use air containing chemicals, organic solvent, synthetic oil or corrosive gas as it may be cause of breakage of components or operation failure.

Maintenance

⚠ **Warning**

(1) Release the pressure in the product to the atmosphere when replacing parts or removing piping.

(2) Maintenance and checks should be done by following the procedure in this operation manual. Incorrect handling of the product may cause breakage or operation failure of the equipment or device.

(3) Perform periodical check to find cracks, flaws or other deterioration on resin bowl.
If any of these appear, replace with a new bowl. Otherwise, breakage may occur. Investigate and/or review the operating conditions if necessary.

(4) Check for dirt in resin bowl periodically. If any dirt is seen, replace with new bowl. If removing dirt by washing the resin bowl, never use washing material other than neutral detergent. Otherwise, the bowl is damaged.

(5) Replace the element every 2 years or when the pressure drop at the output pressure from initial operation becomes 20 kPa, whichever comes first, to prevent damage to the element.

(6) Open and close the drain cock manually. The use of tools can result in damage to the product.

(7) Discharge drain in the bowl before it reaches the upper drain level indicated on the bowl. If drain flows into the outlet side, it may be cause of operation failure. Refer to the section [8. Operation and Adjustment] (P13) for discharging of drain. Furthermore, when drain is discharged, release the pressure in the bowl to the atmosphere and remove the bowl before proceeding.

2. Applications

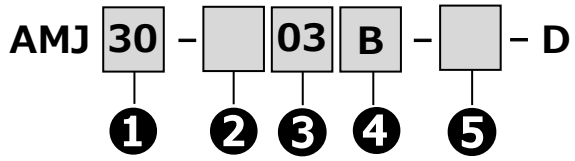
This product aims at eliminating water droplets in the air line for vacuum.

3. Standard Specifications

Model	AMJ30-D		AMJ40-D		AMJ50-D	
Port size	1/4	3/8	3/8	1/2	3/4	1
Fluid	Air					
Ambient and fluid temperature	-5 to 60 ℃ (with no freezing)					
Proof pressure	0.5 MPa					
Operating pressure range	-100～0 kPa					
Vacuum release pressure	0.5 MPa or less					
Water droplet removal ratio Note 1)	99%					
Max. air flow capacity	200 L/min(ANR)		350 L/min(ANR)		500 L/min(ANR)	
Drain capacity	45 cm^3		96 cm^3		96 cm^3	
Bowl material	Polycarbonate					
Bowl guard	Standard (Polycarbonate)					
Weight	0.22 kg		0.42 kg		1.01 kg	

Note 1) Based on SMC measurement standards.
Water droplet indicates condensed moisture. Water vapor which is not condensed is not included.

4. How to Order



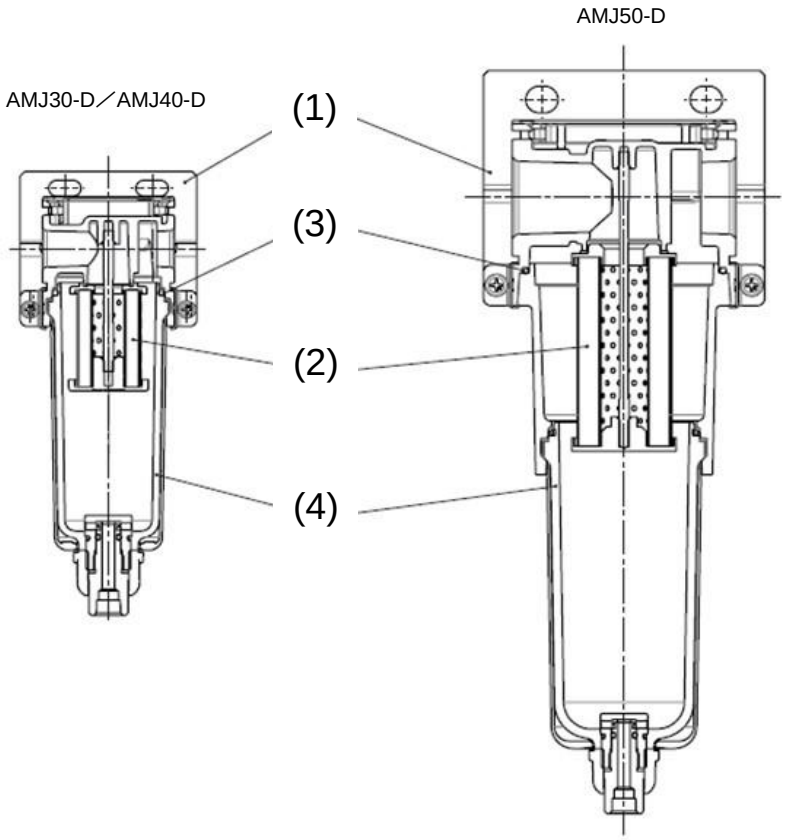
				Symbol	Description	❶ Body size		
						30	40	50
❷	Thread type			**Nil**	Rc	●	●	●
				N	NPT	●	●	●
				F	G	●	●	●
❸	Port size			**02**	1/4	●	—	—
				03	3/8	●	●	—
				04	1/2	—	●	—
				06	3/4	—	—	●
				10	1	—	—	●
❹	Bracket			**Nil**	Without mounting option	●	●	●
				B	With bracket	●	●	●
❺ Note 1)	Semi-standard	a	Bowl	**Nil**	Polycarbonate bowl	●	●	●
				2	Metal bowl	●	●	●
				6	Nylon bowl	●	●	●
		b	Drain port	**Nil**	With drain cock 1/8	●	●	●
				J	With drain guide 1/4	●	●	●
		c	Flow direction	**Nil**	Flow direction: Left to right	●	●	●
				R	Flow direction: Right to left	●	●	●
		d	Pressure unit Temp. unit	**Nil**	Pressure unit: kPa Temp. unit: ℃	●	●	●
				Z	Pressure unit: psi Temp. unit: ℉	○ Note 2)	○ Note 2)	○ Note 2)

Note 1) ❺Semi-standard: Select one each for a to d.

Note 2) ○: For NPT thread type only.

5. Structural Drawing, Option and Replacement Parts

Structural drawing / Option / Replacement parts



Option

No.	Part name	Part No.		
		AMJ30-D	AMJ40-D	AMJ50-D
(1)	Bracket assembly Note 1)	AF34P-070AS	AF44P-070AS	AF54P-070AS

Note1) Assembly of 2 types of bracket and 2 set screws.

Replacement Parts

No.	Part name	Part No.		
		AMJ30-D	AMJ40-D	AMJ50-D
(2)	Element	AMJ-EL3000	AMJ-EL4000	AMJ-EL5000
(3)	Bowl seal	C32FP-260S	C42FP-260S	
(4)	Bowl assembly	Refer to the section [6. Bowl Assembly Specifications] (P10～11).		

Note 1) The numbers in the table and structural drawing are consistent with the numbers in
[10. How to Replace the Components] (P15-18) and [11. Disassembly Drawing] (P19).

6. Bowl Assembly Specifications

6-1. Bowl assembly for AMJ30-D

<table>
<tr><td>Semi-standard symbol</td><td>–</td><td>6</td><td>J</td><td>6J</td></tr>
<tr><td>Appearance and part No.</td><td colspan="2">Semi-standard: - (Standard)
<table><tr><td>Piping port thread type</td><td>(4) Part No.</td></tr><tr><td>Rc</td><td>C3LV-D</td></tr><tr><td>G</td><td>C3LVF-D</td></tr><tr><td>NPT</td><td>C3LVN(-Z)-D</td></tr></table>
Semi-standard: 6
<table><tr><td>Piping port thread type</td><td>(4) Part No.</td></tr><tr><td>Rc</td><td>C3LV-6-D</td></tr><tr><td>G</td><td>C3LVF-6-D</td></tr><tr><td>NPT</td><td>C3LVN-6(Z)-D</td></tr></table>
  </td><td colspan="2">Semi-standard: J
<table><tr><td>Piping port thread type</td><td>(4) Part No.</td></tr><tr><td>Rc</td><td>C3LV-J-D</td></tr><tr><td>G</td><td>C3LVF-J-D</td></tr><tr><td>NPT</td><td>C3LVN-J(Z)-D</td></tr></table>
Semi-standard: 6J
<table><tr><td>Piping port thread type</td><td>(4) Part No.</td></tr><tr><td>Rc</td><td>C3LV-6J-D</td></tr><tr><td>G</td><td>C3LVF-6J-D</td></tr><tr><td>NPT</td><td>C3LVN-6J(Z)-D</td></tr></table>
  </td></tr>
<tr><td>Semi-standard symbol</td><td colspan="2">2</td><td colspan="2">2J</td></tr>
<tr><td>Appearance and part No.</td><td colspan="2">Semi-standard: 2
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 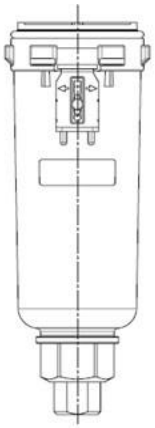 </td><td colspan="2">Semi-standard: 2J
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 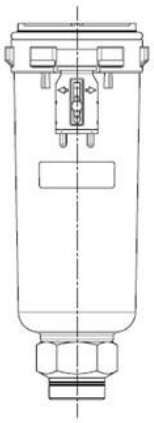 </td></tr>
</table>

Note 1) Part No. (4) includes Bowl seal (3). Refer to the section [11. Disassembly Drawing] (P19).
Note 2) "Z" in Part No. (4) indicates semi-standard specifications. The pressure unit: psi. The temperature unit: ℉
Note 3) Refer to the section [4. How to Order] (P8) for semi-standard symbols.

6-2. Bowl assembly for AMJ40-D, AMJ50-D

<table>
<tr><td>Semi-standard symbol</td><td>–</td><td>6</td><td>J</td><td>6J</td></tr>
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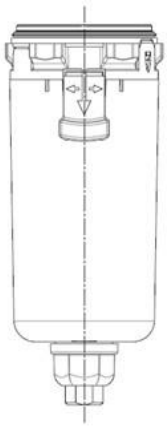
Semi-standard: 6
<table><tr><th>Piping port thread type</th><th>(4) Part No.</th></tr><tr><td>Rc</td><td>C4LV-6-D</td></tr><tr><td>G</td><td>C4LVF-6-D</td></tr><tr><td>NPT</td><td>C4LVN-6(Z)-D</td></tr></table>
  </td><td colspan="2">Semi-standard: J
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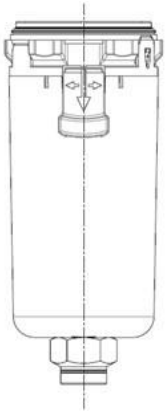
Semi-standard: 6J
<table><tr><th>Piping port thread type</th><th>(4) Part No.</th></tr><tr><td>Rc</td><td>C4LV-6J-D</td></tr><tr><td>G</td><td>C4LVF-6J-D</td></tr><tr><td>NPT</td><td>C4LVN-6J(Z)-D</td></tr></table>
  </td></tr>
<tr><td>Semi-standard symbol</td><td colspan="2">2</td><td colspan="2">2J</td></tr>
<tr><td>Appearance and part No.</td><td colspan="2">Semi-standard: 2
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 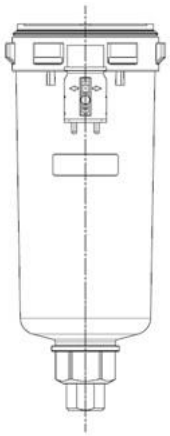 </td><td colspan="2">Semi-standard: 2J
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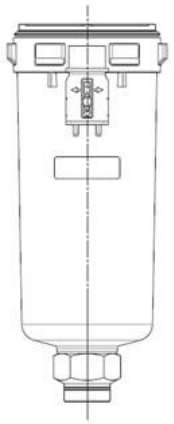
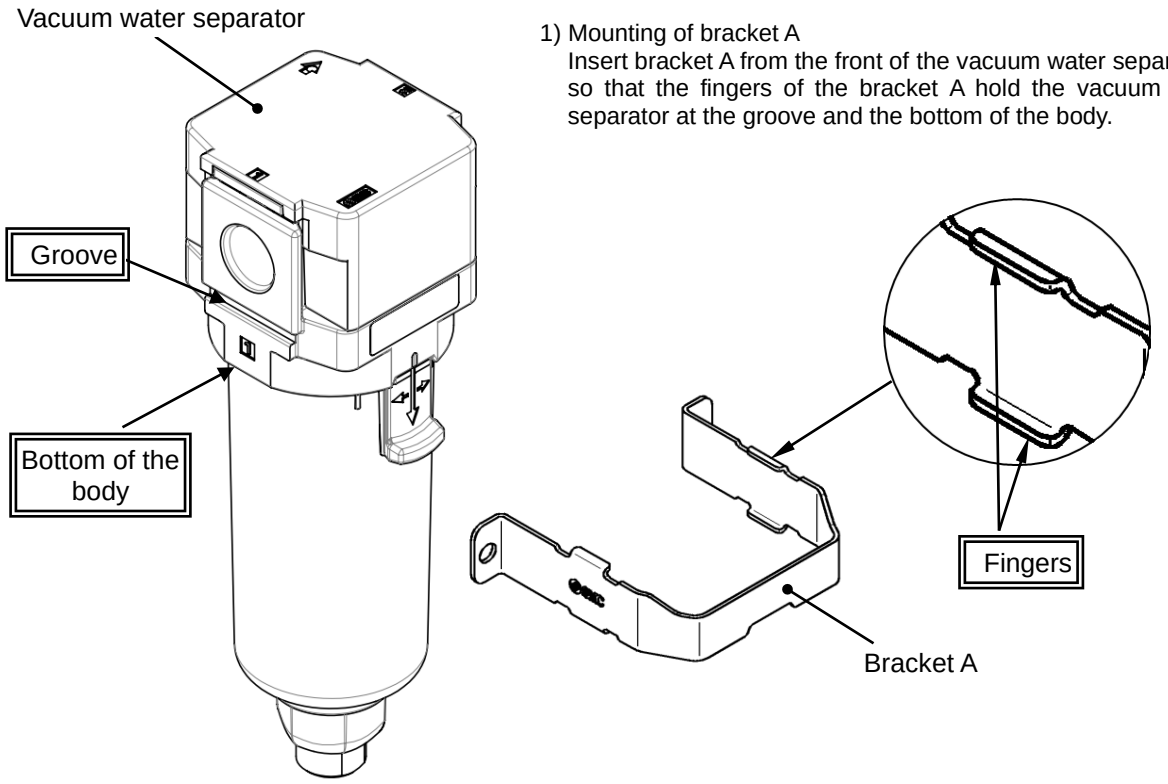
  </td></tr>
</table>

Note 1) Part No. (4) includes Bowl seal (3). Refer to the section [11. Disassembly Drawing] (P19).
Note 2) "Z" in Part No. (4) indicates semi-standard specifications. The pressure unit: psi. The temperature unit: °F
Note 3) Refer to the section [4. How to Order] (P8) for semi-standard symbols.

7. Assembly of Optional Parts

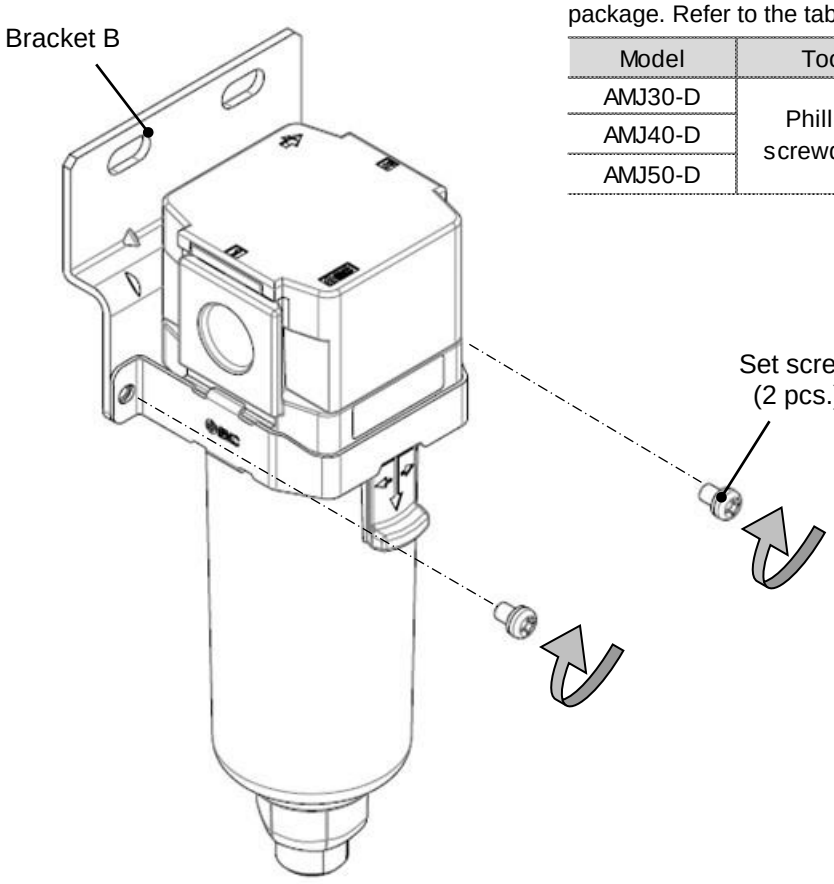
Bracket



1) Mounting of bracket A
Insert bracket A from the front of the vacuum water separator so that the fingers of the bracket A hold the vacuum water separator at the groove and the bottom of the body.

2) Mounting of bracket B
Fix the bracket B with the set screw (2 pcs.) included in the package. Refer to the table below for the tightening torque.

Model	Tool	Tightening torque
AMJ30-D	Phillips screwdriver	0.75+/-0.2 N・m
AMJ40-D		
AMJ50-D		1.5+/-0.2 N・m

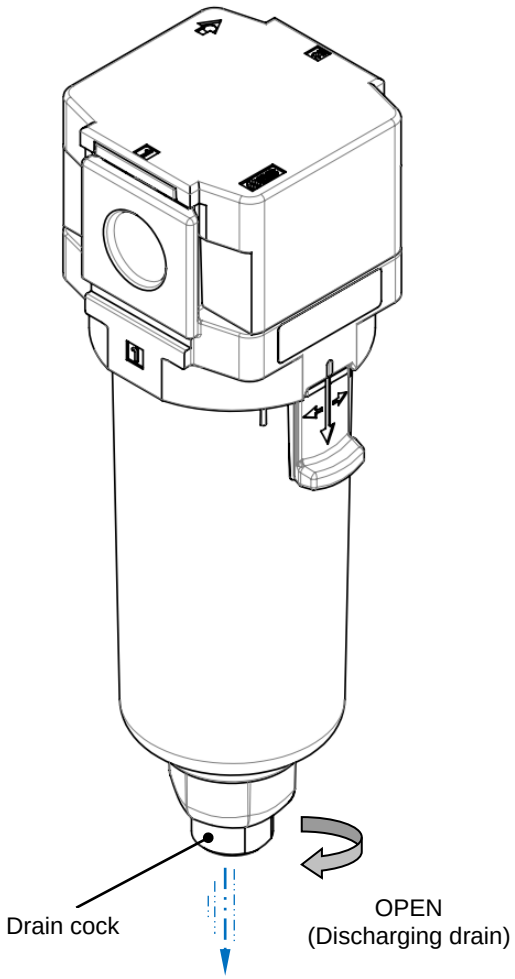


8. Operation and Adjustment

8-1. Discharge from the product with drain cock

・When drain is to be discharged, first confirm that all equipment, etc is stopped, and return the interior of the bowl to atmospheric pressure before proceeding.

AMJ-D: Drain cock (rotation type)



9. Trouble Shooting

Refer to the sections [8. Operation and Adjustment] (P13), [10. How to Replace the Components] (P15-18) and [11.Disassembly Drawing] (P19).

Trouble		Possible cause	Countermeasure	Page for reference
Category	Failure			
Flow rate	As pressure drop is large, fluid does not flow.	Clog of the element.	Replace the element.	P17-18
Vacuum pressure does not decrease	Air sucks from the gap between the bowl and body.	The bowl seal is damaged.	Replace the bowl seal. Grease up before replacing the bowl seal. Note)	P15-16
	Air sucks from the broken part of the bowl.	The bowl is damaged.	Replace the bowl assembly.	P15-16
Operability	Drain is not discharging when the drain cock opens.	Blockage of outlet of the drain cock due to solid foreign matter etc.	Replace the bowl assembly.	P15-16
	Too much drain comes from the piping of outlet side.	Drain level reaches the upper limit level on the bowl.	Open the drain cock for discharging and replace the element.	P13 P17-18

Note) Fluorine grease is recommended.

10. How to Replace the Components

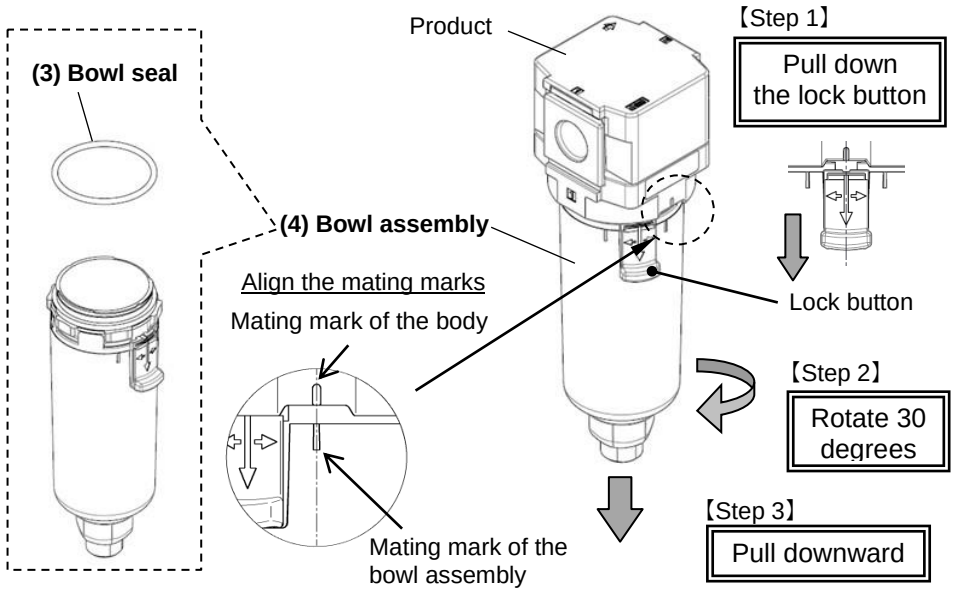
⚠ Warning

Before replacement, make sure that no pressure remains in the product.

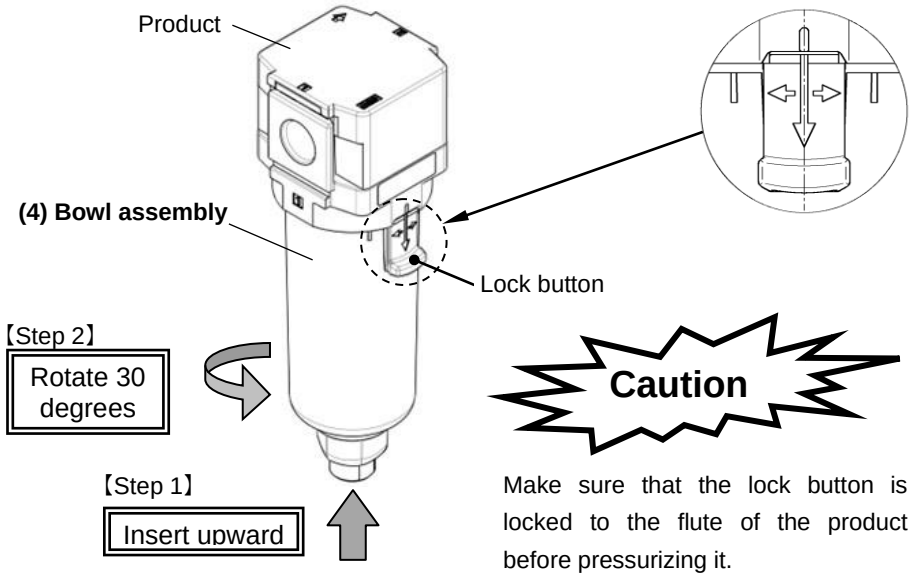
After replacement, confirm that the product satisfies specific functions and no external leakage occurs before operating it.

10-1. Bowl Assembly Replacement

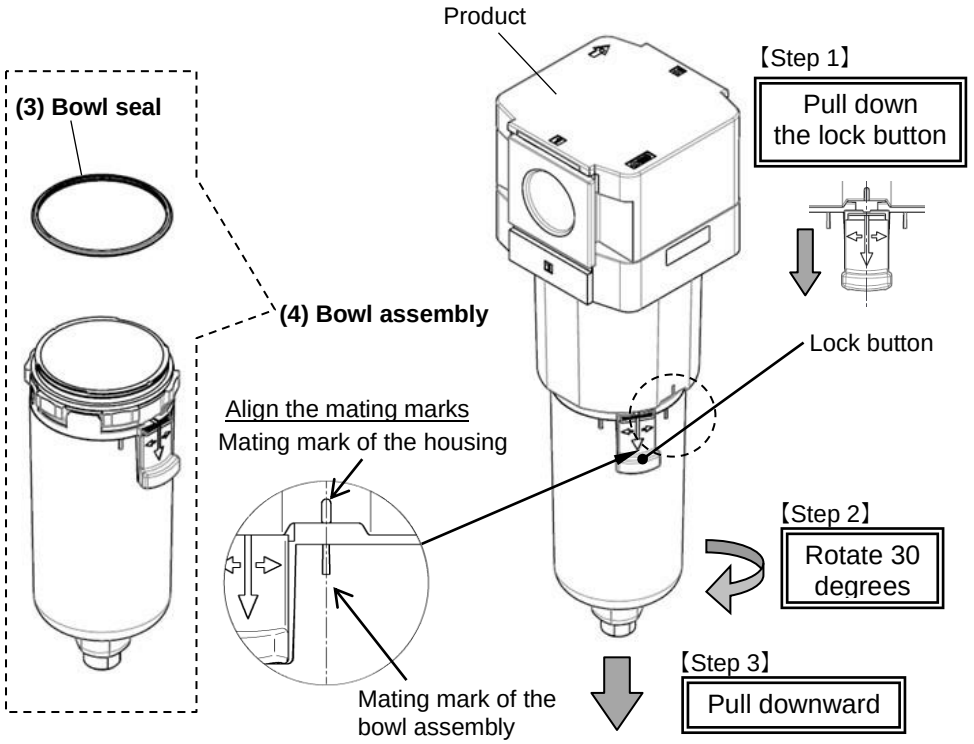
Applicable model	Work category	Procedure	Tool	Criteria
AMJ30-D AMJ40-D	Disassembly	1） Remove the bowl assembly from the product. While the lock button is held down, rotate the bowl assembly by approx. 30 degrees so that the mating marks of the body and bowl assembly meet each other. Then remove the bowl assembly by pulling it downward.	–	–



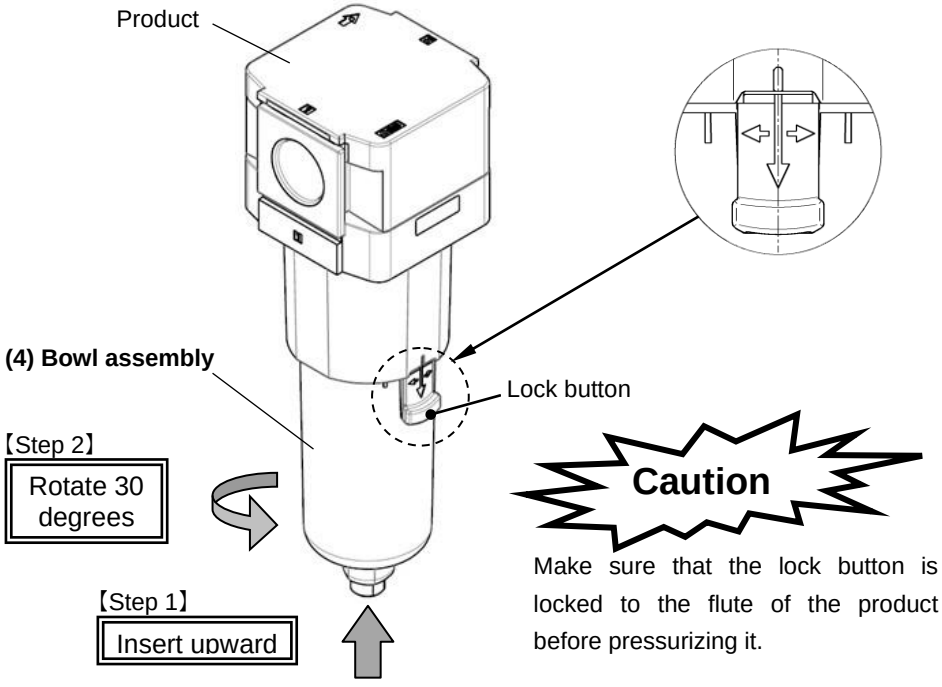
Work category	Procedure	Tool	Criteria
Assembly	1） Mount the bowl assembly to the product and rotate the bowl assembly until the lock button is locked in position as shown in the figure below.	–	–



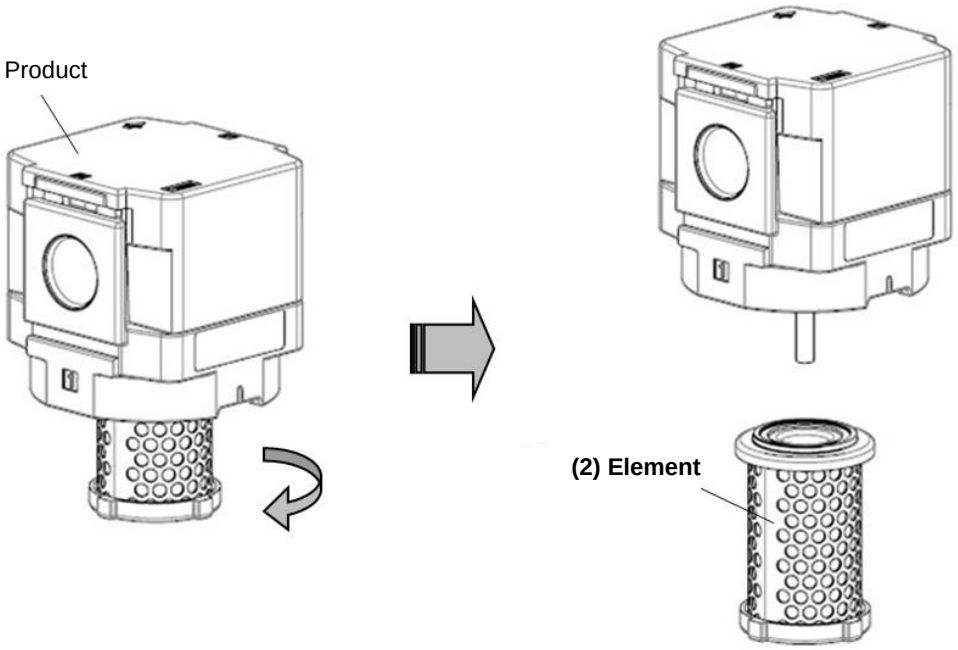
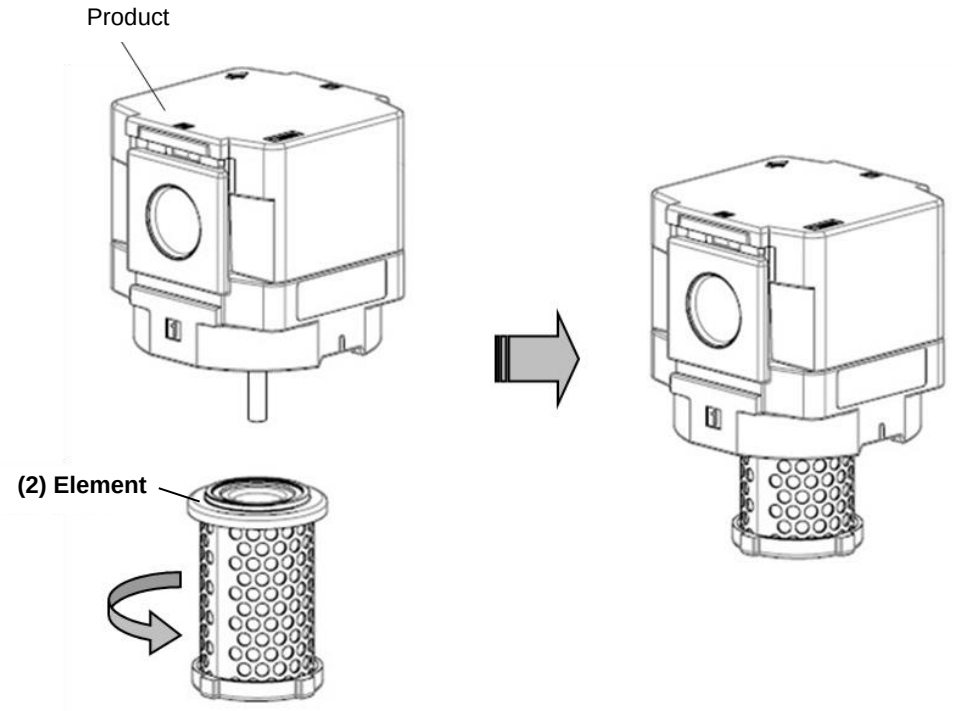
Applicable model	Work category	Procedure	Tool	Criteria
AMJ50-D	Disassembly	1） Remove the bowl assembly from the product. While the lock button is held down, rotate the bowl assembly by approx. 30 degrees so that the mating marks of the body and bowl assembly meet each other. Then remove the bowl assembly by pulling it downward.	–	–

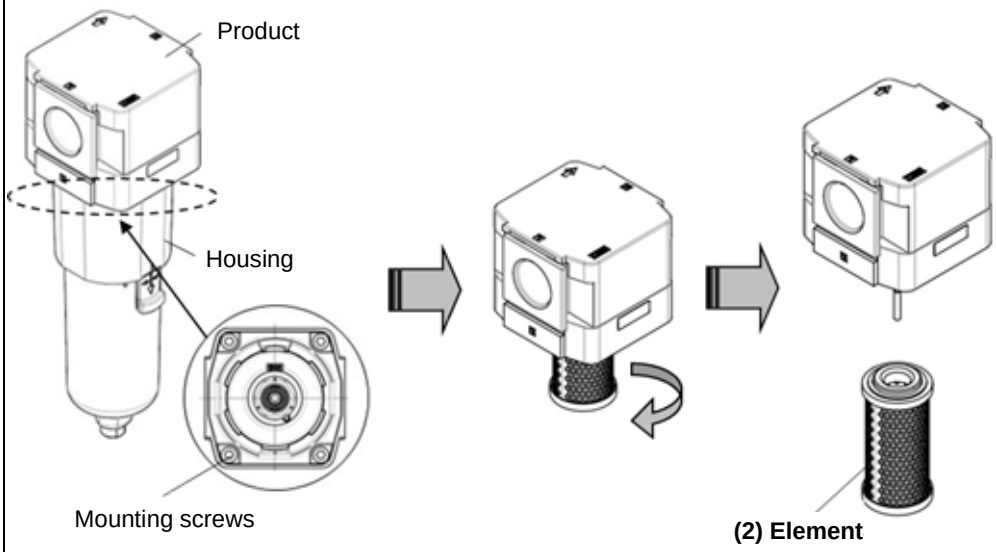
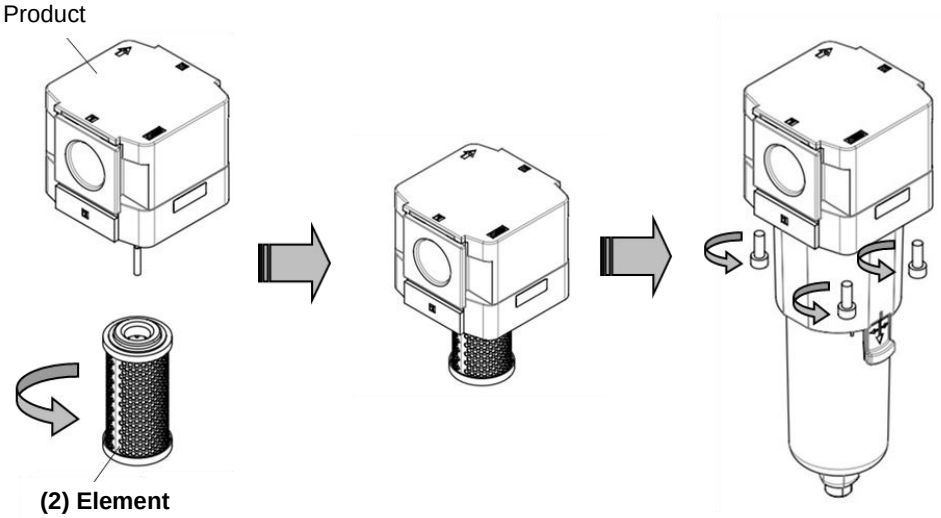


Work category	Procedure	Tool	Criteria
Assembly	1） Mount the bowl assembly to the product and rotate the bowl assembly until the lock button is locked in position as shown in the figure below.	–	–



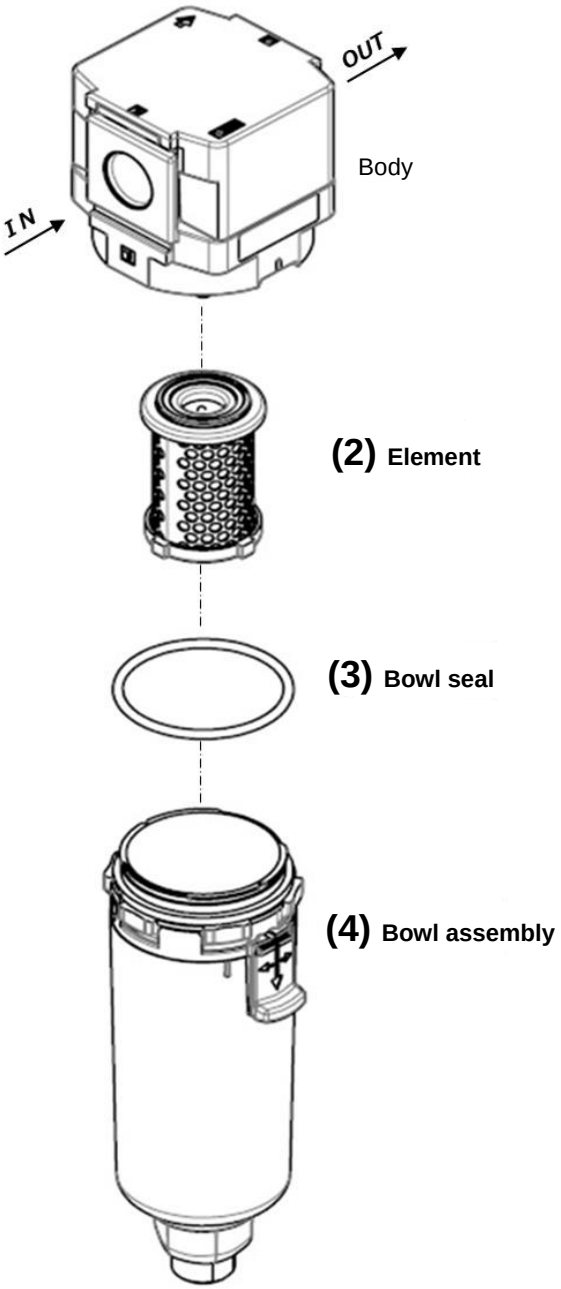
10-2. Element Replacement

Applicable model	Work category	Procedure	Tool	Criteria
AMJ30-D AMJ40-D	Disassembly	1） Remove the bowl assembly referring to the section [10-1. Bowl Assembly Replacement] (P15). After that, remove the element by rotating it counterclockwise.	–	–
				
	Work category	Procedure	Tool	Criteria
	Assembly	1） Mount the element by rotating it clockwise. After hand tightening the element, retighten by hand about 1/6 turn more and confirm that there is no looseness of the element. Mount the bowl assembly referring to the section [10-1. Bowl Assembly Replacement] (P15).	–	–
				

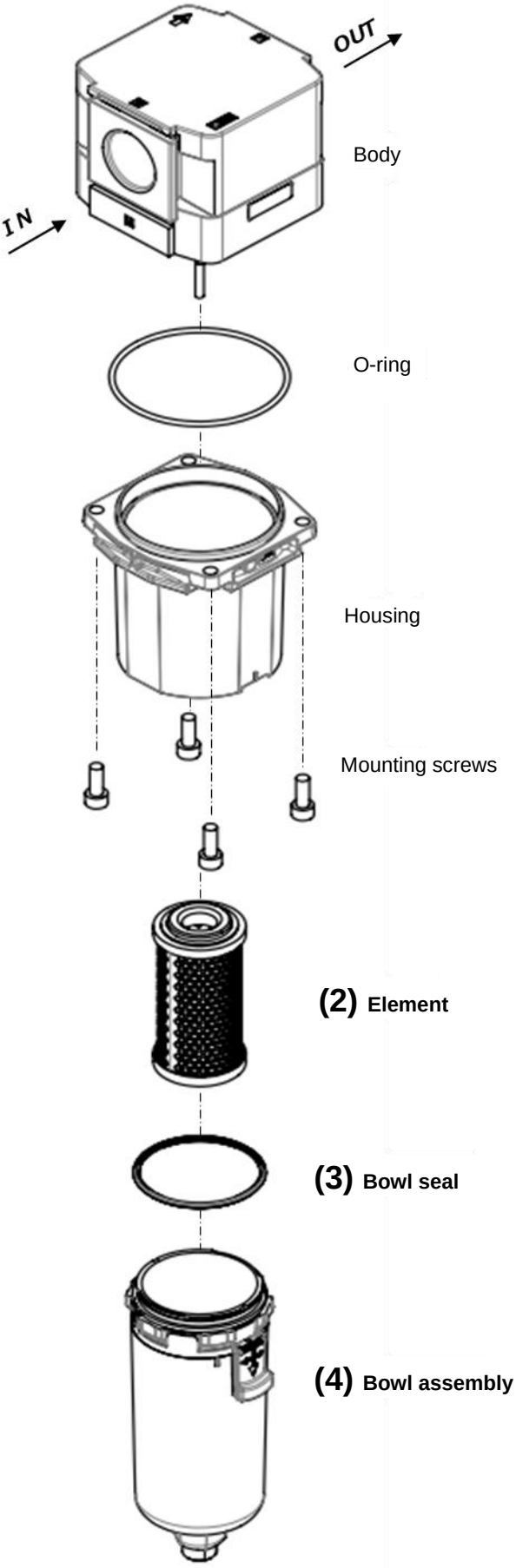
Applicable model	Work category	Procedure	Tool	Criteria
AMJ50-D	Disassembly	1） When loosening the mounting screws to remove the housing from the body, hold the housing by hand to prevent it from dropping. When the housing is removed, rotate the element counterclockwise to remove.	Hexagon wrench key (Nominal size: 5)	–
				
	Work category	Procedure	Tool	Criteria
	Assembly	1） Mount the element by rotating it clockwise. After hand tightening the element, retighten by hand about 1/6 turn more and confirm that there is no looseness of the element. When tightening the mounting screws, hold the housing by hand to prevent it from dropping. Tighten the mounting screws referring to the torque specified on the right.	Hexagon wrench key (Nominal size: 5)	Mounting screws Tightening torque: 3.5±0.3 N・m
				

11. Disassembly Drawing

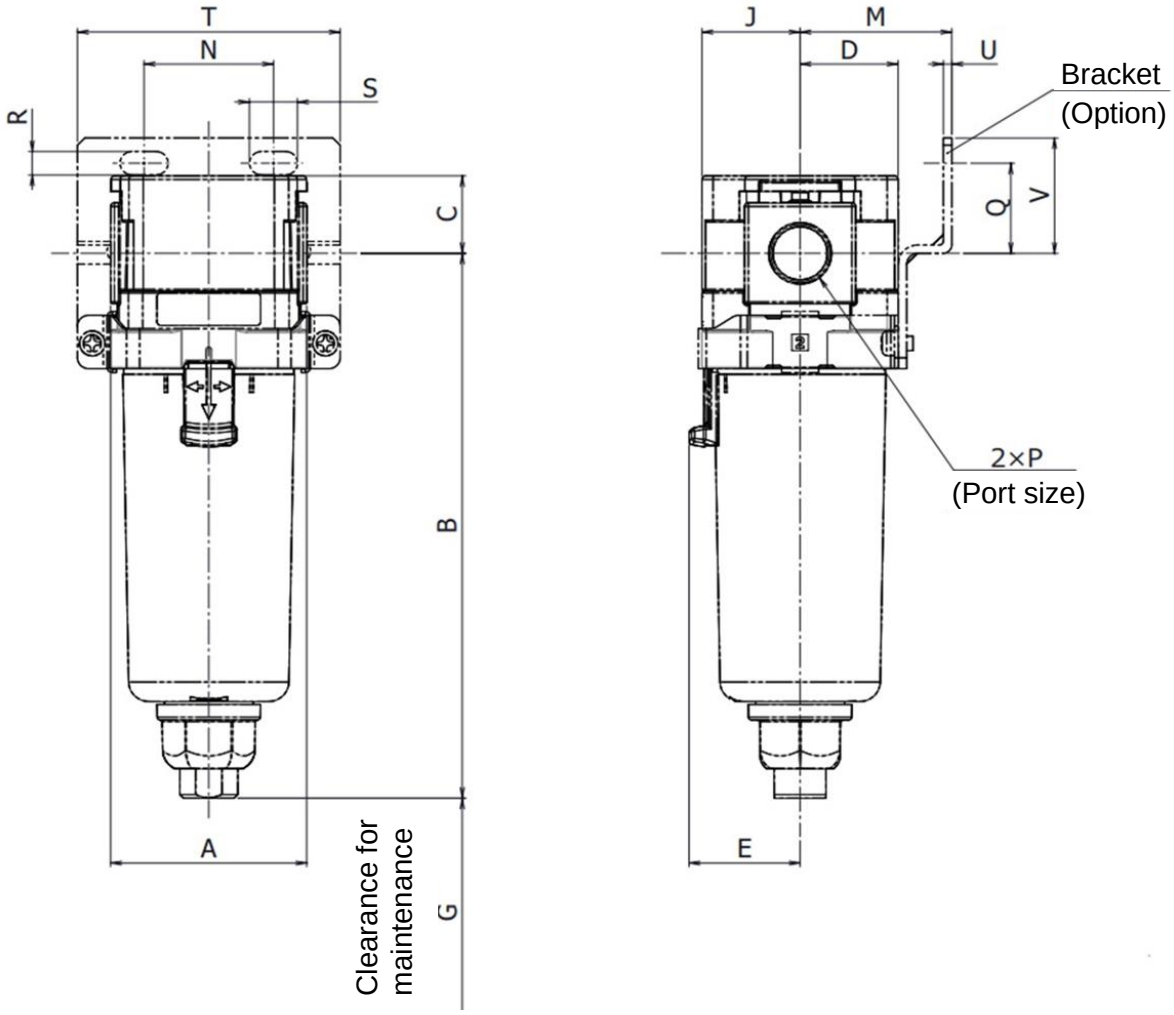
AMJ30-D,AMJ40-D



AMJ50-D



12. Dimensions



Model	P	A	B 注)		C	D	E	G	J
			With drain cock	With drain guide					
AMJ30-D	1/4・3/8	53	151.2(151.1)	144.4(144.3)	21.5	26.5	30	45	26.5
AMJ40-D	3/8・1/2	70	181(182.8)	174.2(176)	25.5	35.5	38.4	70	35.5
AMJ50-D	3/4・1	90	254(255.8)	247.2(249)	32	45	38.4	80	45

Model	Bracket mount							
	M	**N**	**Q**	**R**	**S**	**T**	**U**	**V**
AMJ30-D	41	35	25	6.5	13	71	2.3	32
AMJ40-D	50	52	30	8.5	12.5	88	2.3	39
AMJ50-D	70	66	40.5	11	13	113	3.2	52.5

Note) ( ) is the case for metal bowl.

Revision history

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