CKD

SM-278162-A

INSTRUCTION MANUAL

VACUUM FILTERS

VFA1000
VFA3000
VFA4000

- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

CKD Corporation

For Safety Use

To use this product safety, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (to the level pursuant to JIS B 8370 Pneumatic System Rules).

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.

Our customers use this product for a very wide range of applications, and we cannot keep track of all of them. Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, examine whether the product meets your application, requirements, and how to use it.

This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents, read this operation manual carefully for proper operation.

Observe the cautions on handling described in this manual, as well as the following instructions:

⚠DANGER: Failure to pay attention to DANGER notices may cause a situation that results in a fatality or serious injury and that requires urgent addressing.

⚠WARNING: Failure to pay attention to WARNING notices may result in a fatality or serious injury.

⚠CAUTION: Failure to pay attention to WARNING notices may result in injury or damage to equipment or facilities.

Note 1. IS0 4414 : Pneumatic fluid power・・・Recommendations for the application of equipment to transmission and control systems

Note 2. JIS B 8370 : General rule for pneumatic systems

INDEX

VACUUM FILTERS

VFA1000

VFA3000

VFA4000

Manual No. SM-278162-A

1.UNPACKING

1.1 Confirm that the ordered product and the product model indicated on the product are the same.

1.2 Check that there is no damage on the outside of the product.

1.3 Thoroughly read the handling precautions and instruction manual enclosed with the product.

> ⚠WARNING: To prevent foreign matter from entering the product, do not remove the port protection plug (port seal) until just before starting piping work.
> The connected equipment could malfunction and lead to accidents if foreign matter enters.

2. INSTALLATION

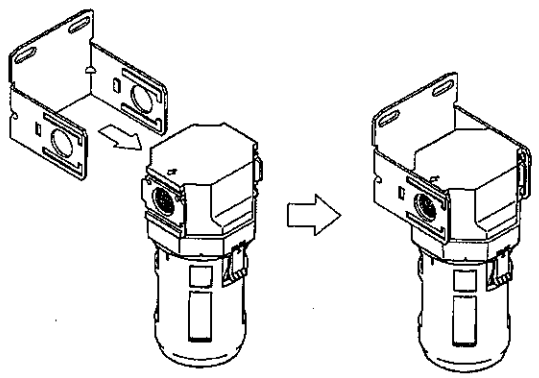
2.1 Installation environment

> ⚠WARNING: (1) Mount the product where it will not be subject to direct sunlight.
> If the ambient temperature exceeds 50° C, the product could be damaged and accidents could occur.
> (2) Avoid mounting the product where it will be subject to vibration or impact.
> Failure to observe this could lead to product damage and accidents.

2.2 Installation methods

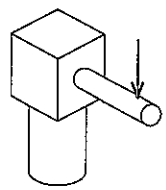
(1) Mount the main body so that the bowl is facing straight downward.
Provide space for mounting and removing the bowl and bowl guard.

(2) When mounting with a C-type bracket (enclosed option), pipe after mounting the bracket onto the product. Refer to the following drawing for details on mounting the bracket.
Align the convex section of the C-type bracket to the product body's concave section, and then press in.



> ⚠WARNING: ●Bending moment
> Make sure that the bending moment, caused by the piping load, is not applied on the body or piping sections.
> Avoid piping with a single support fixture as excessive force will be applied and damage could occur.

Models	Bending moment (N·m)
VFA1000	15
VFA3000	50
VFA4000	50

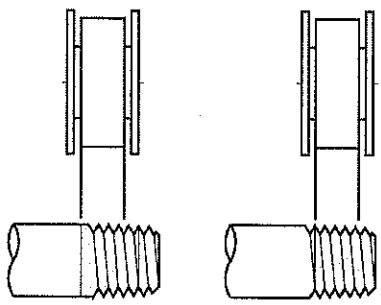


2.3 Piping methods

(1) Remove all foreign matter with air blow, etc., before connecting the piping to the equipment.

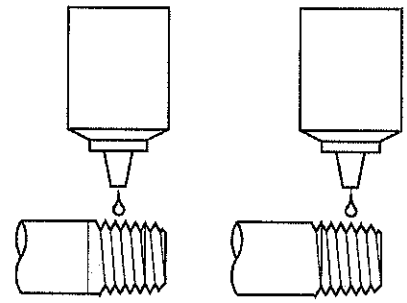
(2) Sealing tape or sealant is used when piping. Use these only on the two threads from the end of the threads, and make sure that sealing scraps or sealant does not enter the pipe or equipment.

●Seal Tape



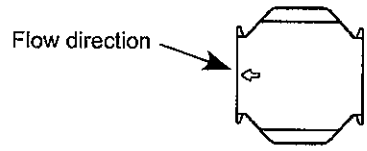
(Right) (False)

●Sealant (Paste or liquid)



(Right) (False)

(3) Check the IN and OUT orientation of the pipe before connecting.



Top view

(4) Pipe while making sure that there are no leaks at the piping port section. After piping, check that the required vacuum degree is established in the circuit.

⚠WARNING:

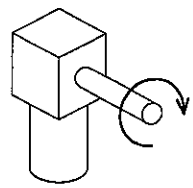
(1) Make sure that foreign matter and sealant, etc., does not enter the product during the plumbing.
Failure to observe this could lead to bowl damage or malfunctioning of the connected equipment, and could lead to accidents.

(2) Do not apply screw lock agent or leakage detection agent, etc., when piping.
Application could lead to cracking of the resin bowl.

⚠CAUTION:

●Tightening torque

Do not apply excessive torque on the body or piping sections when piping.



Port size	Tightening torque (N·m)
1/8	3 ~ 5
1/4	6 ~ 8
3/8	13 ~ 15
1/2	16 ~ 18

3. OPERATION

⚠ WARNING:

(1) Use the product within the specifications.
(2) This product is for vacuums. Do not use in a pressured state, except for instant pressurization that occurs due to vacuum break. The vacuum break must be less than the withstanding pressure, and must not be used exclusively for pressurizing. If used exclusively for pressurizing, the product could be damaged and accidents could occur.
(3) Do not use this product in an atmosphere containing corrosive gases, chemicals or sea water, or where these maters could come in contact. Furthermore, do not use this product as a vacuum circuit to intake these matters. Failure to observe this could lead to product damage or accidents.
(4) When using a polyamide (nylon) bowl type product, make sure that the product can withstand use. Refer to the table in the following "Resin bowl chemical resistance" (page 4) the bowl's chemical resistance. If a polyamide bowl cannot be used, use the optional aluminum alloy (metal) bowl. (VFA3000, 4000 Series only)
(5) Use with the specified air flow direction. The product will not function correctly if the air flow direction is incorrect.
(6) The bowl and bowl guard are designed to be used as a set. Always use these as a set. If the bowl guard is removed during operation, the bowl could dislocate during operation and cause personal injuries.

⚠ CAUTION:

(1) This product is a filter for low vacuum. Performance in ranges exceeding the specified pressure cannot be guaranteed.
(2) Dispose and drain the dust and drain accumulated in the bowl so that the environment is not contaminated.
(3) Check the chemical composition of the testing liquid, sealant and adhesives to confirm that they do not contain elements not usable with the polyamide bowl.

●Resin bowl chemical resistance

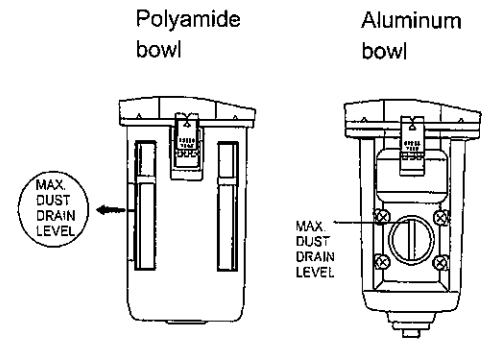
Classification of chemicals		Principal application	Polyamide bowl	Polyamide body
Inorganic compounds	Acids	Deoxidizing, Degreasing, Surfase preparation	X	X
	Alkalis	Degreasing, Coolant, Leak detector	O	O
	Salts	Galvanizing	O	O
Organic compounds	Aromatic hydrocarbons	Thinner	X	X
	Chlorinated aliphatic hydrocarbons	Cleaning	O	O
	Chlorinated aromatic hydrocarbons	Agricultural chemicals	O	O
	Petroleum solvent	Degreasing	O	O
	Alcohol	Antifreezing admixture , Leak detector, Soldering paste	X	X
	Phenol	Disinfectant	X	X
	Ether	Brake fluid	O	O
	Ketones		X	X
	Carboxylic acids	Dyestuff, Surfase preparation, Paint, Leak detector	X	X
	Ester	Lubricating oil, Hydraulic fluid, Rust preventives, Plasticizer	O	O
	Hydroxy acids	Food additive	X	X
	Nitro compounds		O	O
	Amine	Brake fluid, Antistatic additives, Dyestuff	X	X
	Nitrile	Raw material of nitril rubber	O	O

4. MAINTENANCE

4.1 Periodic inspections

(1) Clogging of the filter element will lead to a drop in the vacuum source performance. Periodically inspect, clean and replace the element according to the usage state.

(2) Periodically discharge the dust and drainage accumulated in the bowl so that the dust and drainage do not exceed the upper limit indicator on the bowl guard (upper edge of glass window on aluminum alloy bowl type). If use is continued at levels exceeding the upper limit, the dust or drain age accumulated in the bowl could flow out to the piping OUT side and cause equipment trouble.



⚠WARNING: If any cracks, scratches or other deterioration, or if a drop in the transparency of the polyamide (nylon) bowl is found, replace the bowl with a new bowl or aluminum alloy (metal) bowl. Continued use could lead to damage and accidents.

4.2 Disassembly and assembly

> ⚠ WARNING: Always set the vessel to the atmospheric state before removing the bowl and bowl guard to clean or replace the dust filter element, etc.
> When mounting the bowl or bowl guard again, accurately insert and fix these into the body, and confirm that the required vacuum degree is established in the circuit.

(1) When replacing the packing or O-ring, apply fluorine grease (Daikin Industries Demnum L200 or equivalent), and then assemble.

(2) Bowl and element (assembly) replacement methods VFA1000 Series

●VFA 1000 Series

(a) While pressing up the bowl and bowl guard, rotate by approx. 45° until these parts stop. (Fig. 1, 2)

(b) Pull the bowl and bowl guard downward and off. (Fig. 2, 3)

(c) Insert a hexagon socket screw key (width across flats 4mm) on the lower side of the element assembly. Turn 45° counterclockwise and remove the element. (Fig. 3)

(d) Follow the disassembly procedures in reverse to assemble.

(e) When establishing a vacuum in the vessel again, confirm that the alignment mark on the bowl guard is aligned with the body mark (Fig. 1 A).

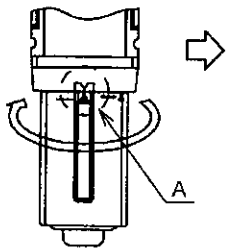


Fig. 1

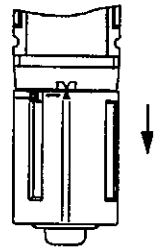


Fig. 2

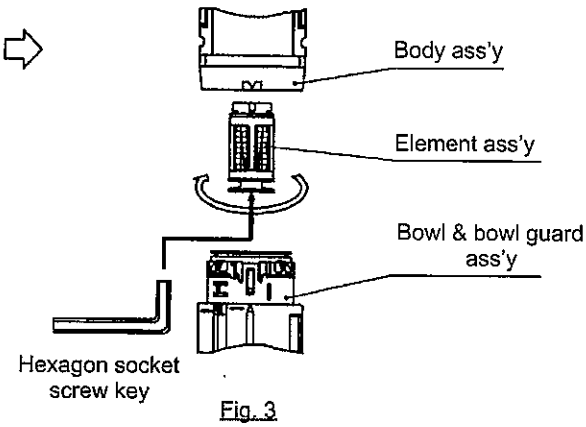


Fig. 3

● VFA 3000, 4000 Series

(a) While pressing the latch with a finger, turn the bowl and bowl guard by approx imately 45 degrees (until the Δ mark on the latch is aligned with the Δ mark on the body). (Fig. 1, 2)

(b) Pull the bowl and bowl guard downward and off. (Fig. 2, 3)

(c) The element can be removed by turning the baffle counterclockwise. A width across flats 10mm and 14mm hexagon socket screw key can be respectively attached to the bottom of the VFA3000 and VFA4000 baffles.
When turning the baffle by hand, protect with a cloth, etc.

(d) Follow the disassembly procedures in reverse to assemble.

(e) Securely fix the baffle so that the element is not loose. The turning torque for mounting is approx. 130N・cm for the 40μm polyamide type, and approx. 200N・cm for the 5μm polypropylene type.

(f) When establishing a vacuum in the container again, confirm that the latch is securely inserted in the concave section of the body. (Fig. 1)

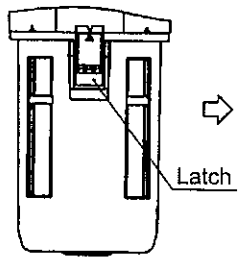


Fig. 1

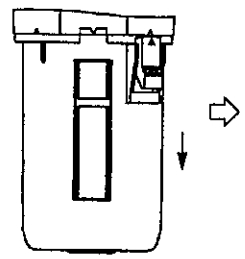


Fig. 2

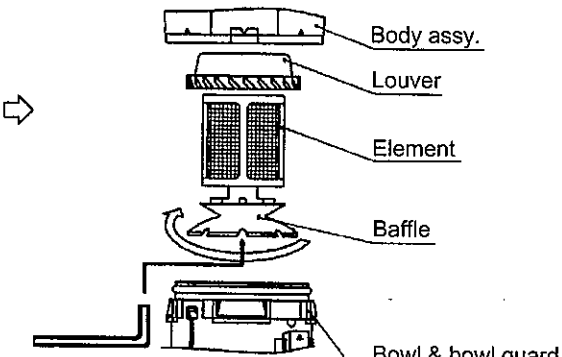
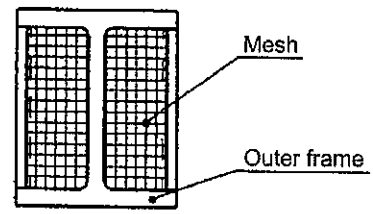


Fig. 3

4.3 Bowl and element washing methods

(1) Use a neutral household detergent to wash the bowl, and rinse sufficiently with water after washing.

(2) Regenerate the filter element by air blow, or by washing with a neutral household detergent, rinsing with water and then drying. Hold the outer frame of the element, and make sure not to press the mesh with hands.
(The mesh could peel.)



⚠WARNING:	When washing the polyamide (nylon) bowl, use a household detergent, and then rinse with water. Other methods of washing can cause bowl damage and can lead to accidents.

4.4 Trouble shooting

Irregular phenomenon	Cause	Countermeasure
Dust and drain flow to piping out side.	The accumulated dust and drain have exceeded the upper limit indicator.	Discharge the dust and drain.
	Air is flowing past the recommended flow rate.	Replace with a model that matches the flow rate. Reduce the flow rate.
There is no flow.	Dust has adhered onto the element.	Wash or replace the element.
The pressure loss is great.	Dust has adhered onto the element.	Wash or replace the element.
	Air is flowing past the recommended flow rate.	Replace with a model that matches the flow rate.
The degree of vacuum does not rise.	Foreign matter has adhered to the O-ring or packing.	Remove the foreign matter adhered on the O-ring or packing. If the parts are not damaged, apply grease and remount.
	The O-ring or packing is damaged.	Replace the O-ring or packing with new parts.
	The bowl is damaged.	Replace the bowl with a new part.
	The piping connection is leaking.	Remove the piping, and piping again following section 3.3. Piping methods (page 8).

Note 1: Flow rate at initial pressure loss 3 kPa or less (when using standard element.)

Note 2: As a standard, the element's filtration section has an average 40 μ m mesh (material: polyamide), and as an option has a fiber type (material: polypropylene) with a filtration degree equivalent to 5 μ m.

5. Products

5.1 Product specifications

Models		VFA-1000		VFA-3000		VFA-4000	
Working pressure range	kPa	-100 ~ 0					
Resisting pressure	MPa	0.5					
Temperature range	℃	5~50					
Allowable accumulation of drain	cm^3	10		45		80	
Port size	Rc , G , NPT	1/8	1/4	1/4	3/8	3/8	1/2
Weight	kg	0.1		0.3		0.5	
Maximum flow rate	l/min(ANR)	60	80	100	200	250	400

Note 1: Flow rate at initial pressure loss 3 kPa or less when using standard element.

Note 2: As a standard, the element's filtration section has an average 40 μ m mesh (material: polyamide), and as an option has a fiber type (material: polypropylene) with a filtration degree equivalent to 5 μ m.

5.2 How to order

(1) Selection rule

VFA3000 - 8G - M - B

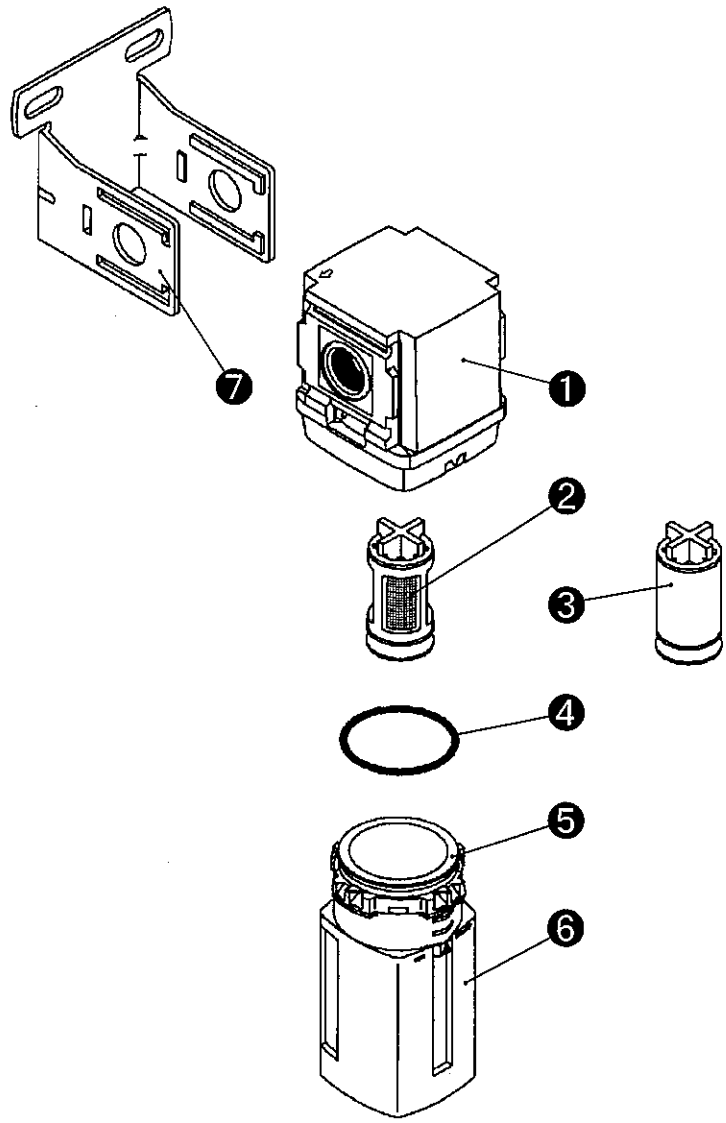
Models	Port size & thread				Options			Attachments	
VFA1000	6	1/8	No mark	Rc	Bowl	No mark	PA	No mark	No attachment
	8	1/4	G	G	Material	M	Aluminium Alloy	B	C-type bracket
VFA3000	8	1/4	N	NPT	Filter	No mark	PA (40μm)		
	10	3/8			element	Y5	PP (5μm)		
VFA4000	10	3/8							
	15	1/2							

(2) Spare parts list

Models	Parts name	Parts number
VFA-1000	Element assy. (40μm)	VFA1000-E
	Element assy. (5μm)	VFA1000-E-Y5
VFA-3000	Element (40μm)	VFA3000-E
	Element (5μm)	VFA3000-E-Y5
VFA-4000	Element (40μm)	VFA4000-E
	Element (5μm)	VFA4000-E-Y5

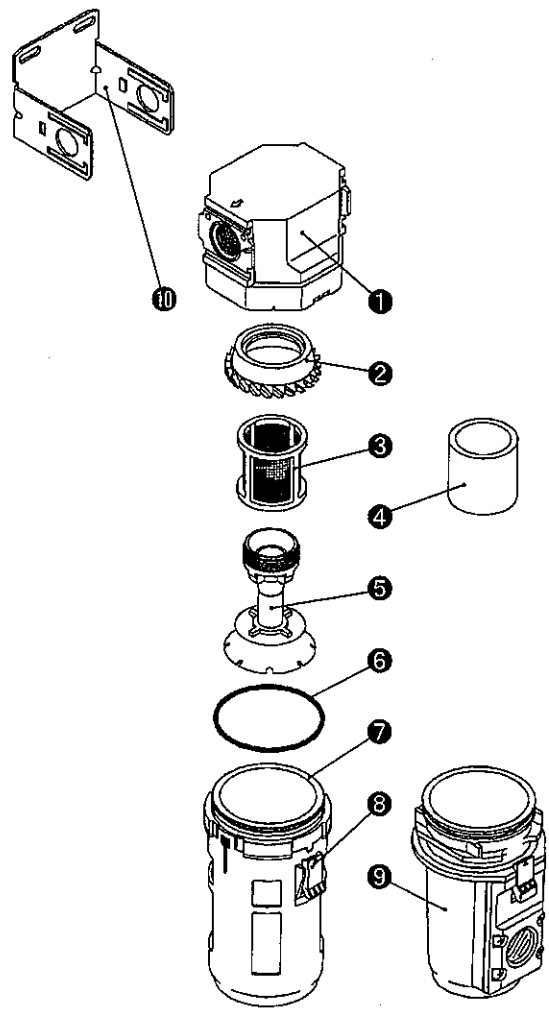
5.3 Assembly drawing

●VFA1000



No.	Parts name	Parts number
❶	Body assy.	
❷	Element ass'y (40μm)	VFA1000-E
❸	Element ass'y (5μm)	VFA1000-E-Y5
❹	Packing	
❺	Bowl assy.	
❻	Bowl guard	
❼	C-type bracket	

●VFA3000/VFA4000

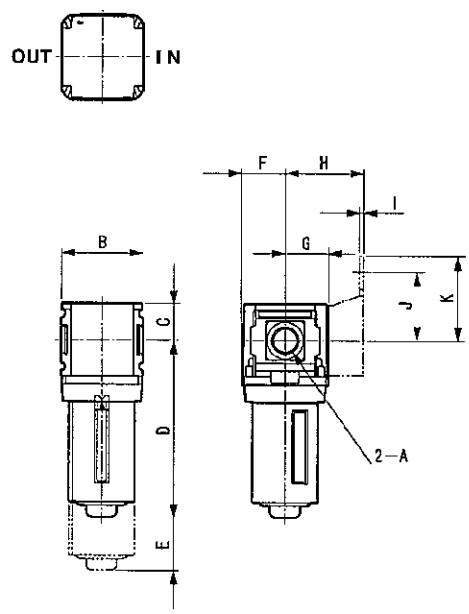


Bowl & bowl guard assy.　　Alum. bowl assy.

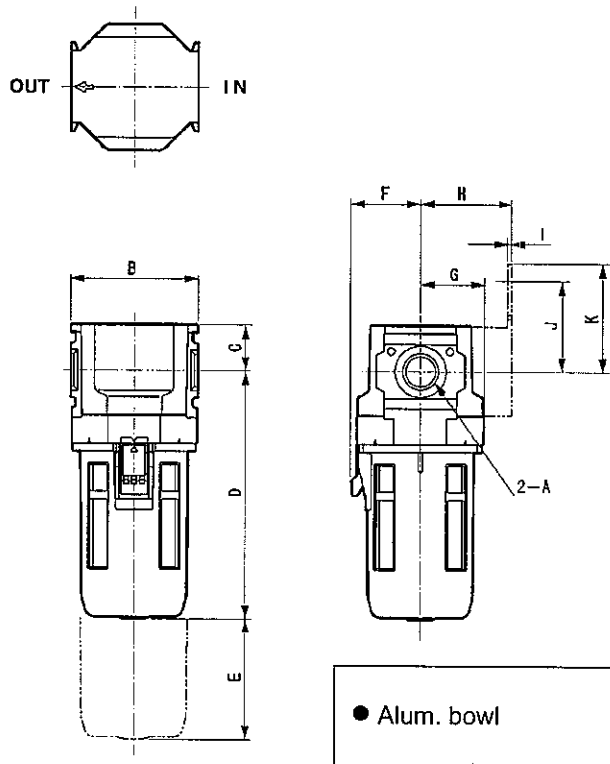
No.	Parts name	Parts number	
		VFA3000	VFA4000
❶	Body assy.		
❷	Louver		
❸	Element (40μm)	VFA3000-E	VFA4000-E
❹	Element (5μm)	VFA3000-E-Y5	VFA4000-E-Y5
❺	Baffle		
❻	O-ring		
❼	Bowl		
❽	Bowl guard assy.		
❾	Alum. bowl assy.		
❿	C-type bracket		

5.4 External dimensions

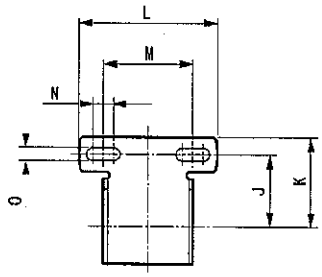
●VFA1000



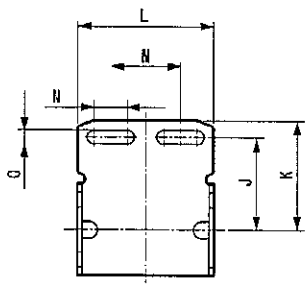
●VFA3000
●VFA4000



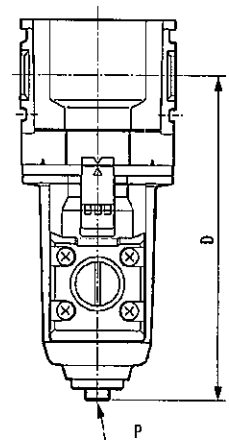
● C-type bracket



● C-type bracket



● Alum. bowl



Models	D	P
VFA3000	133	Rc1/8
VFA4000	155	

Models		A	B	C	D	E	F	G	C-type bracket							
									H	I	J	K	L	M	N	O
VFA1000	−6	Rc1/8	40	18	88	40	21.5	21.5	40	2	35	43.5	68	44	10	6.5
	−8	Rc1/4														
VFA3000	−8	Rc1/4	63	22.5	123.5	60	34.5	31.5	45	2.3	45	53.5	67	34.5	16.5	7
	−10	Rc3/8														
VFA4000	−10	Rc3/8	80	22.5	149	60	42.5	39.5	55	2.3	45	53.5	84	55	14	7
	−15	Rc1/2														