

INSTRUCTION MANUAL

THE MIDDLE PRESSURE FITER

FM series

- 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.

For Safety Use

To use this product safely, 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.

※1) ISO 4414 :Pneumatic fluid power . . . Recommendations for the application of equipment to transmission and control systems.

※2) JIS B 8370:General rule for pneumatic systems

<Unpacking>



WARNING

Do not remove the port protective plug (port seal or cap) immediately before piping in order to prevent entry of foreign matter. Failure to follow this instruction may result in malfunction of terminal equipment.

<Installation>



WARNING

- 1) This product is manufactured as a general industrial machinery component. Do not use this product for medical relation, equipment, a circuit about the human life.
- 2) Do not use this product in an atmosphere containing organic or other chemicals or where chemicals may adhere to the product. Failure to follow this instruction may result in breakage of the bowl.
- 3) Be sure to prevent foreign matter (such as sealant and chips) from entering the filter. Failure to follow this instruction may result in breakage of the bowl or malfunction of terminal equipment.
- 4) In piping, avoid applying too much torque, load, or overhanging. Failure to follow this instruction may result in breakage of the product.
- 5) Be sure to firmly secure the product with specified brackets, fixing feet, and pipe supports, otherwise the product may shake under pressure, causing an accident.

<Operation>



WARNING

- 1) If the compressed air contains chemicals or corrosive gas, malfunction or breakage of the product.
- 2) Operate the product within the specified pressure and temperature ranges in the correct flow direction. Failure to follow this instruction may result in breakage of the bowl or malfunction of terminal equipment.
- 3) Drain the bowl regularly so that the drainage limit is not exceeded. Failure to follow this instruction may result in breakage of the bowl or malfunction of terminal equipment.
- 4) Do not face the outlet when draining the bowl. Drainage may splash on your face and cause injury.



CAUTION

Be sure to properly treat drainage collected in the bowl to avoid environmental pollution.

<Maintenance>



WARNING

- 1) Before removing the bowl, cut off pressurized air and depressurize the bowl. Make sure that the bowl is completely depressurized. If it is not completely depressurized, the bowl may jump and cause an injury.
- 2) Be sure to keep the bowl guard mounted during use. Should the bowl break with no guard mounted, bowl fragments may scatter and cause injury.

<Troubleshooting>



WARNING

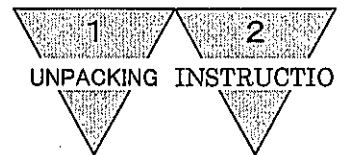
- 1) When a flaw, such as a crack or a scratch, is found on the bowl, replace it with a new one. Failure to follow this instruction may result in breakage of the bowl and an accident.
- 2) Check the transparent resin bowl regularly for any smears. If there are any smears or it is otherwise unclear, replace it with a new one. Failure to follow this instruction may result in breakage of the bowl and an accident.
- 3) When cleaning a transparent resin bowl, use a neutral detergent for home use and rinse it well with water. Any other cleaning method may result in breakage of the bowl and an accident.

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FM series

THE MIDDLE PRESSURE FILTER

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1. Unpacking

- 1) Confirm that the product model number ordered and the product model number marked on the product are identical with each other.
- 2) Inspect the product for damage.
- 3) If the package contains any documents other than this INSTRUCTION MANUAL, such as handing notes, be sure to familiarize yourself with the contents before use.



WARNING

Do not remove the port protective plug (port seal or cap) immediately before piping in order to prevent entry of foreign matter. Failure to follow this instruction may result in malfunction of terminal equipment.

2. Installation

2. 1 Installation Environment

Avoid using the regulator in the following environment.

- 1) When the ambient temperature exceeds the service temperature range of the product.
- 2) Where the dusty atmosphere.
- 3) An atmosphere where corrosive gasses.
- 4) An atmosphere where spatter could scatter.
- 5) Where the product is exposed to direct sun lay and when water contact to the product.
- 6) Where the product is exposed to radiant heat if the product is installed near a heat source.
- 7) An environment where ozone generated.
- 8) Where the product is exposed to excessive shock or vibration.



WARNING

Do not use this product in an atmosphere containing organic or other chemicals or where or where chemicals may adhere to the product. Failure to follow this instruction may result in breakage.

2. 2 Piping

- 1) So mount that arrow mark on plate cover of the product matches with the intended air flow

- 2) Avoid to mount the product with connecting ports smaller than the dia. Of pipes of the air system.

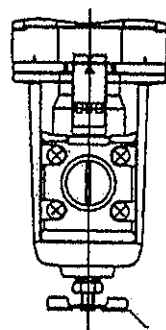
3) Drain piping

In case of drain discharge option "NO CODE"

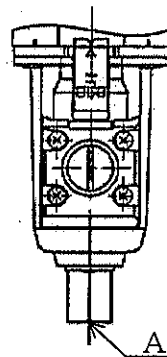
drain cock is attached (A drain pipe cannot be connected.)

In case of drain discharge option "F", "F1"

A drain pipe can be connected with the attached Rc1/4 female screw. If the connected, turn the joint into the screw while holding the hexagonal cock with a spanner. Also, within the tube length of 5 m, avoid standing-up plumbing.



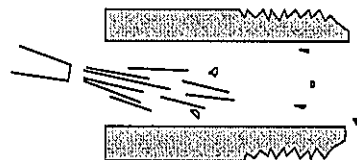
Drain cock



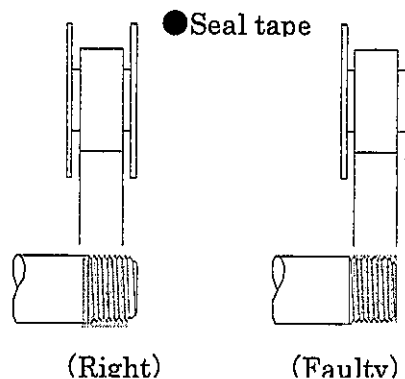
| Type of thread air system | A |
|------------------------------|---------|
| Rc | Rc 1/8 |
| NPT | NPT 1/8 |
| G | G 1/8 |

- 4) Mount a bowl perpendicularly underneath of pipe.

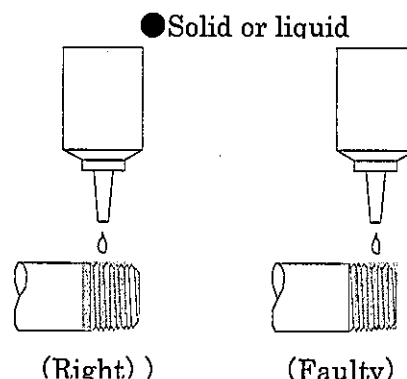
- 5) Flush air into the pipe to blow out foreign substances and chips before piping. Be sure to prevent foreign matter (such as sealant and chips) from entering filter. Failure to follow this instruction may result in the product lifetime decline.



- 6) Apply seal tape or sealant two pitches thread off from pipe tip and carefully keep its residual from falling into pipes or equipment.



● Seal tape



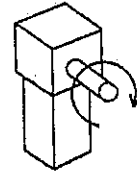
● Solid or liquid

**WARNING**

Be sure to prevent foreign matter (such as sealant and chips) from entering filter. Failure to follow this instruction may result in breakage of the bowl or malfunction of terminal equipment.

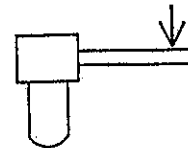
- 7) Avoid applying too much torque to the body or the piping. Apply torque to tighten a pipe as indicated below.

| | FM3000 FM4000 | FM6000 FM8000 |
|-------------------|------------------|------------------|
| Max. torque (N·m) | 30 | 70 |



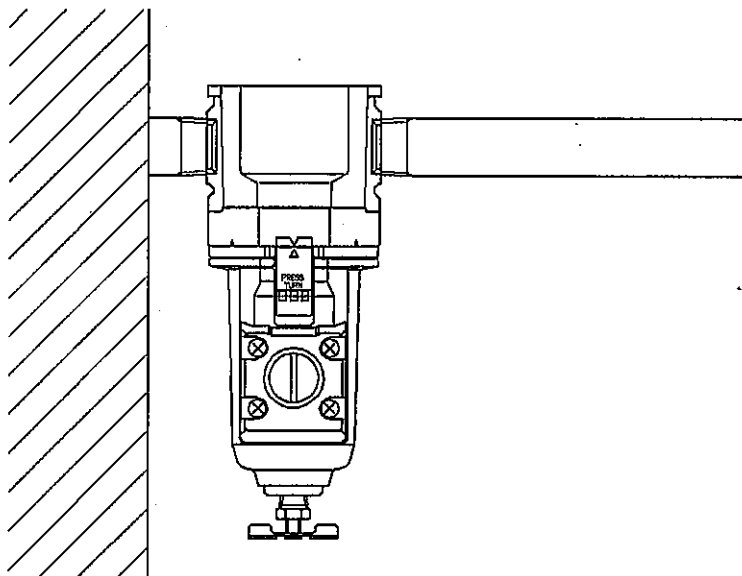
- 8) Avoid applying a piping load or torque to the body or the piping. The following table specifies the piping load torque.

| | FM3000 FM4000 | FM6000 FM8000 |
|-------------------|------------------|------------------|
| Max. torque (N·m) | 50 | 100 |



Do not overhang the product with a pipe as shown below.

If installed in this manner, the product may abnormal stress, resulting in breakage



**WARNING**

In piping, avoid applying too much torque, load, or overhanging. Failure to follow this instruction may result in breakage of the product.

2.3 Installation

- 1) In case of making use of the C type bracket "B" (optional), mount the regulator onto the C type bracket first, prior to screwing a piece of pipe into body of regulator. After aligning side grooves of body of regulator to the ridges on both sides of the C type bracket, push side the bracket forcibly along the groove as per illustrated in Fig.3.
- 2) Mount the product so that its drain port settles downward.
- 3) Mount it in the upper steam of the pneumatic equipment be serviced as close as possible.
- 4) Allow a clearance or above 60 mm under the bowl so that parts can be removed during disassembly. (See Fig.4.)

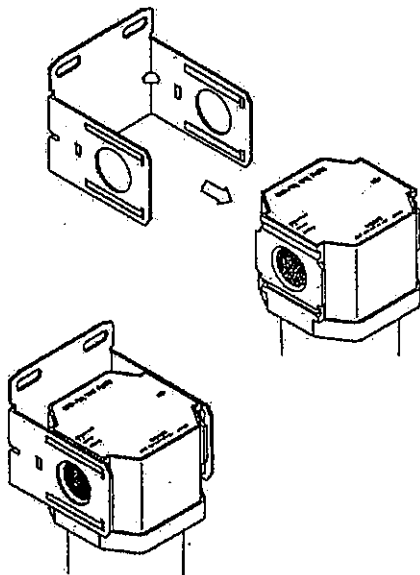


Fig.3.

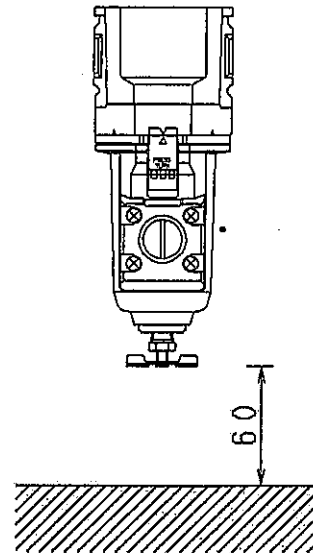


Fig.4.

Note : A piping adapter set and a C type bracket can not be used together.

**WARNING**

Be sure to firmly secure the product with specified brackets, fixing feet, and pipe supports, otherwise the product may shake under pressure, causing an accident.

3. Proper Operation

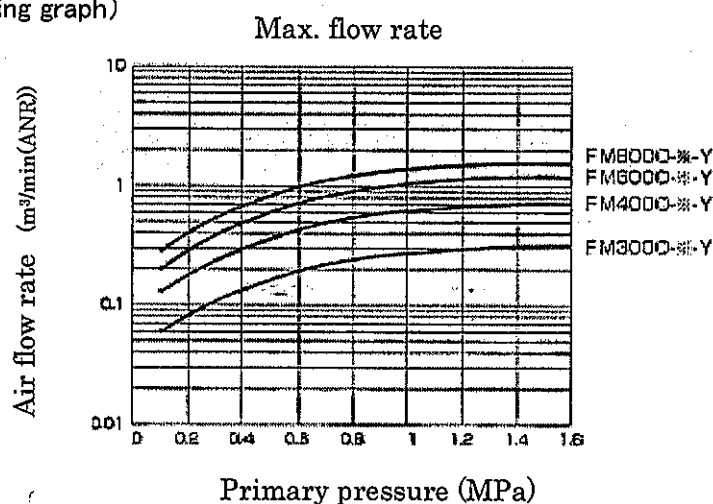
3. 1 Instructions



WARNING

- 1) If the compressed air contains chemicals or corrosive gas, malfunction or breakage of the product may result.
- 2) Operate the product within the specified pressure and temperature ranges in the correct flow direction. Failure to follow this instruction may result in breakage of the bowl or malfunction of terminal equipment.

- 1) In case of optional element "Y", Maintain the throughput flow at or below the max. (following graph)



- 2) Do not allow more than the rated flow even temporarily where there is strong pulsation. Failure to pay attention to this instruction may result in drainage reaching the secondary side
- 3) The minimum working pressure for the product with an optional auto drain is 0.15 MPa (In NO type) or 0.1 MPa (In NC type).



CAUTION

Be sure to properly treat drainage in the bowl to avoid environmental pollution.

3. 2 Drain Discharge

To remove the drainage collected in the bowl of the product, turn the drain cock in a counterclockwise direction. Be sure to turn it back clockwise after draining. (Fig.2.)

Note 1: In case of optional auto drain, Only the

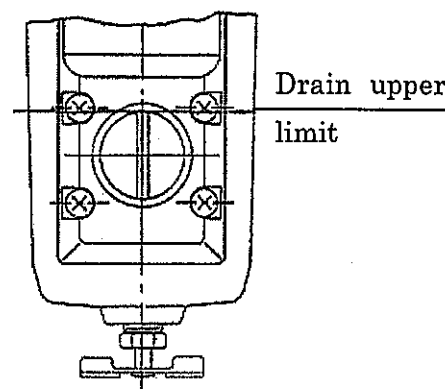


Fig.2

automatic discharge.

It isn't possible to discharge manually.

Note 2 : Drain the drainage so that drainage dose not accumulate past the upper limit of the product.



WARNING

- 1) Make it accustomed to drain sludge regularly prior to its top level reaching to max. drain marking. Failure to follow this instruction may result in breakage of the bowl or malfunction of terminal equipment.
- 2) Do not face the outlet when drain is purged. Drainage may splash on your face and cause injury.

4 Maintenance

4. 1 Periodic Inspection

- 1) Make it accustomed to drain sludge regularly prior to its top level reaching to max. drain marking. To remove the drainage, see pages 9-10.
- 2) To maintain normal operation of auto drain, clean the drain (by blowing air or washing with tap water) regularly or replace it

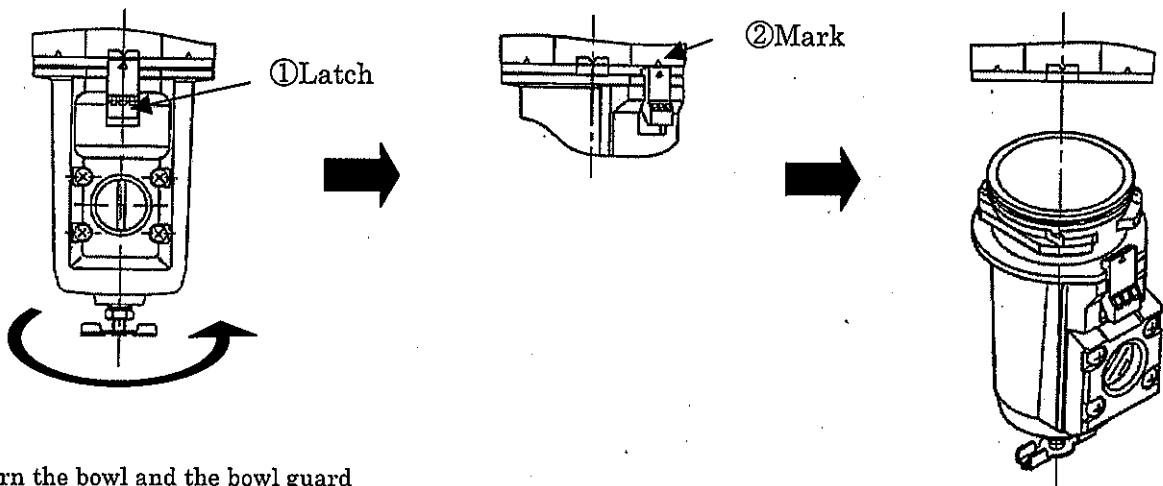
4. 2 Dismounting Bowl



WARNING

Before removing the bowl, cut off pressurized air and depressurize the bowl.

Make sure that the bowl is completely depressurized. If it is not completely depressurized, the bowl may jump and cause an injury.

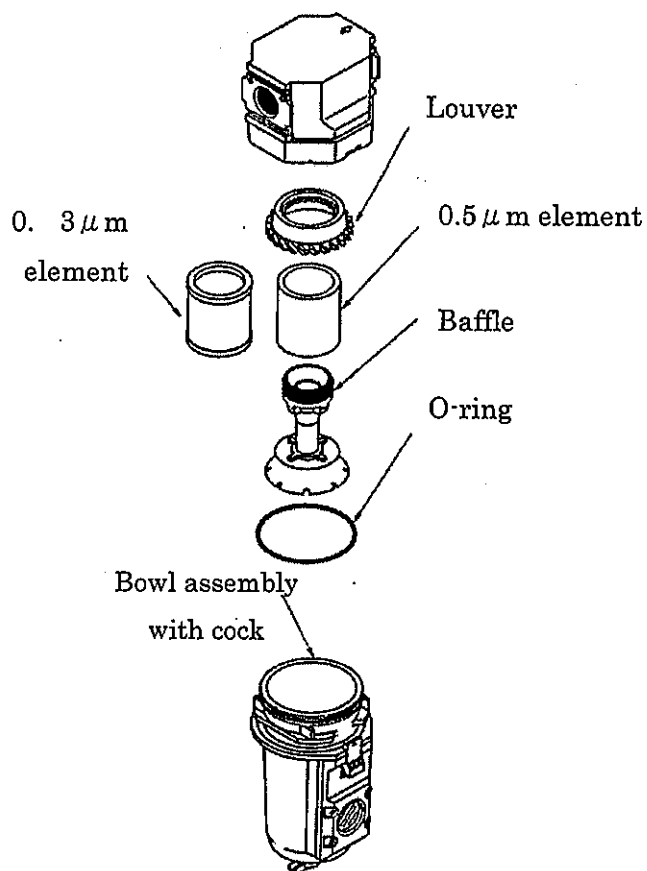


Turn the bowl and the bowl guard leftwards as indicated by the arrow while turning the latch ①.

Align the mark ② on the body or spacer with the mark on the latch and pull out the bowl together.

To mount the bowl and the bowl guard, follow the removal steps in reverse. Before introducing compressed air, check that the latch is securely fitted in the recess in the body or spacer.

4. 3 Repair Parts



Note 1 : A set of louver , baffle , element , and O-ring is provided. But, In case of FM8000 , A set of baffle , element , and O-ring is provided.

Note 2 :The bowl construction has the O ring.

Note 3 :The O ring is five sets.

| | FM3000 | FM4000 | FM6000 | FM8000 |
|--------------------------------|------------------|------------------|------------------|------------------|
| Repair kits 5 μ m element | F3000-KIT | F4000-KIT | F6000-KIT | F8000- KIT |
| Repair kits 0.3 μ m element | F3000-KIT -Y | F4000-KIT -Y | F6000-KIT -Y | F8000- KIT -Y |
| Element 5 μ m element | F3000-ELEMENT | F4000-ELEMENT | F6000-ELEMENT | F8000- ELEMENT |
| Element 0.3 μ m element | F3000- ELEMENT-Y | F4000- ELEMENT-Y | F6000- ELEMENT-Y | F8000-ELEMENT -Y |
| Bowl assembly with cock | F3000-BOWL-M | F4000-BOWL-M | F4000-BOWL-M | F4000-BOWL-M |
| O-ring | F3000-ORING | F4000-ORING | F4000-ORING | F4000-ORING |

5. Trouble Shooting

| Phenomena | Major Causes | Remedies |
|---|--|--|
| Sludge comes out from directly after the product. | Sludge accumulation has exceeded the max. drain level | Drain sludge. (See page 10) |
| | Flow rate exceeds the maximum flow rate. | Replace with a model suitable for the flow rate. |
| Sludge does not come out when open the drain cock. | Drain port has been clogged with foreign particle. | 圧縮空気を止めてボウル組立を外しボウル内部を清掃する。 清掃しても不具合が改善できなければボウル組立を交換する。 |
| Auto drain does not drain automatically. Air leaks from drain port. | Mechanical trouble of Auto drain or clogged with foreign particle. | |
| Air leaks at the hook up of the bowl. | The O-ring is damaged or has foreign matter on its surface. | Remove the bowl, upon shutting air off, and replace the O ring with new one or wash and rinse the packing. |
| | Bowl is defective. | Remove the bowl, upon shutting air off, and replace it with new one. |



WARNING

- 1) When a flaw, such as a crack or a scratch, is found on the bowl, replace it with a new one. Failure to follow this instruction may result in breakage of the bowl and an accident.
- 2) When cleaning a bowl, use a neutral detergent for home use and rinse it well with water. Any other cleaning method may result in breakage of the bowl and an accident.

6. Product Specifications And How To Order

6. 1 Product Specifications

Specifications

| Model | | FM3000 | FM4000 | FM6000 | FM8000 |
|--------------------------|-----------------|---------------------------------------|---------------|--------|-----------|
| Working fluid | | Compressed air | | | |
| Max.working pressure | MPa | 1.6 | | | |
| Withstanding pressure | MPa | 2.4 | | | |
| Withstanding temperature | °C | - 5 TO 60(But, are not in the freeze) | | | |
| Filtration rating | μm | 5 or 0.3 | | | |
| Drain capacity | cm ³ | 45 | 80 | 80 | 80(Note1) |
| Port size | | 1/4, 3/8 | 1/4, 3/8, 1/2 | 3/4, 1 | 3/4, 1 |
| Standard accessories | kg | 0.35 | 0.55 | 1.0 | 1.26 |

Note 1: Only manual drain cock type can pool drain up to 170cm³ max.

6. 2 How To Order

FM3000-8-F-0-0-B

A: Model

| A: Model | | | |
|----------|---|---|---|
| F | F | F | F |
| M | M | M | M |
| 3 | 4 | 6 | 8 |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 |

| Symbol | Descriptions | | | | |
|--------------|--------------|---|---|---|---|
| B: Port size | | | | | |
| B | 1/4 | ● | ● | ● | ● |
| 10 | 3/8 | ● | ● | ● | ● |
| 15 | 1/2 | ● | ● | ● | ● |
| 20 | 3/4 | ● | ● | ● | ● |
| 25 | 1 | ● | ● | ● | ● |

| | | | | | |
|----------------------------|-----|---|---|---|---|
| C: Pipe screw kind: Note 6 | | | | | |
| NO CODE | Rc | ● | ● | ● | ● |
| N | NPT | ● | ● | ● | ● |
| G | G | ● | ● | ● | ● |

| | | | | | |
|---|---------|--|---|---|---|
| D: Option: Note 1, Note 2, Note 3, Note 4 | | | | | |
| Drainage | NO CODE | With manual drain cock | ● | ● | ● |
| | F | Automatic drain (N.O. type) Drain port Rc1/4 Max. working pressure 1.5MPa Max. service temperature 45°C | ● | ● | ● |
| | F1 | Automatic drain (N.C. type) Drain port Rc1/4 Max. working pressure 1.5MPa Max. service temperature 45°C | ● | ● | ● |
| | | | | | |
| Bowl material | NO CODE | Metal bowl | ● | ● | ● |
| Element | NO CODE | 5 μm | ● | ● | ● |
| | Y | 0.3 μm | ● | ● | ● |
| Differential pressure detection | NO CODE | No existence for pressure sensing port | ● | ● | ● |
| | Q | With pressure sensing port | ● | ● | ● |
| Flow direction | NO CODE | Normal flow (Left→Right) | ● | ● | ● |
| | X1 | Opposite flow (Right→Left) | ● | ● | ● |

| | | | | | |
|----------------------|----------------------------|---|---|---|---|
| E: Indicate pressure | | | | | |
| NO CODE | MPa, Pipe screw kind Rc | ● | ● | ● | ● |
| J1 | MPa, Pipe screw kind NPT·G | ● | ● | ● | ● |

| | | | | | |
|--|-----------------------------|---|---|---|---|
| F: Attachment (attached): Note 4, Note 5 | | | | | |
| NO CODE | It is not in the attachment | ● | ● | ● | ● |
| A8 | Rc1/4 pipe adapter set | ● | ● | ● | ● |
| A10 | Rc3/8 pipe adapter set | ● | ● | ● | ● |
| A15 | Rc1/2 pipe adapter set | ● | ● | ● | ● |
| A20 | Rc3/4 pipe adapter set | ● | ● | ● | ● |
| A25 | Rc1 pipe adapter set | ● | ● | ● | ● |
| A32 | Rc1 1/4 pipe adapter set | ● | ● | ● | ● |

| | | | | | |
|-------------------------------|-----|---|---|---|---|
| ※: adapter screw kind: Note 7 | | | | | |
| NO CODE | Rc | ● | ● | ● | ● |
| N | NPT | ● | ● | ● | ● |
| G | G | ● | ● | ● | ● |

| | | | | | |
|-------------------------------|-----------------------------|---|---|---|---|
| Q: Bracket (attached): Note 5 | | | | | |
| NO CODE | It is not in the attachment | ● | ● | ● | ● |
| B | C type bracket | ● | ● | ● | ● |

Note1: Select options per drain discharge, bowl material and, flow direction section.
When selecting multiple options, write them from the top.

Note2: Min. Operating pressure of automatic drain is 0.1MPa for option symbol "F".
Purge air with initially generated drain until pressure rising to 0.1MPa.

Note3: Min. Operating pressure of automatic drain is 0.15MPa for option symbol "F1".

Note4: A piping adapter set (A400-*) is attached.

Note5: A piping adapter set and a C type bracket can not be used together.

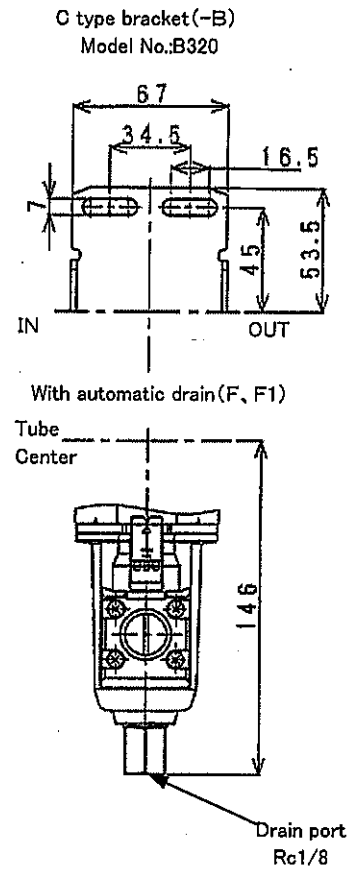
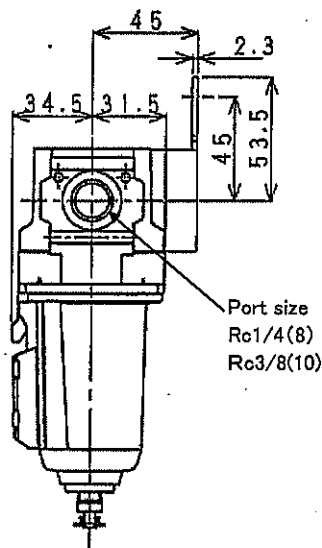
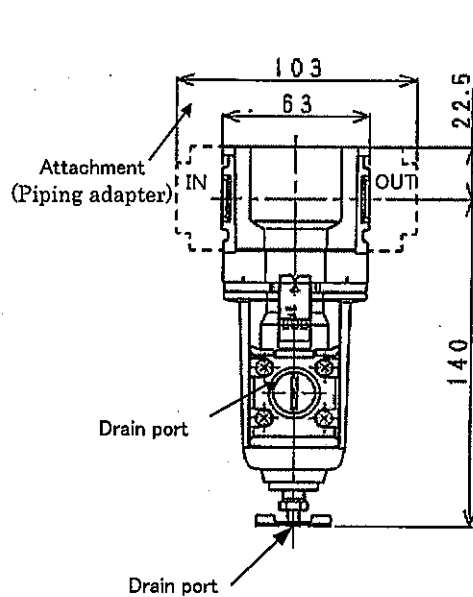
Note6: The piping adapter port can select the thread. Blank: Rc N: NPT G: G

EX: A8G...G thread

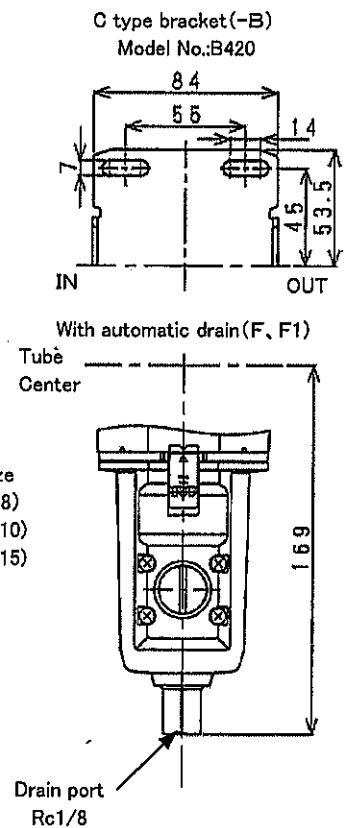
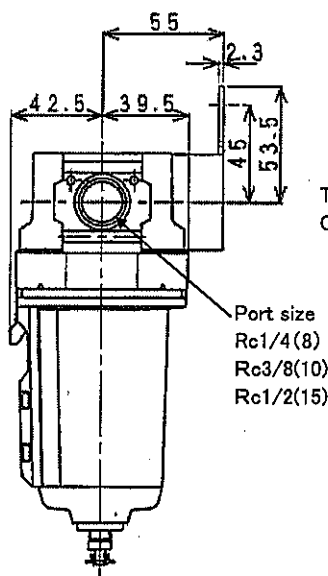
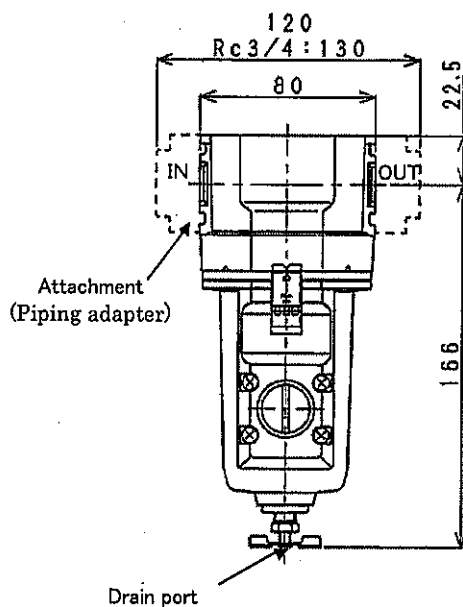
Note7: FM8000 is large automatic drain when select the option "F" "F1".

6. 3 Outside Dimensions

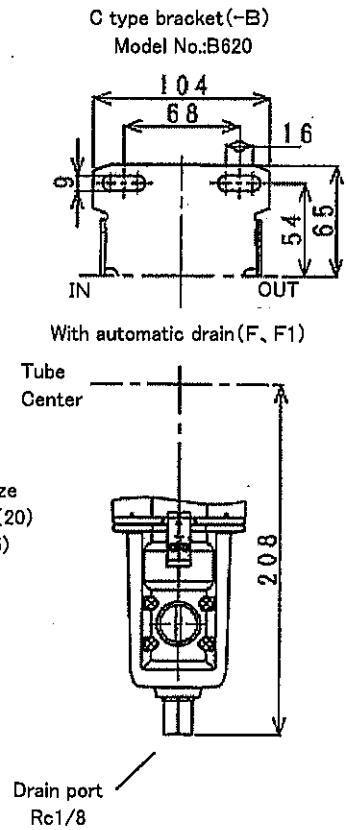
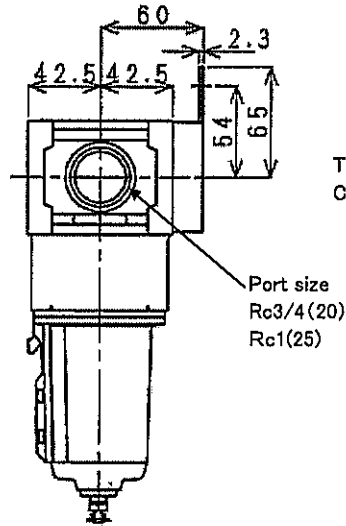
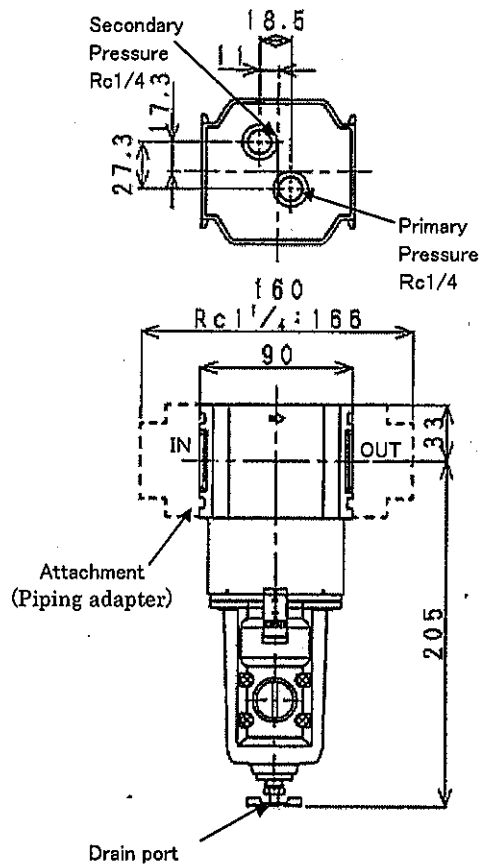
● FM3000



● FM4000



● FM6000



● FM8000

