CKD

F.R.L. Unit

Modular Type SELEX F.R.L. Outdoor Series

INSTRUCTION MANUAL

SM-602192-A/3

Filter Regulator:	WW□000 Series
Air Filter:	FW□000 Series
Regulator:	RW□000 Series
Lubricator:	LW□000 Series

- Read this Instruction Manual before using the product.
- Read the safety notes carefully.
- Keep this Instruction Manual in a safe and convenient place for future reference.

CKD Corporation

PREFACE

Thank you for purchasing CKD's **"Modular Type SELEX F.R.L. outdoor Series" F.R.L. unit**.
This Instruction Manual contains basic matters such as installation and usage instructions in order to ensure optimal performance of the product. Please read this Instruction Manual thoroughly and use the product properly.
Keep this Instruction Manual in a safe place and be careful not to lose it.

Product specifications and appearances presented in this Instruction Manual are subject to change without notice.

- The product is intended for users who have basic knowledge about materials, piping, electricity, and mechanisms of pneumatic components. CKD shall not be responsible for accidents caused by persons who selected or used the product without knowledge or sufficient training.
- Since there are a wide variety of customer applications, it is impossible for CKD to be aware of all of them. Depending on the application or usage, the product may not be able to exercise its full performance or an accident may occur due to fluid, piping, or other conditions. It is the responsibility of the customer to check the product specifications and decide how the product shall be used in accordance with the application and usage.

SAFETY INFORMATION

When designing and manufacturing any device incorporating the product, the manufacturer has an obligation to ensure that the device is safe. To that end, make sure that the safety of the machine mechanism of the device, the pneumatic or water control circuit, and the electric system that controls such mechanism is ensured.

To ensure the safety of device design and control, observe organization standards, relevant laws and regulations, which include the following:

ISO 4414, JIS B 8370, JFPS 2008 (the latest edition of each standard), the High Pressure Gas Safety Act, the Industrial Safety and Health Act, other safety rules, organization standards, relevant laws and regulations

In order to use our products safely, it is important to select, use, handle, and maintain the products properly.
Observe the warnings and precautions described in this Instruction Manual to ensure device safety.

Although various safety measures have been adopted in the product, customer's improper handling may lead to an accident. To avoid this:

Thoroughly read and understand this Instruction Manual before using the product.

To explicitly indicate the severity and likelihood of a potential harm or damage, precautions are classified into three categories: "DANGER", "WARNING", and "CAUTION".

⚠ DANGER	Indicates an imminent hazard. Improper handling will cause death or serious injury to people.
⚠ WARNING	Indicates a potential hazard. Improper handling may cause death or serious injury to people.
⚠ CAUTION	Indicates a potential hazard. Improper handling may cause injury to people or damage to property.

Precautions classified as "CAUTION" may still lead to serious results depending on the situation.
All precautions are equally important and must be observed.

Other general precautions and tips on using the product are indicated by the following icon.

Indicates general precautions and tips on using the product.

Precautions on Product Use

⚠ WARNING

The product must be handled by a qualified person who has extensive knowledge and experience.

The product is designed and manufactured as a device or part for general industrial machinery.

Use the product within the specifications.

The product must not be used beyond its specifications. Also, the product must not be modified and additional work on the product must not be performed.

The product is intended for use in devices or parts for general industrial machinery. It is not intended for use outdoors (Except for outdoor specification products) or in the conditions or environment listed below.

- In applications for nuclear power, railroad system, aviation, ship, vehicle, medical equipment, and equipment that directly touches beverage or food.
- For special applications that require safety including amusement equipment, emergency shut-off circuit, press machine, brake circuit, and safety measures.
- For applications where life or properties may be adversely affected and special safety measures are required.

(Exception is made if the customer consults with CKD prior to use and understands the specifications of the product. However, even in that case, safety measures must be taken to avoid danger in case of a possible failure.)

Do not handle the product or remove pipes and devices until confirming safety.

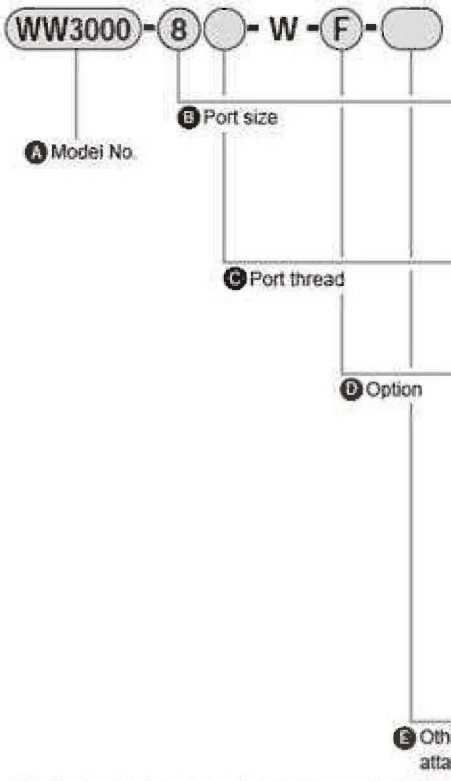
- Inspect and service the machine and devices after confirming the safety of the entire system. Also, turn off the energy source (air supply or water supply) and power to the relevant facility. Release compressed air and fluid from the system and use extreme care to avoid water or electric leakage.
- Since there may be hot or live parts even after operation has stopped, use extreme care when handling the product or removing pipes and devices.
- When starting or restarting a machine or device that incorporates pneumatic components, make sure that a safety measure (such as a pop-out prevention mechanism) is in place and system safety is secured.

CONTENTS

1. PRODUCT OVERVIEW

1.1 Model Number Indication

1.1.1 WW□000 Series

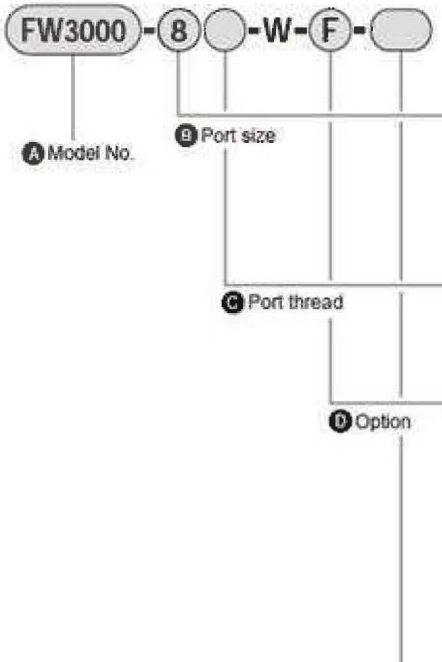


Code		Description	A Model No. WW3000	WW4000	WW8000
B Port size					
8		1/4	●	●	
10		3/8	●	●	
15		1/2	●	●	
20		3/4			●
25		1			●
C Port thread					*1, *2
Blank		Rc thread (pressure unit: MPa temperature display unit: °C)	●	●	●
N		NPT thread (pressure unit: psi temperature display unit: °F)	●	●	●
G		G thread (pressure unit: bar temperature display unit: °C)	●	●	●
D Option					*3 *4
Drain discharge *4	Blank	With manual cock	●	●	●
	F	Auto-drain with manual override (NO: Exhaust when not pressurized)	●	●	●
	F1	Auto-drain with manual override (NC: No exhaust when not pressurized)	●	●	●
Element	Blank	5 µm	●	●	●
	Y	0.3 µm (submicron) *5	●	●	●
Knob	Blank	Without knob	●	●	●
	K	With knob	●	●	●
guarantee period	Blank	1 year after delivery	●	●	●
	G	3 years after delivery *6 *7 (with inspection certificate, inspection guidelines, traceability system diagram)	●	●	●
Flow Direction	Blank	Standard flow (left → right)	●	●	●
	X1	Reverse flow (right → left)	●	●	●
E Other attachments					
Blank		Not included	●	●	●
BW		C-bracket	●	●	●
GW49P		Pressure gauge (GW49D-6-P10) *8	●	●	●

⚠ Precautions for model No. selection

*1: G and NPT threads are available for IN, OUT, gauge port and drain outlet of auto-drain.
*2: In compliance with the Measurement Act, the psi display cannot be used in Japan.
*3: Select options for the drainage, element, knob, warranty period and flow direction items. When selecting options for several items, list options in order from the top.
*4: Refer to "Pneumatic, Vacuum, and Auxiliary Components (Catalog No.CB-024SA)" for the auto-drain use conditions.
*5: Refer to page 7 for max. processing flow rate when option "Y" is selected.
*6: The warranty period of option G is 3 years from the date of delivery or 1 year from initial use.
*7: For option G, the specifications and drawings must be agreed upon.
*8: The pressure gauge cannot be attached when using NPT threads or G threads. (Consult with CKD if required.)

1.1.2 FW□000 Series

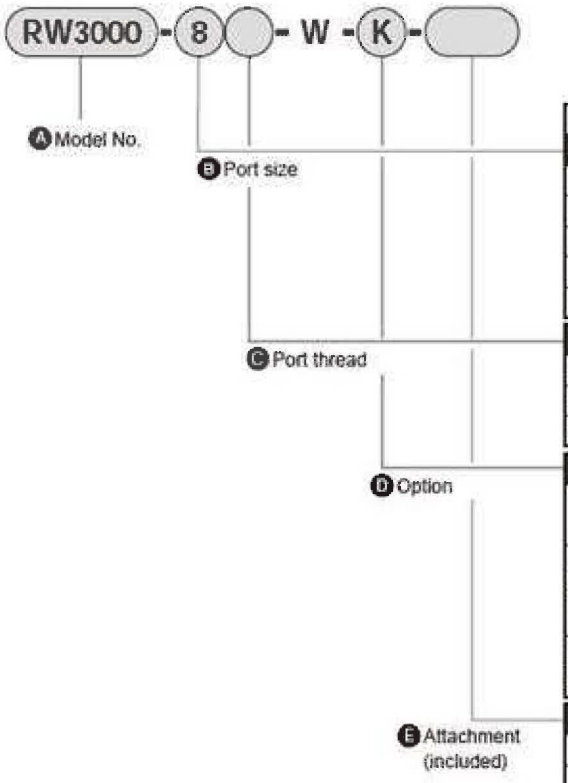


Code		Description	A Model No. FW3000	FW4000	FW8000
B Port size					
8		1/4	●	●	
10		3/8	●	●	
15		1/2		●	
20		3/4			●
25		1			●
C Port thread					*1, *2
Blank		Rc thread (pressure unit: MPa temperature display unit: °C)	●	●	●
N		NPT thread (pressure unit: psi temperature display unit: °F)	●	●	●
G		G thread (pressure unit: bar temperature display unit: °C)	●	●	●
D Option					*3
Drain discharge *4	Blank	With manual cock	●	●	●
	F	Auto-drain with manual override (NO: Exhaust when not pressurized)	●	●	●
	F1	Auto-drain with manual override (NC: No exhaust when not pressurized)	●	●	●
Element	Blank	5 µm	●	●	●
	Y	0.3 µm (submicron) *5	●	●	●
Warranty period	Blank	1 year after delivery	●	●	●
	G	3 years after delivery *6 *7 (with inspection certificate, inspection guidelines, traceability system diagram)	●	●	●
Flow Direction	Blank	Standard flow (left → right)	●	●	●
	X1	Reverse flow (right → left)	●	●	●
E Other attachments					
Blank		Not included	●	●	●
BW		C-bracket	●	●	●

⚠ Precautions for model No. selection

*1: G and NPT threads are available for IN, OUT and drain outlet of auto-drain.
*2: In compliance with the Measurement Act, the psi display cannot be used in Japan.
*3: Select options for the drainage, element, warranty period and flow direction items. When selecting options for several items, list options in order from the top.
*4: Refer to "Pneumatic, Vacuum, and Auxiliary Components (Catalog No.CB-024SA)" for the auto-drain use conditions.
*5: Refer to page 1 for max. processing flow rate when option "Y" is selected.
*6: The warranty period of option G is 3 years from the date of delivery or 1 year from initial use.
*7: For option G, the specifications and drawings must be agreed upon.

1.1.3 RW□000 Series

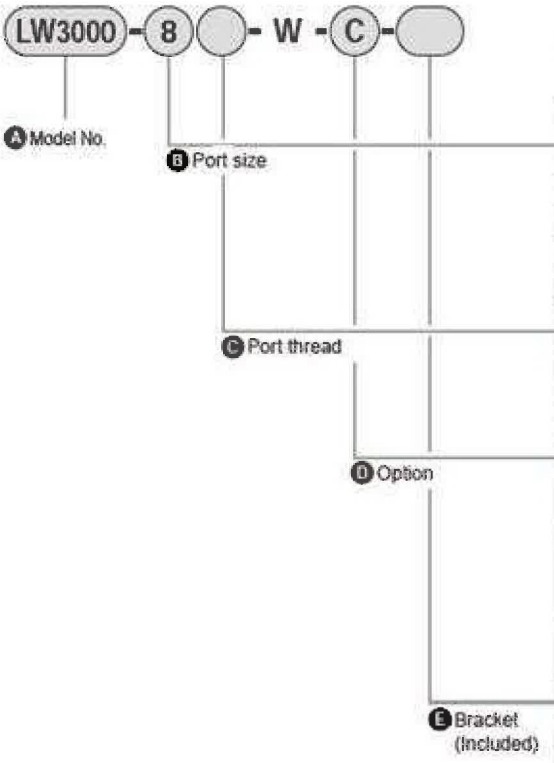


Code		Description	Ⓐ Model No. RW3000	RW4000	RW8000
Ⓑ Port size					
8		1/4	●	●	
10		3/8	●	●	
15		1/2		●	
20		3/4			●
25		1			●
Ⓒ Port thread					*1, *2
Blank		Rc thread (pressure unit: MPa temperature display unit: °C)	●	●	●
N		NPT thread (pressure unit: psi temperature display unit: °F)	●	●	●
G		G thread (pressure unit: bar temperature display unit: °C)	●	●	●
Ⓓ Option					*3 *4
Knob	Blank	Without knob	●	●	●
	K	With knob	●	●	●
guarantee period	Blank	1 year after delivery	●	●	●
	G	3 years after delivery *4 *5 (with inspection certificate, inspection guidelines, traceability system diagram)	●	●	●
Flow Direction	Blank	Standard flow (left → right)	●	●	●
	X1	Reverse flow (right → left)	●	●	●
Ⓔ Other attachments					
Blank		Not included	●	●	●
BW		C-bracket	●	●	●
GW49P		Pressure gauge (GW49D-6-P10) *6	●	●	●

⚠ Precautions for model No. selection

*1: G and NPT threads are available for IN, OUT and gauge ports.
*2: In compliance with the Measurement Act, the psi display cannot be used in Japan.
*3: Select options for the knob, warranty period and flow direction. When selecting options for several items, list options in order from the top.
*4: The warranty period of option G is 3 years from the date of delivery or 1 year from initial use.
*5: For option G, the specifications and drawings must be agreed upon.
*6: The pressure gauge cannot be attached when using NPT threads or G threads. (Consult with CKD if required.)

1.1.4 LW□000 Series



* Refer to "Pneumatic, Vacuum and Auxiliary Components (Catalog No.CB-024SA)" for options.

Code		Description	A Model No. LW3000	LW4000	LW8000
B Port size					
8		1/4	●	●	
10		3/8	●	●	
15		1/2		●	
20		3/4			●
25		1			●
C Port thread					*1, *3
Blank		Rc thread	●	●	●
N		NPT thread	●	●	●
G		G thread	●	●	●
D Option					*2
Drain Discharge	Blank	Without manual cock	●	●	●
	C	With manual cock	●	●	●
guarantee period	Blank	1 year after delivery	●	●	●
	G	3 years after delivery *4 *5 (with inspection certificate, inspection guidelines, traceability system diagram)	●	●	●
Flow Direction	Blank	Standard flow (left → right)	●	●	●
	X1	Reverse flow (right → left)	●	●	●
E Bracket (included)					
Blank		Not included	●	●	●
BW		C-bracket	●	●	●

⚠ Precautions for model No. selection

*1: G and NPT threads are available for IN and OUT.
*2: When selecting options for several items, list options in order from the top.
*3: In compliance with the Measurement Act, the psi display cannot be used in Japan.
*4: The warranty period of option G is 3 years from the date of delivery or 1 year from initial use.
*5: For option G, the specifications and drawings must be agreed upon.

1.2 Specifications

1.2.1 Product specifications

■ WW□000 Series

Item		WW3000-W	WW4000-W	WW8000-W
Working fluid		Compressed air		
Max. working pressure	MPa	1.0 *1, 2		
Proof pressure	MPa	1.5		
Fluid temperature	°C	−20 to 60(no freezing)		
Ambient temperature	°C	−20 to 60		
Filtration rating	μm	5 or 0.3		
Set pressure	MPa	0.05 to 0.85		
Pressure relief		With relief mechanism		
Drain capacity	cm^3	45	80	80 (*3)
Port size	Rc, NPT, G	1/4, 3/8, 1/2	1/4, 3/8, 1/2	3/4, 1
Weight	kg	0.8	1.1	2.3

*1 : In the case of "F" with auto-drain, the min. working pressure of auto-drain is 0.1 MPa. Air is purged with initial drainage until pressure reaches 0.1 MPa.
*2 : In the case of "F1" with auto-drain, the min. working pressure of auto-drain is 0.15MPa.
*3 : Up to 170cm^3 is stored with the manual cock only.

■ FW□000 Series

Item		FW3000-W	FW4000-W	FW8000-W
Working fluid		Compressed air		
Max. working pressure	MPa	1.0 *1, 2		
Proof pressure	MPa	1.5		
Fluid temperature	°C	−20 to 60(no freezing)		
Ambient temperature	°C	−20 to 60		
Filtration rating	μm	5 or 0.3		
Drain capacity	cm^3	45	80	80 (*4)
Port size	Rc, NPT, G	1/4, 3/8	1/4, 3/8, 1/2	3/4, 1
Weight	kg	0.35	0.55	1.26

*1 : In the case of "F" with auto-drain, the min. working pressure of auto-drain is 0.1MPa. Air is purged with initial drain until pressure reaches 0.1 MPa.
*2 : In the case of "F1" with auto-drain, the min. working pressure of auto-drain is 0.15 MPa.
*3 : When "F", “F1" with auto-drain is selected, be careful of drain freezing.
*4 : Up to 170cm^3 is stored with the manual cock only.

■ RW□000 Series

Item	RW3000-W	RW4000-W	RW8000-W
Working fluid	Compressed air		
Max. working pressure MPa	1.0		
Proof pressure MPa	1.5		
Fluid temperature °C	−20 to 60(no freezing)		
Ambient temperature °C	−20 to 60		
Set pressure MPa	0.05 to 0.85		
Pressure relief	With relief mechanism		
Port size Rc, NPT, G	1/4, 3/8	1/4, 3/8, 1/2	3/4, 1
Weight kg	0.5	0.75	1.65

■ LW□000 Series

Item	LW3000-W	LW4000-W	LW8000-W
Working fluid	Compressed air		
Max. working pressure MPa	1.0		
Proof pressure MPa	1.5		
Fluid temperature °C	5 to 60(no freezing)		
Ambient temperature °C	−10Up to 60		
Min. drip flow rate *1 m^3/min(ANR)	0.03	0.065	
Oil storage capacity cm^3	85	170	170(MAX360) *2
Oil used	Turbine oil Class 1 ISO VG32 (spindle oil cannot be used)		
Port size Rc, NPT, G	1/4, 3/8	1/4, 3/8, 1/2 (3/4 uses an adaptor)	3/4, 1 (1 1/4 uses an adaptor)
Weight kg	0.38	0.55	1.5

*1 : The min. drip flow is that at which five drops of turbine oil drip per minute at the primary pressure of 0.5 MPa and inlet air temperature of 20°C. (It cannot be used for dry fog.)
*2 : When lubricating from the filling plug, set 300cm^3 or less below the top of the cup window.

1.2.2 Weight

■ WW□000 Series

Unit : kg

	Drain discharge		Knob	Attachment
Symbol	F	F1	K	BW
WW3000	0.02	0.02	0.1	0.17
WW4000	0.02	0.02	0.1	0.21
WW8000	0.02	0.02	0.1	0.36

・Add to the standard equipment mass.

■ FW□000 Series

Unit : kg

	Drain discharge		Attachment
Symbol	F	F1	BW
FW3000	0.02	0.02	0.17
FW4000	0.02	0.02	0.21
FW8000	0.02	0.02	0.36

・Add to the standard equipment mass.

■ RW□000 Series

Unit : kg

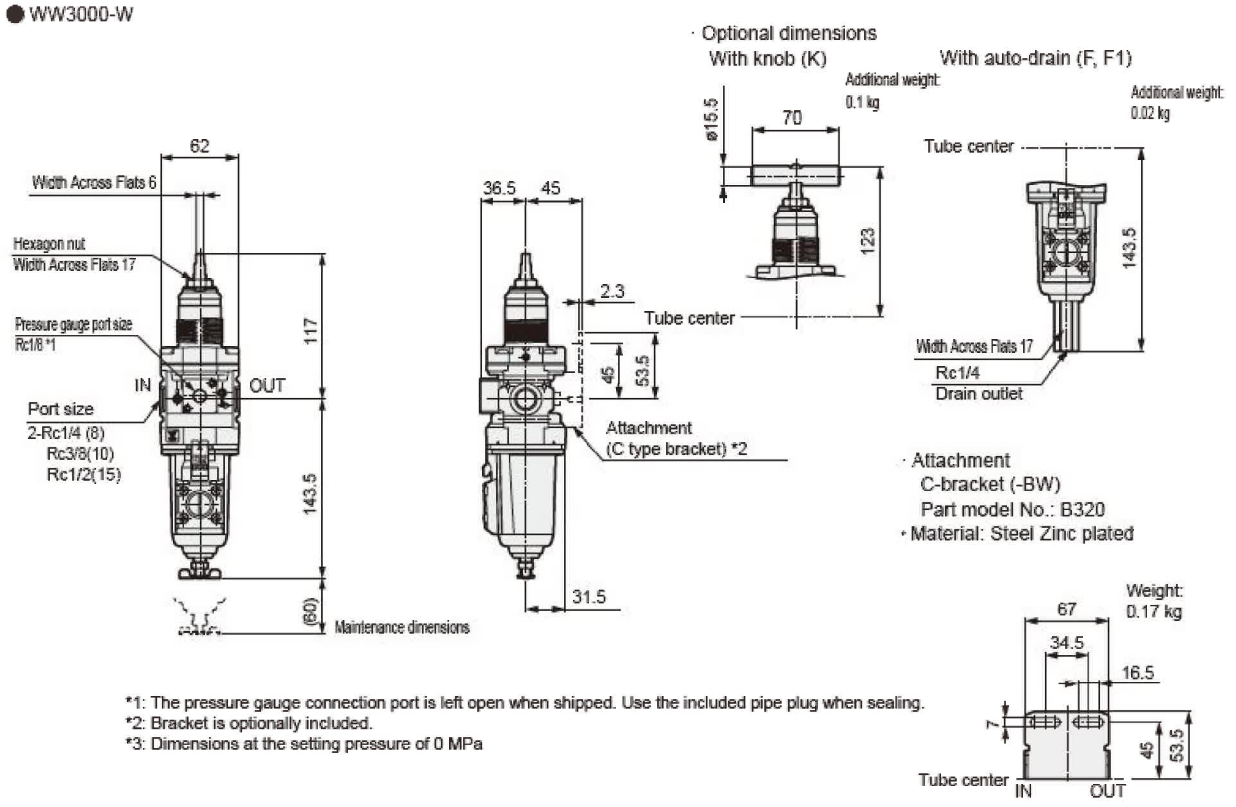
	Knob	Attachment
Symbol	K	BW
RW3000	0.1	0.17
RW4000	0.1	0.21
RW8000	0.1	0.36

・Add to the standard equipment mass.

1.3 Dimensions

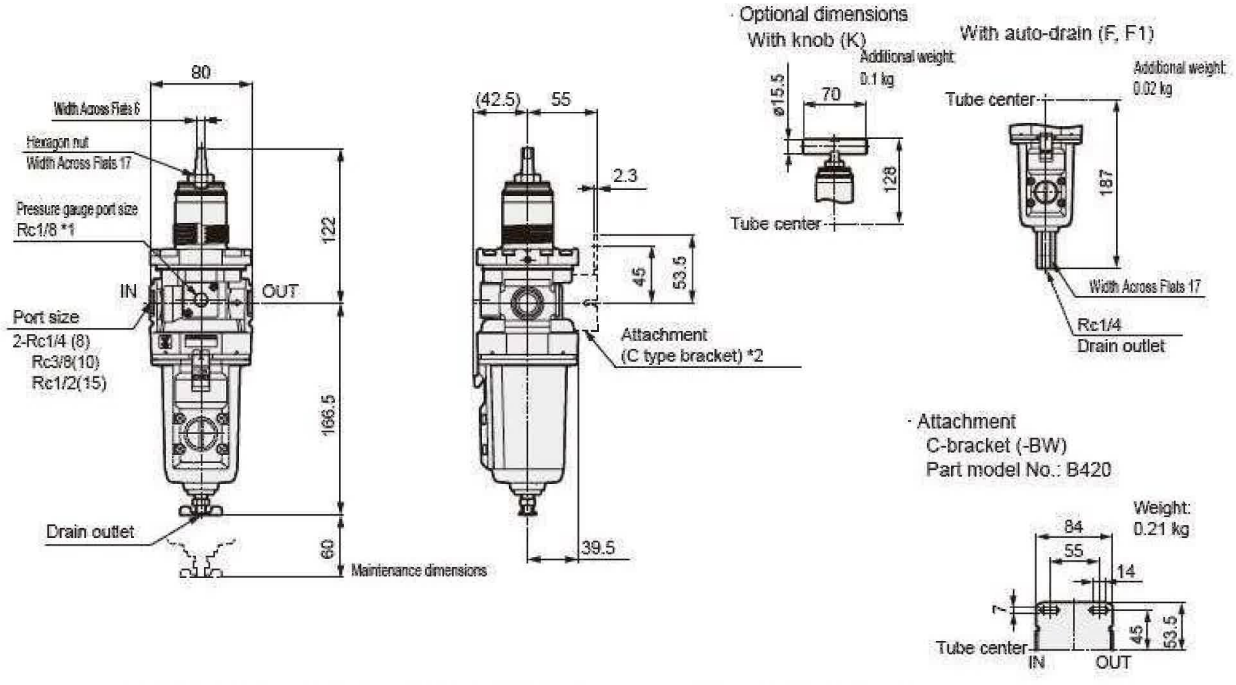
1.3.1 WW□000 Series

● WW3000-W



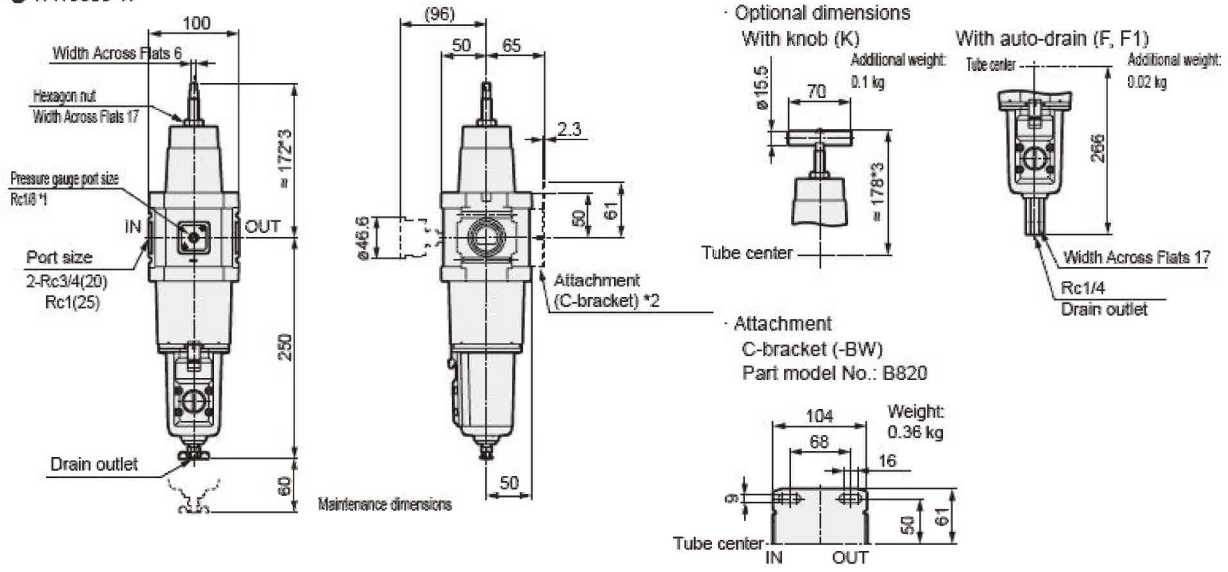
*1: The pressure gauge connection port is left open when shipped. Use the included pipe plug when sealing.
*2: Bracket is optionally included.
*3: Dimensions at the setting pressure of 0 MPa

●WW4000-W



*1: The pressure gauge connection port is left open when shipped. Use the included pipe plug when sealing.
*2: Bracket is optionally included.
*3: Dimensions at the setting pressure of 0 MPa

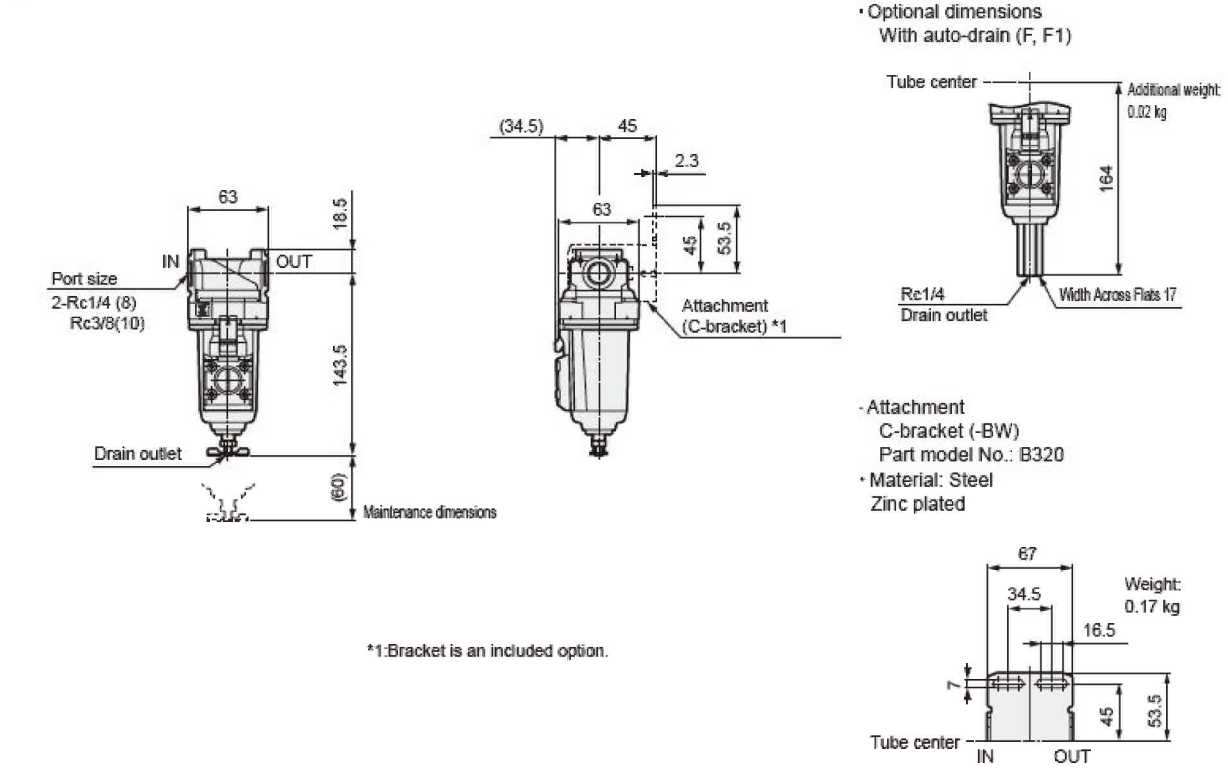
● WW8000-W



*1: The pressure gauge connection port is left open when shipped. Use the included pipe plug when sealing.
*2: Bracket is optionally included.
*3: Dimensions at the setting pressure of 0 MPa

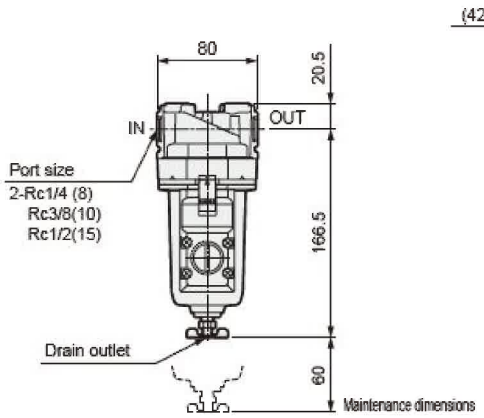
1.3.2 FW□000 Series

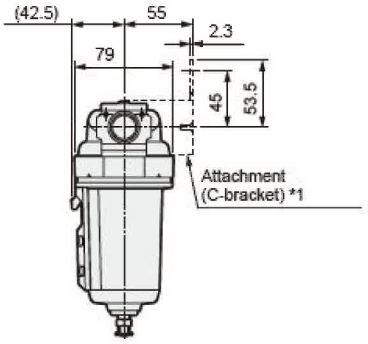
● FW3000-W



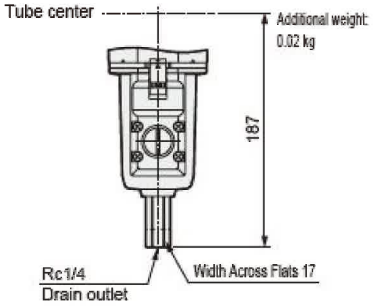
*1:Bracket is an included option.

● FW4000-W

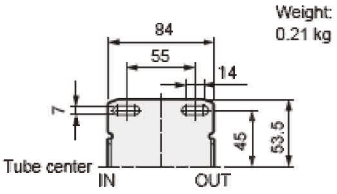




- Optional dimensions
With auto-drain (F, F1)

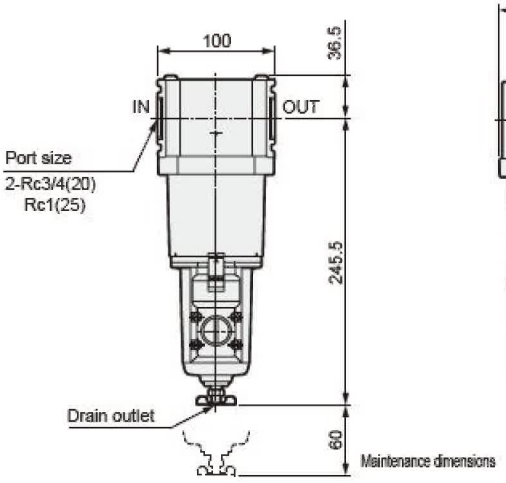


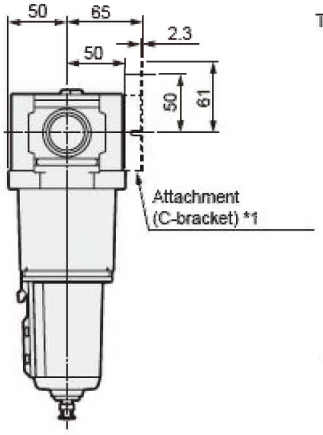
・Attachment
C-bracket (-BW)
Part model No.: B420



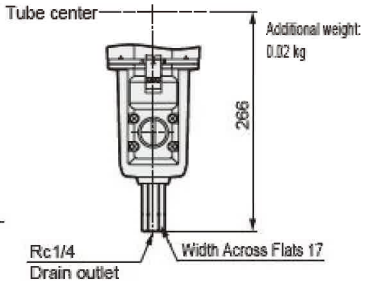
*1: Bracket is an included option.

● FW8000-W

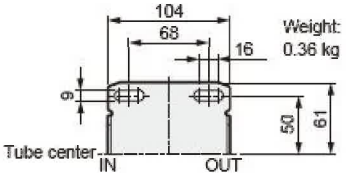




・Optional dimensions
With auto-drain (F, F1)



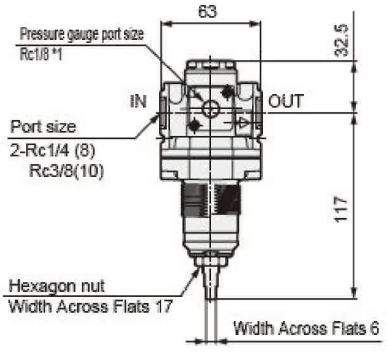
・Attachment
C-bracket (-BW)
Part model No.: B820

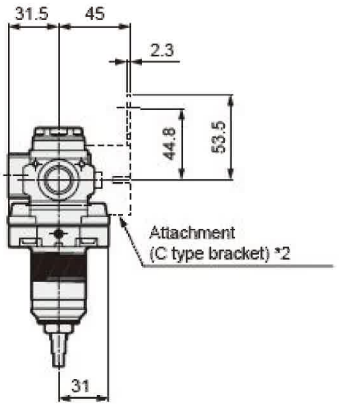


*1:Bracket is an included option.

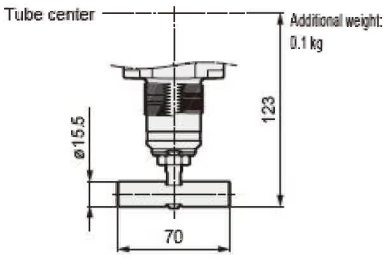
1.3.3 RW□000 Series

● RW3000-W



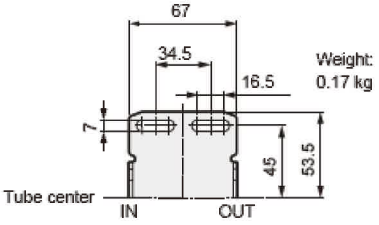


・Optional dimensions
With knob (K)

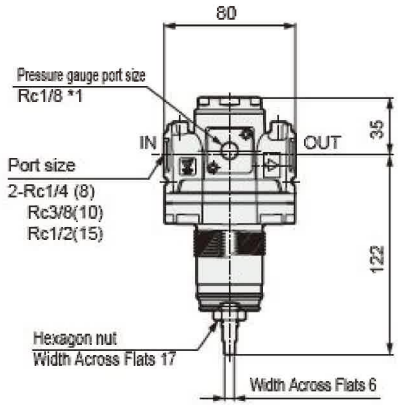


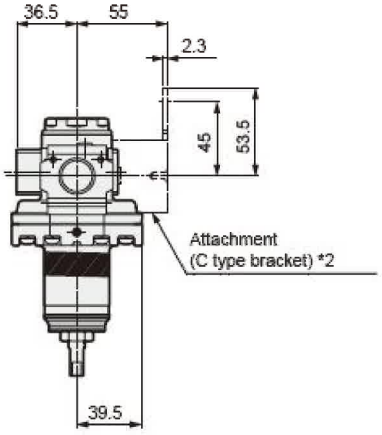
・Attachment
C-bracket (-BW)
Part model No.: B320
・Material: Steel Zinc plated

*1: The pressure gauge connection port is left open when shipped. Use the included pipe plug when sealing.
*2: Bracket is optionally included.
*3: Dimensions at the setting pressure of 0 MPa

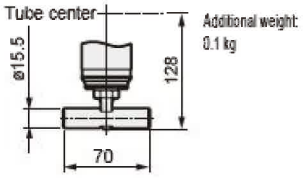


●RW4000-W

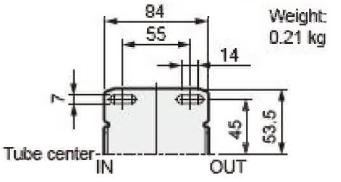




・Optional dimensions
With knob (K)

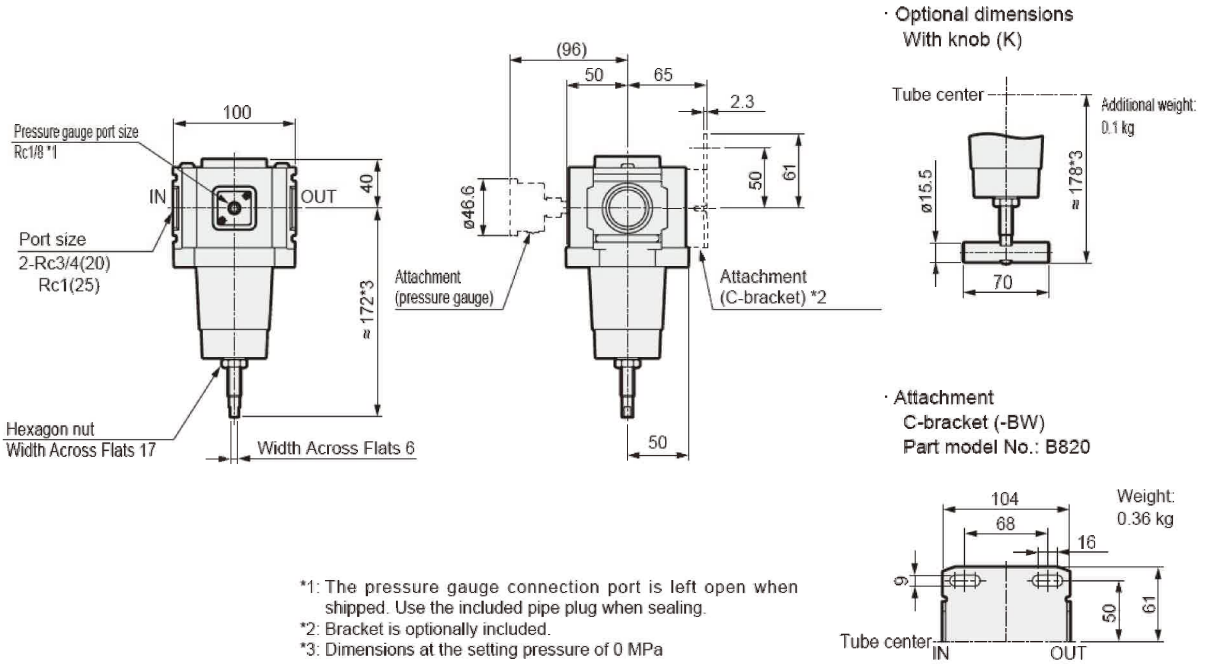


・Attachment
C-bracket (-BW)
Part model No.: B420



*1: The pressure gauge connection port is left open when shipped. Use the included pipe plug when sealing.
*2: Bracket is optionally included.
*3: Dimensions at the setting pressure of 0 MPa

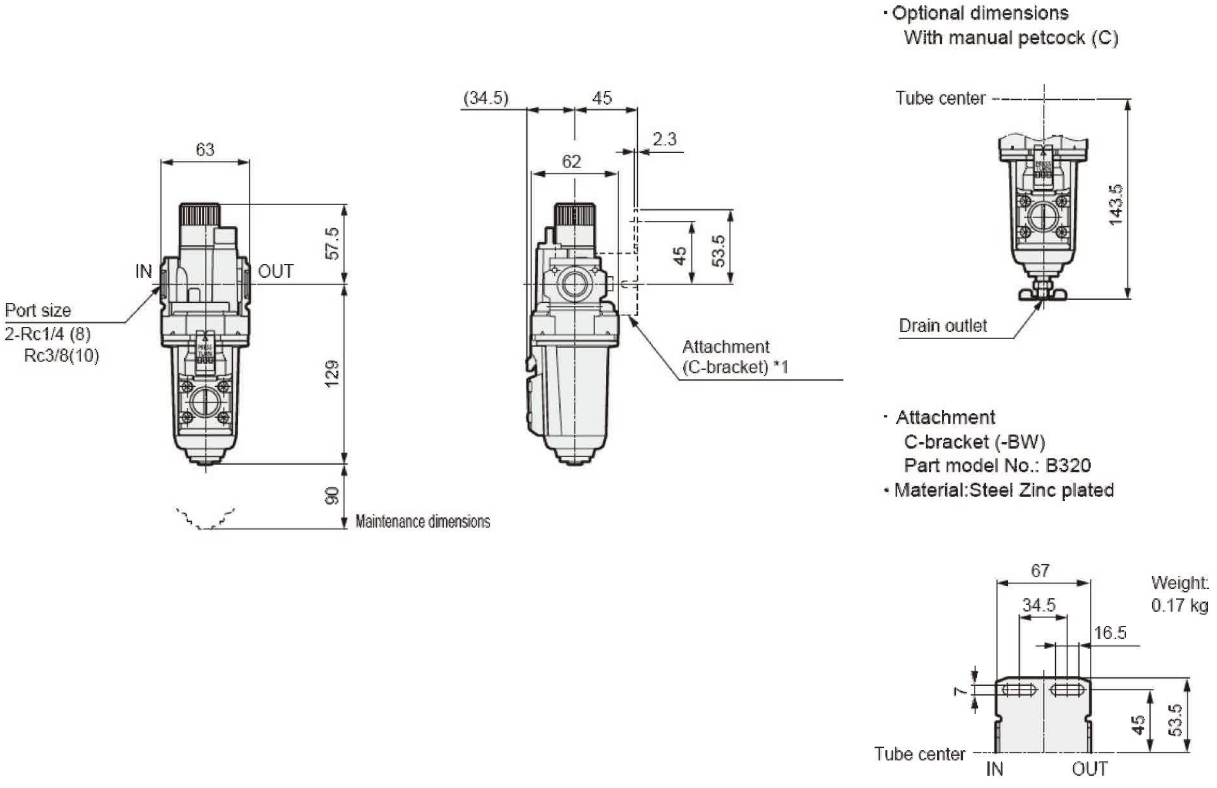
● RW8000-W



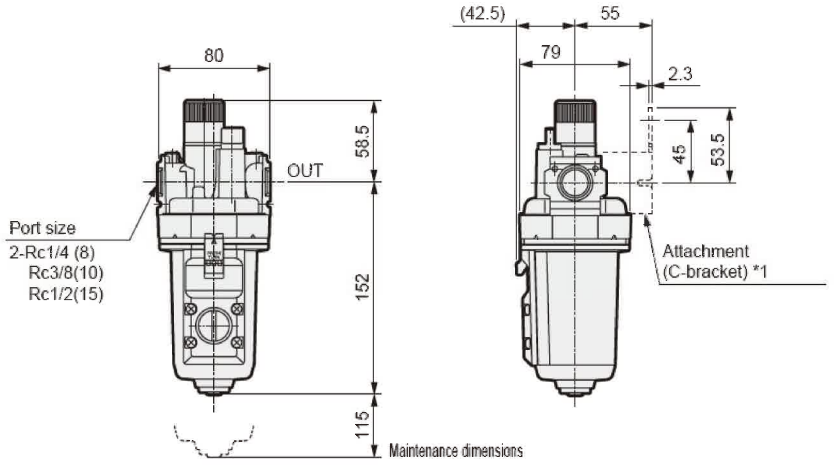
*1: The pressure gauge connection port is left open when shipped. Use the included pipe plug when sealing.
*2: Bracket is optionally included.
*3: Dimensions at the setting pressure of 0 MPa

1.3.4 LW□000 Series

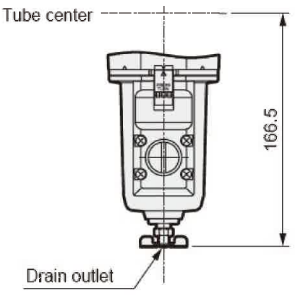
● LW3000-W



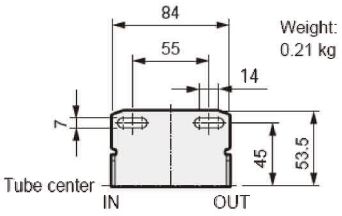
● LW4000-W



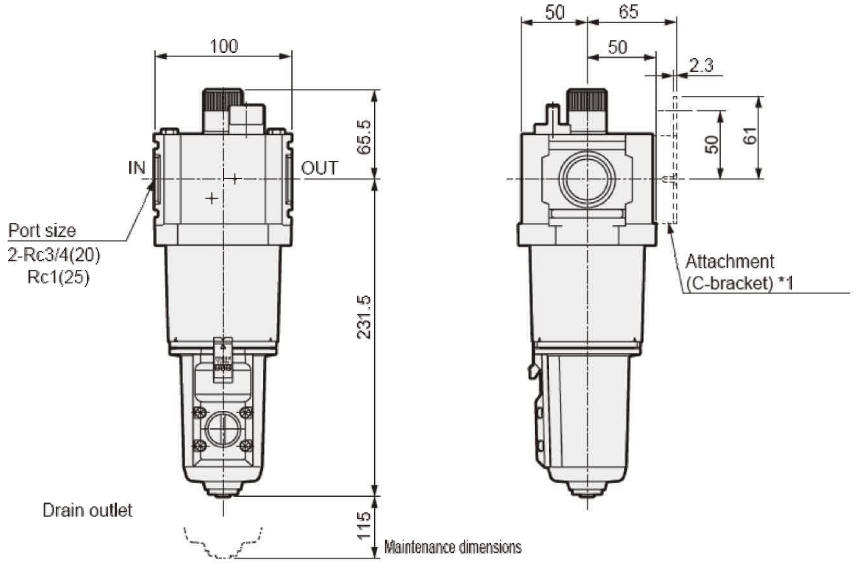
· Optional dimensions
With manual petcock (C)



· Attachment
C-bracket (-BW)
Part model No.: B420

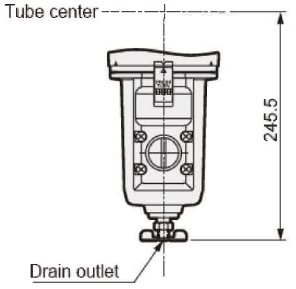


● LW8000-W

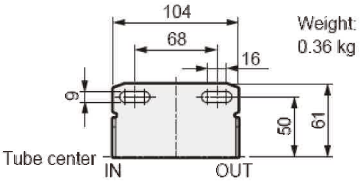


*1:Bracket is an included option.

· Optional dimensions
With manual petcock (C)



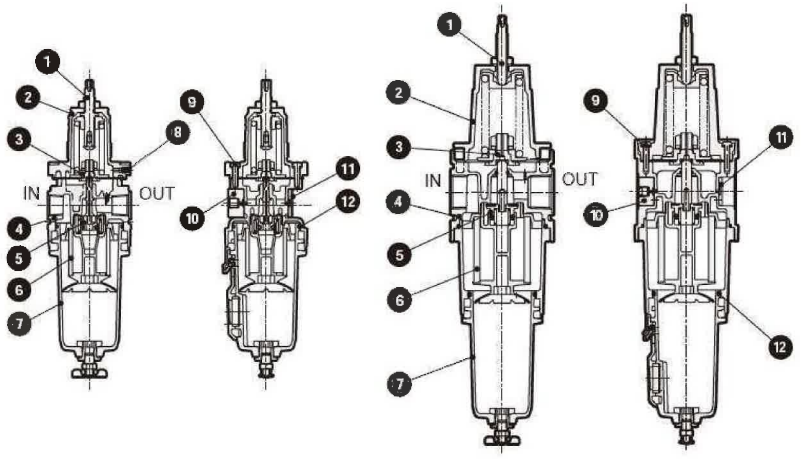
· Attachment
C-bracket (-BW)
Part model No.: B820



1.4 Internal Structure

1.4.1 WW□000 Series

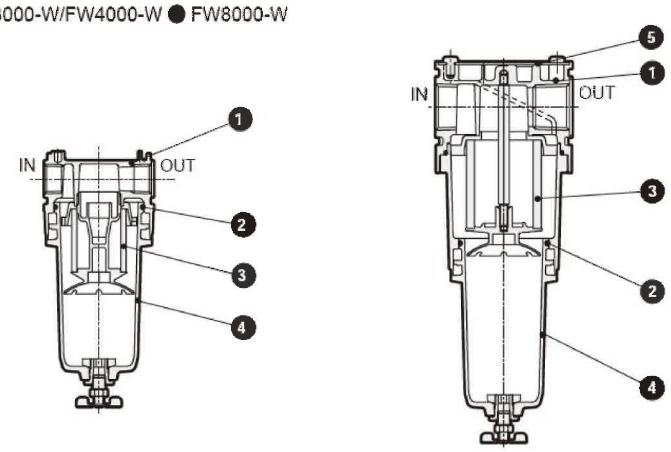
● WW3000-W/WW4000-W ● WW8000-W



No.	Part name	Material
1	Adjusting screw assembly	Stainless steel (aluminum, nitrile rubber, polyacetal resin: WW3000, WW4000)
2	Cover	Aluminum alloy die-casting
3	Diaphragm assembly	Stainless steel, nitrile rubber, aluminum
4	Body	Aluminum alloy die-casting
5	Valve assembly	Copper alloy, hydrogenated nitrile rubber (polyacetal resin: WW3000, WW4000)
6	Element	Polypropylene
7	Metal bowl assembly	Aluminum alloy die-casting, copper alloy,Zinc alloy die-casting, nitrile rubber
8	Plug	Stainless steel
9	Screws	Stainless steel
10	Gauge plug assembly	Aluminum, nitrile rubber, stainless steel
11	Seal plug assembly	Aluminum, nitrile rubber, stainless steel
12	O-ring	Special nitrile rubber

1.4.2 FW□000 Series

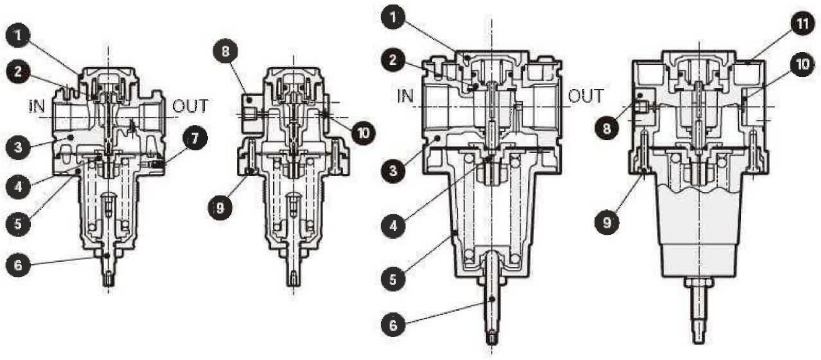
● FW3000-W/FW4000-W ● FW8000-W



No.	Part name	Material
1	Body	Aluminum alloy die-casting
2	O-ring	Special nitrile rubber
3	Element	Polypropylene
4	Metal bowl assembly	Aluminum alloy die-casting, copper alloy,Zinc alloy die-casting, nitrile rubber
5	Plate cover	Aluminum

1.4.3 RW□000 Series

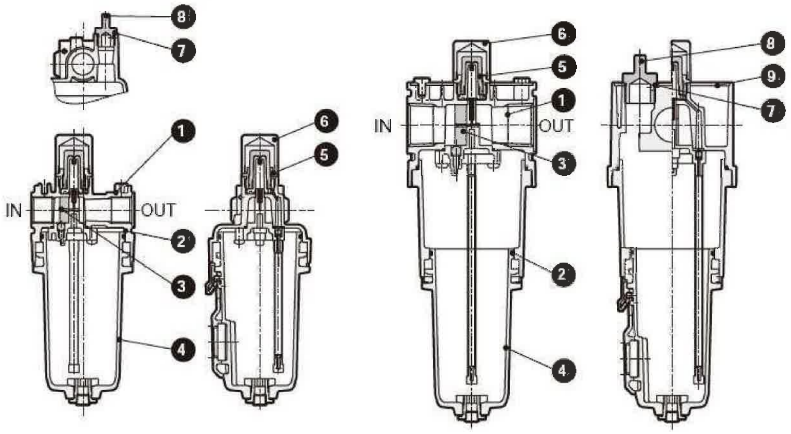
● RW3000-W/RW4000-W ● RW8000-W



No.	Part name	Material
1	Bottom plug	Aluminum alloy die-casting
2	Valve assembly	Copper alloy, hydrogenated nitrile rubber (polyacetal resin: RW3000, RW4000)
3	Body	Aluminum alloy die-casting
4	Diaphragm assembly	Stainless steel, nitrile rubber, aluminum
5	Cover	Aluminum alloy die-casting
6	Adjusting screw assembly	Stainless steel (aluminum, nitrile rubber, polyacetal resin: RW3000, RW4000)
7	Plug	Stainless steel
8	Gauge plug assembly	Aluminum, nitrile rubber, stainless steel
9	Screws	Stainless steel
10	Seal plug assembly	Aluminum, nitrile rubber, stainless steel
11	Plate cover	Aluminum

1.4.4 LW□000 Series

● LW3000-W/LW4000-W ● LW8000-W



No.	Part name	Material
1	Body	Aluminum alloy die-casting
2	O-ring	Special nitrile rubber
3	Flow guide	Nitrile rubber
4	Metal bowl assembly	Aluminum alloy die-casting, Zinc alloy die-casting, stainless steel
5	Adjusting domeAssembly	Stainless steel, nitrile rubber, Polycarbonate resin
6	Dome cover	Aluminum
7	O-ring	Nitrile rubber
8	Filling plug	Stainless steel
9	Plate cover	Aluminum

2. INSTALLATION

2.1 Environment

⚠ WARNING

Install safety equipment if an output pressure above the set pressure of the regulator can cause damage or operation fault on the secondary side device.

Observe the conditions of use.

- There are cases in which the regulator cannot be used in secondary side sealing circuits and balance circuits.
- Do not use the lubricator for lubricating air motors and bearings.
- The lubricator may not lubricate when used in machines that are operated with high frequency such as in a press machine.

When using in cold regions, take appropriate measures for cold regions.

- If freezing occurs, leaks and malfunctions can occur. Dew point of air quality please perform appropriate management.

⚠ CAUTION

Observe the following precautions regarding the ambient environment.

- Do not use the product where there is direct irradiation of ultraviolet rays.
- Avoid installing the product where it is exposed to direct sunlight.
- Avoid installing the product where it is subject to vibrations and shocks.

Install an air dryer and a drain separator before the air filter if there is a large amount of drainage.

An excessive amount of drainage from the compressor may cause the air to become hot and highly humid and this may lead to lower durability or corrosion of the product.

Make sure that substances such as chlorine do not become mixed with the compressed air when using a water lubricated type compressor circuit.

Note that using dry air accelerates the deterioration of the rubber parts of the regulator.

Do not use the product in an environment where:

- Ambient temperature is not within the product operating temperature range
  (If you use it in an environment exposed to direct sunlight, the product temperature may become higher than the ambient temperature.)
- Air can freeze
- Atmosphere contains corrosive gas, fluids, or chemicals
- Atmosphere contains a lot of dust
- Atmosphere contains spatter
- There is a heat source in the surrounding area and heat is radiated
- Ozone is produced

2.2 Unpacking

⚠ CAUTION

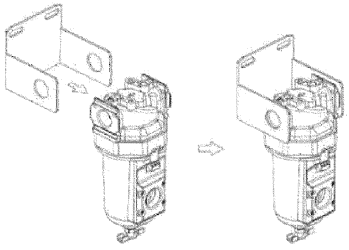
Do not open the packing of the product until just before piping.
Foreign matters may enter the product and cause a failure or malfunction.

- Check that the model number ordered and the model number indicated on the product are the same.
- Check the exterior of the product for any damage.

2.3 Mounting

■ C-type bracket (if selected in the model number)

Attach the C-type bracket to the product as shown in the figure below before piping.



Align the convex portion of the C-type bracket with the concave portion of the product and push in.

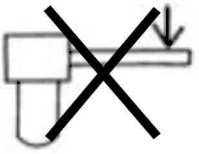
■ Regulator, filter regulator

- Tighten the gauge plug mounting screw lightly (0.8 Nm or less).
- When attaching a pressure gauge with a safety mark or a general screw pressure gauge to the gauge plug, tighten it to 3 to 5 Nm or less.
- Do not move or swing the product by holding the pressure control knob of the regulator section.

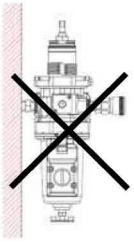
2.4 Piping

⚠ WARNING

Do not apply pipe loads or torque to the body and the pipes.



Do not support the product at only one end as illustrated in the figure below since this may apply excessive force and lead to damage.



<Piping load torque>

Series	3000-W	4000-W	8000-W
Max. torque (N·m)	50	50	100

⚠ CAUTION

Fully flush and clean the pipes before use.
Residual dust or foreign matter in a pipe may cause operation fault.

Connect the pipes correctly according to the direction of flow by checking the direction of the arrow.

Prevent foreign matters from entering the pipes while piping and connecting the fitting.
Be careful not to allow cutting chips from the piping screw and seal material from entering the pipes while piping and connecting the fitting.
Residual dust or foreign matter in a pipe may cause lower performance of the product.

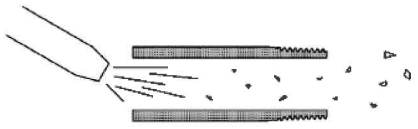
Tighten the pipes with the appropriate tightening torque.

Do not subject the body and the pipes to a bending moment that is due to pipe loads.

Follow the conditions below for the drain piping of the automatic drain.
To prevent operation faults, use pipes with an inside diameter of ø5.7 or more and a length of 5 m or less for the section of pipes for discharging the drainage and avoid riser piping.
Avoid piping that applies lateral loads to the bowl. Secure the hexagon side of the cock and screw the fitting into the Rc1/4 internal thread.

■ Pipe cleaning

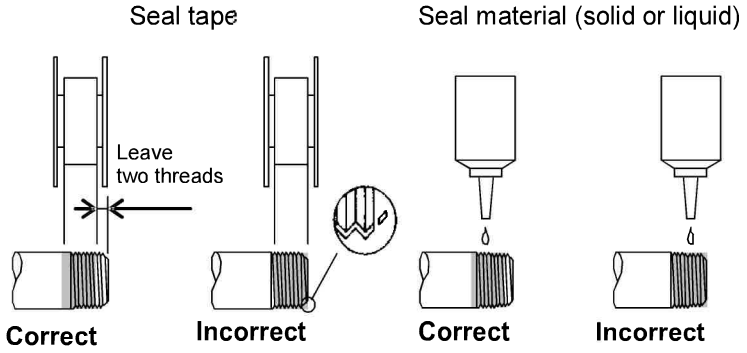
Before piping, blow air into the pipes to clean the interior and to remove cutting chips and foreign matters.



■ Seal material

Apply a seal tape or seal material to the screw threads leaving two or more threads at the pipe end uncovered or uncoated. If the pipe end is fully covered or coated, a shred of seal tape or residue of seal material may enter inside of the pipes or device and cause a failure.

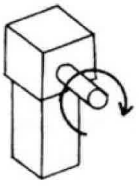
When using a seal tape, wind it around the screw threads in the direction opposite from the screw threads and press it down with your fingers to attach it firmly.
When using a liquid sealant, do not apply seal material to the internal threads.



■ Pipe screwing torque

Do not apply excessive torque to the body and the pipes when piping.

Series	3000-W	4000-W	8000-W
Max. torque (N·m)	30	30	70

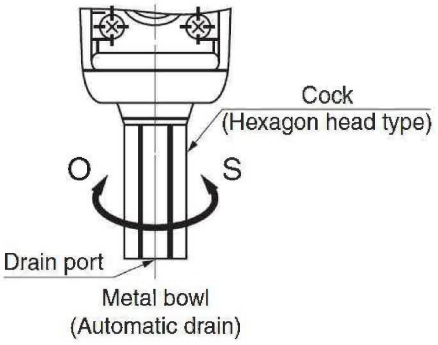


■ Drain piping for bowl

Avoid piping that applies lateral loads to the bowl.

■ Drain piping for metal bowl with automatic drain

Secure the hexagon part of the cock and screw the fitting into the internal threads of the drain port. When using a metal bowl with automatic drain, drainage cannot be manually discharged if a tightening joint is used for the drain piping.



3. USAGE

⚠ WARNING

Use the product within the specifications.

Do not use the product for medical purposes or in any equipment or circuit that concerns human life.

The product is designed for industrial use.

⚠ CAUTION

Check the working circuit and the working fluid.

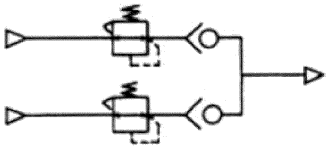
If fluids containing solids or fluids not in the specifications flow into the product, operation faults may occur. Attach a filter to the primary side of the product to prevent solids from entering.

Set the secondary side pressure of the regulator to 85% or less of the primary side pressure.

The pressure drop may increase.

Do not use the OUT side as a closed circuit when using the regulators in parallel as shown below.

If a closed circuit is required, attach a check valve to the OUT side of each regulator.

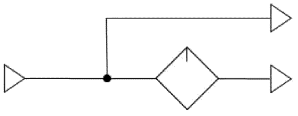


If pulsation occurs on the regulator or the filter regulator, change the conditions of use or the piping conditions. For example, lower the primary side pressure.

Pulsation may occur depending on the conditions of use or the piping conditions.

Do not use a distributor to divide air into lubricated air and non-lubricated air.

The lubricator oil may flow back.



Check the minimum air rate for dripping required for the lubricator.

If the working air rate is low, oil may not drip.

Conditions of use for the automatic drain

<NO type automatic drain (discharges drainage when pressure is not applied): "F" and "FF">

- Use a compressor with a capacity of 0.75 kW {90 l/min (ANR)} or more.
- Set the pressure to 0.1 MPa or more. (Air is purged with initial drainage until pressure reaches 0.1 MPa.)

<NC type automatic drain (does not discharge drainage when pressure is not applied): "F1" and "FF1">

- Use a compressor (a compressor with a capacity of 0.75 kW or less can be used).
- Set the pressure to 0.15 MPa or more.

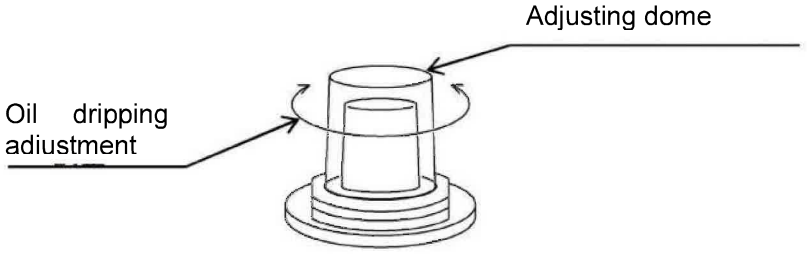
To use the product correctly:

- Check the primary side pressure and set the regulator pressure so that the pressure rises. Lock the knob after setting.

- Check the arrow indicating the air inlet before connecting. Reverse connection may cause a malfunction.
- Install the air filter and lubricator vertically with the case facing downward. Drainage may not be properly discharged or checking the dripping of drainage may not be possible.
- Avoid using the automatic drain where vibrations occur since it may cause faults and malfunctions.

Adjusting the oil drip rate of lubricator

Use bare hands to turn the adjusting dome and adjust the oil drip rate. When turning the dome in the closing direction, tighten with a torque of 0.5 N·m or less. The numbers (scale) on the dial are used as a reference after adjustment and do not indicate the oil drip rate.



3.1 Operation

⚠ WARNING

Use Class 1 ISO VG32 turbine oil (additive-free) for the lubricator.
Other kinds of oil may cause damage to the product or operation faults.

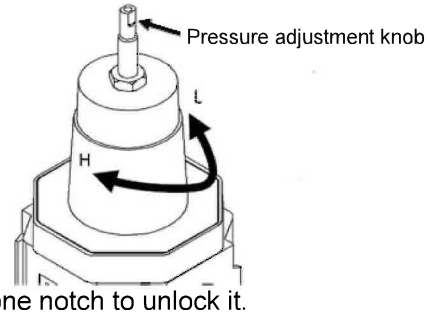
Release the pressure completely from the bowl before removing the filling plug of the lubricator.
To prevent the filling plug from popping out, loosen the filling plug by turning it by approximately 1 turn and release the pressure completely from the bowl before removing the filling plug.
Wipe off dusts around the filling plug to prevent dusts from scattering.

⚠ CAUTION

Pull the pressure adjustment knob to release the lock before setting the regulator pressure.
If the pressure is forcibly set without unlocking, the regulator may become damaged.

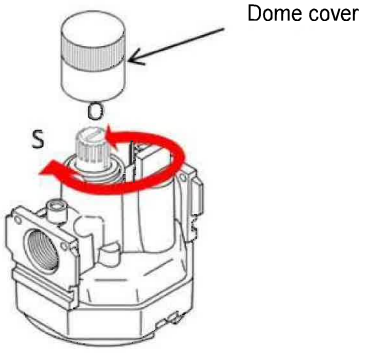
Supply oil to the lubricator bowl periodically so that it does not fall below the lower limit.
< Lubricating >
Slightly loosen the filling plug to release the pressure from the bowl and remove the filling plug. For the filling plug, refer to "Removing the filling plug (lubricator)". (By removing the filling plug, oil can be supplied while pipes are pressurized.)
Oil can be supplied from the filling plug hole after removing the plug. Also, it can be supplied to the bowl directly by removing the bowl and bowl guard.
For removing the bowl, refer to "4.4 How to Perform Maintenance". For LW8000, oil can be supplied to the spacer from the filling plug hole.

■ Adjusting the secondary side pressure (regulator and filter regulator)



- Pull up the pressure adjustment knob one notch to unlock it.
- To raise the secondary side pressure, turn the top of the knob in the H-direction, and to lower the secondary side pressure, turn the knob in the L-direction.
- After setting the secondary side pressure, push down the adjustment knob one notch to lock it.

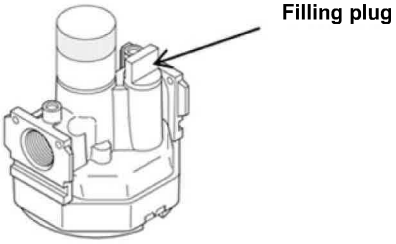
■ Adjusting the oil drip rate (lubricator)



To increase the drip rate, turn the adjusting dome in the O-direction, and to lower the drip rate, turn the dome in the S-direction.
If the dome is hard to turn by hand, place a coin in the slit on the top of the dome and use it to turn the dome.

■ Removing the filling plug (lubricator)

Do not forget to attach the filling plug after lubricating.



Do not remove the bowl without removing the filling plug (while the bowl is pressurized).

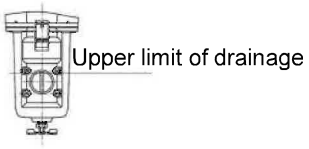
4. MAINTENANCE AND INSPECTION

⚠ WARNING

Stop supplying the pressure and make sure that there is no residual pressure before maintenance.

Check for dirt on the drip window of the lubricator periodically.
If the bowl or the drip window is dirty, replace or clean the bowl or the window.
When cleaning, remove dirt using a diluted household detergent and then rinse well with clean water to prevent damage to the product.

Discharge drainage from the air filter so that it does not accumulate beyond the upper limit.
If drainage flows into the secondary side, operation faults may occur in the device.



Metal bowl

Before removing the bowl assembly, stop supplying the compressed air, release the pressure from the bowl, and check that there is no residual pressure in the bowl.

⚠ CAUTION

Thoroughly read and understand the Instruction Manual supplied with the product before use and maintenance.

Inspect and replace the filter element periodically.
Performance degradation may occur if the element is clogged.

Do not disassemble or modify the product.
Perform regular maintenance every six months to one year.
Replace consumable parts every other year.
(Metal bowl assembly, valve assembly, bottom spring, element, mantle, O-ring)
This product is guaranteed for outdoor use, but it does not guarantee corrosion resistance (no rust, no discoloration).

Check the oil drip rate of the lubricator once a day.
If the oil is not dripping properly, problems may occur with the component being lubricated.

4.1 Daily Inspection

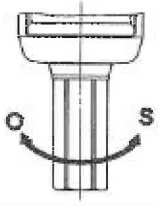
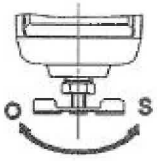
- Thoroughly read and understand this Instruction Manual before maintenance and inspection.
- Check that the product operates properly before starting use.

4.2 Periodic Inspection

- In order to use the product under optimum conditions, perform a periodic inspection every six months.
- It is recommended to check that there is no leakage from the pipes.

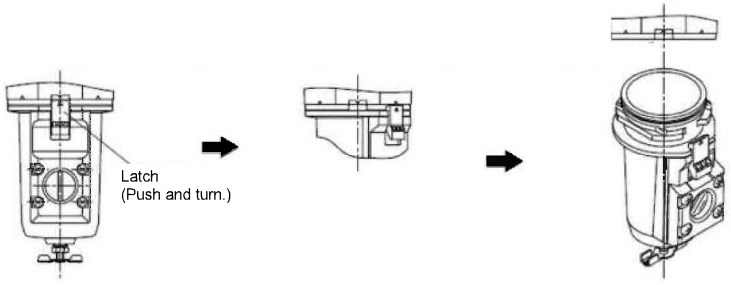
4.3 How to Discharge Drainage

■ Discharging drainage (filter and filter regulator)

Metal bowl with automatic drain 	Drainage is discharged automatically when it is accumulated or can be discharged manually. It is operated in the same way as the Manual drain metal bowl Drainage cannot be manually discharged if a tightening joint is used for the drain piping.
Manual discharge metal bowl 	To discharge drainage, turn the cock in the O-direction, and to stop discharging, turn the cock in the S-direction.

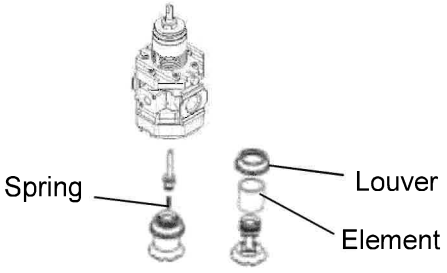
4.4 How to Perform Maintenance

■ Removing the metal bowl



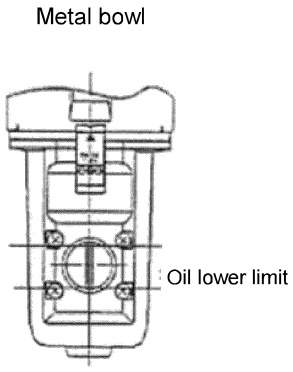
■ Element

Since the valve assembly can also be removed during maintenance, inspect all parts of the assembly at the same time.
Be careful not to lose any part.



■ Lubricator

Supply oil to the lubricator bowl periodically so that the amount of oil does not fall below the lower limit. See the figure below for the oil lower limit.



5. TROUBLESHOOTING

5.1 Problems, Causes, and Solutions

If the product does not operate as intended, check the table below for a possible solution.

Problem	Cause	Solution
Drainage occurs immediately after startup.	Drainage exceeds upper limit.	Discharge the drainage. (Refer to "4.3 How to Discharge Drainage".)
	Maximum processing flow rate is exceeded.	Replace with a model suitable for the working flow rate.
Drainage does not discharge when drain cock is opened.	Drain port is clogged with foreign matters.	Stop supplying the compressed air, remove the bowl assembly, and clean the inside of the bowl. If the problem persists after cleaning, replace the bowl assembly.
Automatic drain does not automatically discharge drainage. Air leaks from drain port.	Automatic drain is damaged, or drain port is clogged with foreign matters.	
Air leaks from where bowl is mounted.	There are scratches or foreign matters on O-ring for bowl sealing.	Stop supplying the compressed air, remove the bowl assembly, and clean or replace the O-ring.
	Bowl is damaged.	Stop supplying the compressed air, remove the bowl assembly, and replace the bowl assembly.
When primary side pressure is applied, air leaks from gap between cover and knob.	IN and OUT ports are connected in reverse.	Connect the product correctly.
Pressure does not rise.	Primary side pressure is insufficient.	Check the primary side pressure.
	Pipe is too long or flow of air is restricted on primary side.	Shorten the pipe or use a pipe with a larger diameter on the primary side.
	Needle of pressure gauge does not move.	Replace the pressure gauge since it may become damaged.
Pressure does not drop.	Back pressure is applied to regulator.	Check if there is a problem with the system.
	It is not relieving pressure since it is non-relief type.	Replace the product with a relief-type.
Leakages occur from cover. Set pressure rises abnormally.	Foreign matters have adhered to valve. Diaphragm is damaged.	Clean or replace the parts.
Secondary side pressure pulsates.	Pulsation may occur depending on piping conditions and usage.	Lower the primary side pressure or restrict the flow of air through the piping.

If you have any other questions or concerns, contact your nearest CKD sales office or distributor.

6. WARRANTY PROVISIONS

6.1 Warranty Conditions

■ Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified below, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD s facilities free of charge.
However, following failures are excluded from this warranty:

- Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or this Instruction Manual.
- Failure caused by incorrect use such as careless handling or improper management.
- Failure not caused by the product.
- Failure caused by use not intended for the product.
- Failure caused by modifications/alterations or repairs not carried out by CKD.
- Failure that could have been avoided if the customer s machinery or device, into which the product is incorporated, had functions and structures generally provided in the industry.
- Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- Failure caused by acts of nature and disasters beyond control of CKD.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.

■ Confirmation of product compatibility

It is the responsibility of the customer to confirm compatibility of the product with any system, machinery, or device used by the customer.

■ Others

The terms and conditions of this warranty stipulate basic matters.
When the terms and conditions of the warranty described in individual specification drawings or the Specifications are different from those of this warranty, the specification drawings or the Specifications shall have a higher priority.

6.2 Warranty Period

The product is warranted for one (1) year from the date of delivery to the location specified by the customer.