CKD

SM-387461-A

INSTRUCTION MANUAL

WATER REGULATOR

WR1

WR2

- 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 operations.

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, **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 notice may cause a situation that result in fatality or serious injury and that requires urgent addressing.

WARNING Failure to pay attention to WARNING notice may result in a fatality or serious injury.

CAUTION Failure to pay attention to CAUTION notice may result in injury or damage to equipment or facilities.

※ 1)ISO4414: Pneumatic fluid power・・・Recommendations for the application of equipment to transmission and control systems.

※2)JIS B 8730: General rule for pneumatic systems

[SM-999999]

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WATER REGULATOR

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1. Unpacking

⚠ CAUTION To prevent foreign matter from entering the inside of the product, do not unpack the product immediately before starting the piping.

■Make sure that the model number indicated on the product is matched with that you have observed.

■Check the exterior of the product for damage.

2. Installation

2.1 Installation environment

⚠ CAUTION

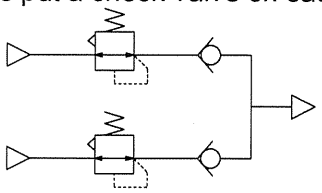
1. Avoid installing this product where it may be subject to direct sunlight.
2. In the case of the use in cold area, please take appropriate freeze preventive measures.
3. Avoid installing where vibration or impact is present.
4. Large drainage (compressed air)
   Install the air dryer and drain separator before the air filter. If there is a large amount of drainage from the compressor, hot and highly humid air could shorten the device life or result in corrosion.
5. Water-lubricated compressor circuit (compressed air)
   Make sure that chlorine-based substances, etc., do not enter compressed air.

■ Do not install the product in a place listed below.
Where
- The ambient temperature is beyond a range of 5～60℃.
- The water (or air) may be frozen.
- The water drop coolant is splashed onto the product.
- The humidity is high and the temperature changes largely, causing dew condensation.
- Corrosive gas, or fluid chemical exists.

2.2 Installation

⚠ CAUTION

1) Do not move or swing the product with the pressure knob kept held.
2) When connecting the products in parallel as shown below, do not close the secondary circuit. If the close circuit is required, always put a check valve on each secondary side.



3) Allow a clearance for maintenance.
4) Plug the pressure gauge port using the pressure gauge and pipe plug. Avoid the repeating of the rapid pressure rise and fall, and the pulsation. It makes the lifetime of the pressure gauge shorten. Ease a pressure change on the circuit.

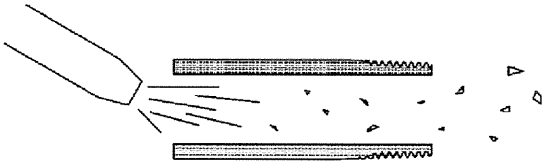
■The posture of the product is free.

2.3 Piping

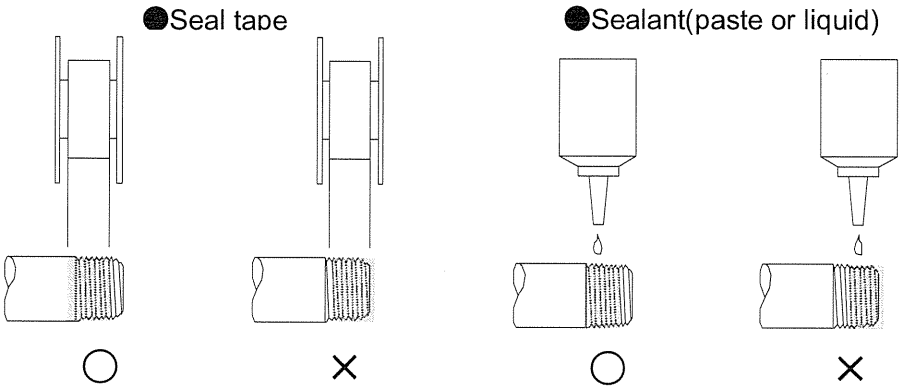
⚠ CAUTION

1) Flash the air piping to be used sufficiently before connecting the filter it. If dust or sealant enters the inside of the pipe during piping work, this may caused the product performance down.
2) Confirm the flow direction indicated with the arrow and correctly connect the product. Installation in the reverse direction will shorten the product life.
3) Make sure that foreign matters do not enter when screwing the pipes or joints. If dust or sealant enters the inside of the pipe during piping work, this may caused the product performance down.

■ Flash air into the pipe to blow out foreign substances and chips before piping.



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



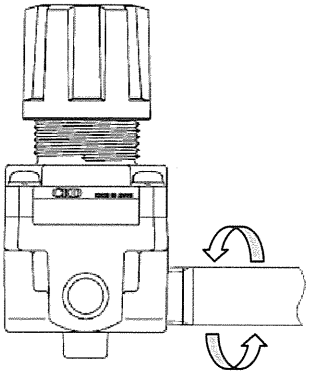
■ Tighten pipes with the appropriate torque.

Pipes must be connected with the appropriate torque to prevent air leakages and screw damage.

First tighten screw by hand to prevent damage to screw threads, then use a tool.

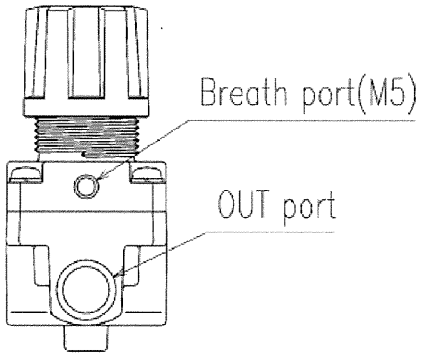
Recommended value

Set screw	Tighten torque N·m
M5	0.2～0.3
Rc1/8	18～20
Rc1/4	23～25
Rc3/8	31～33
Rc1/2	41～43



■ Please maintain the body with spanners at the time of the piping..

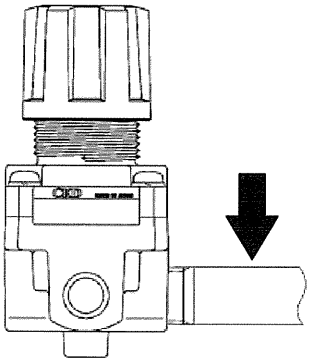
■ When use this product, it recommends piping to breath port. Even if the diaphragm is broken by the pressure out of the specification, water freeze etc., it is possible to let out water safely out.



3.Proper operation

⚠WARNING

1) Use within the product's specific specification range.
2) This product is for industrial use and not for use in devices or circuits for medical equipment or devices that involve human life.
3) Install a safety device where an output pressure exceeding the regulator's set pressure value could result in damage or faulty operation of the secondary side devices.
4) This regulator cannot be used for secondary side sealing circuits or balance circuit.
5) Piping load torque
   Make sure that piping load or torque is not applied on the body or piping.

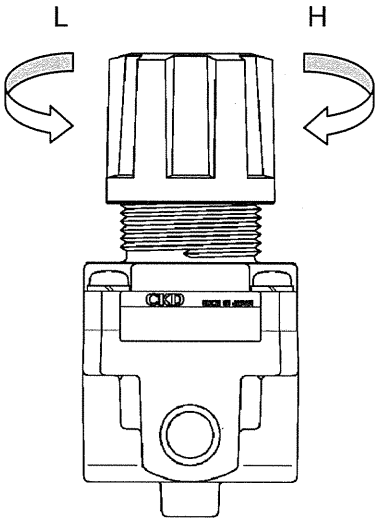


Model	Max. torque N·m
WR1	15
WR2	50

⚠CAUTION

1) Check the working circuit and working fluid. By a fluid to use (the water quality), there is the case that the life of the product comes to have extremely short. Please do not use the fluid except water and the water which a foreign substance , scale were in. This product is equipped with the mesh filter to exclude foreign substance in the initial stages like a seal tape etc. When knowing that the liquid contains foreign substance, install the strainer before the regulator. And pay attention to the mesh filter and the strainer are choked up.
2) Pulsations may occur depending on the working conditions and piping conditions. If pulsations occur, lower the primary pressure.
3) There are cases the secondary pressure flows to the primary side when primal pressure is released. Other devices may malfunction if secondary fluid flow to the primary side, provide a circuit that maintains the pressure.
4) Set secondary side pressure of the regulator to 85% or less of the primary side, or else the pressure drop could increase.

■How to adjust the secondary pressure



By pulling the pressure adjustment knob, lock of knob is released. The secondary pressure rises when turning the knob to direction H, and falls when turning to direction L. After adjusting the secondary pressure, push a knob. The knob is locked and do not turn.

Release the lock before adjusting pressure. Operating the pressure adjustment knob while locked may result in damage.

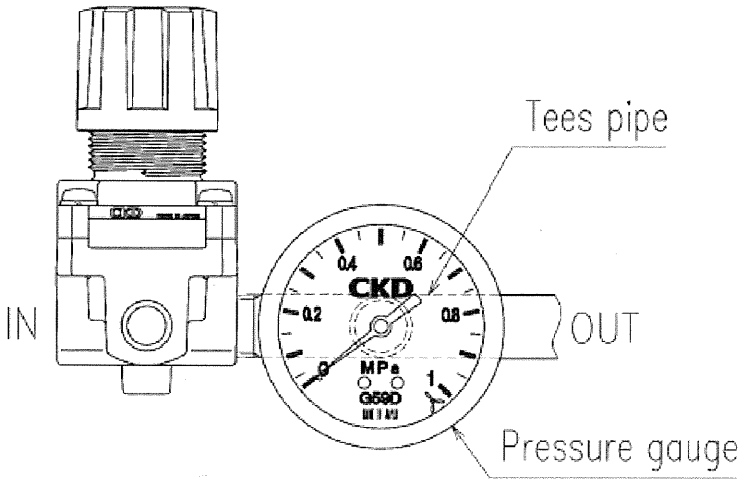
Adjust pressure in the direction of pressure rise. Pressure cannot be set correctly if adjusted downward.

This product cannot be reduced unless secondary pressure is consuming pressure.

After adjusting pressure, lock the knob.

1) A pressure higher than the primary pressure cannot be set.
2) Manually operate the pressure adjustment knob. Use of tools, etc., may result in damage.
3) The set pressure may deviate slightly when the pressure adjustment knob is locked.

■When using this unit for a large flow rate air blow, etc., install a pressure gauge as shown below so that the secondary pressure can be measured accurately.



4. Maintenance

4.1 Inspection

Daily inspection

- Before operating the product, it is recommended to inspect the set pressure using a pressure gauge.

Periodic inspection

- To operate the product in its optimal state, carry out the periodic inspection normally once every six months.
- Inspect the set pressure using a pressure gauge.
- Check that no leak occurs in the piping.

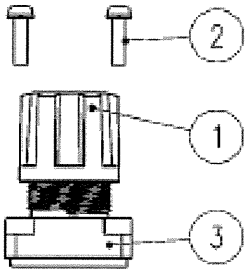
4.2 Disassembly and assembly

⚠ CAUTION

1) The pneumatic component must be disassembled and assembled by a qualified worker. Personnel must be fully familiar with pneumatic component structure and operational principles and safety requirements. Personal involved in this step must have passed the Pneumatic Pressure Skill Test Class 2 or higher.
2) Read the relevant product instruction manual thoroughly and fully familiarize yourself with work before disassembling or assembling the pneumatic component.
3) Before starting the maintenance work, turn OFF the power, shut down the supply pressure, and make sure that no residual pressure remains.
4) Do not modify the product.
5) Do not store this product in a hot, highly humid atmosphere or an atmosphere exceeding the specified range for long. Failure to observe this may cause resin or rubber parts to deteriorate.
6) When not using in the long term, pull out water inside the product. Left water inside the product rust the part, make not to operate, become the cause of leak.

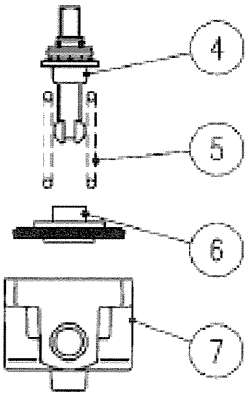
■ How to disassemble the diaphragm ass'y(WR1 /WR2)

1) Turn the knob① until stop at the direction L.
2) Loosen the screw (to fix a cover②(4pcs.)), remove the cover③.
   Pay attention to not to lose pressure adjust screw ass'y④, spring⑤.
3) Remove the diaphragm ass'y⑥.



■ How to assemble the diaphragm ass'y(WR1/WR2)

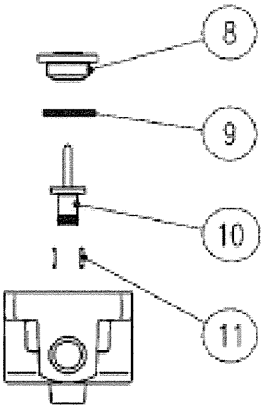
1) Set the 凸 shape part of diaphragm⑥ fitting to the ditch shape part of body⑦.
2) Put the spring⑤ and pressure adjust screw ass'y ④ on the diaphragm, and set the cover③.
   Pay attention to the direction of breath port.



3) Set the cover③ by screw②. Tightening torque of screw is 1.8± 0.2N・m.

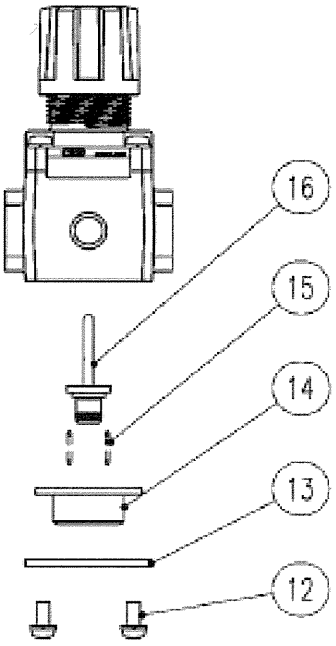
■ How to disassemble the valve ass'y (WR1)
From the condition to have removed a diaphragm, Loosen the valve sheet⑧, remove the gasket⑨, valve ass'y⑩ and bottom spring⑪.

■ How to assemble the valve ass'y (WR1)
Assemble the bottom spring⑪, valve ass'y⑩, gasket ⑨, and tighten up the valve sheet⑧.
Tightening torque of valve sheet is 0.95±0.1N・m.



■ How to disassemble the valve ass'y (WR2)
Loosen the screw⑫(4pcs), remove the plate⑬ and the bottom cap⑭.
Pay attention to not to lose the bottom spring⑮.
Remove the valve element⑯.

■ How to assemble the valve ass'y (WR2)
Assemble valve element⑯, bottom spring⑮, Bottom cap⑭, plate⑬, and set the plate⑬ by the screw⑫.
Tightening torque of screw is 1.8±0.2N・m.

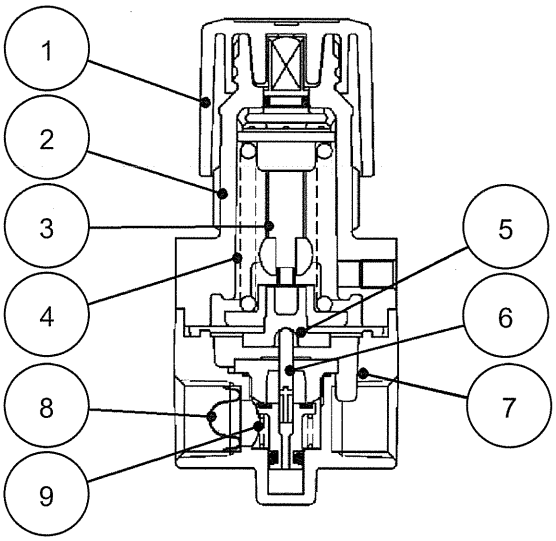


5.Troubleshooting

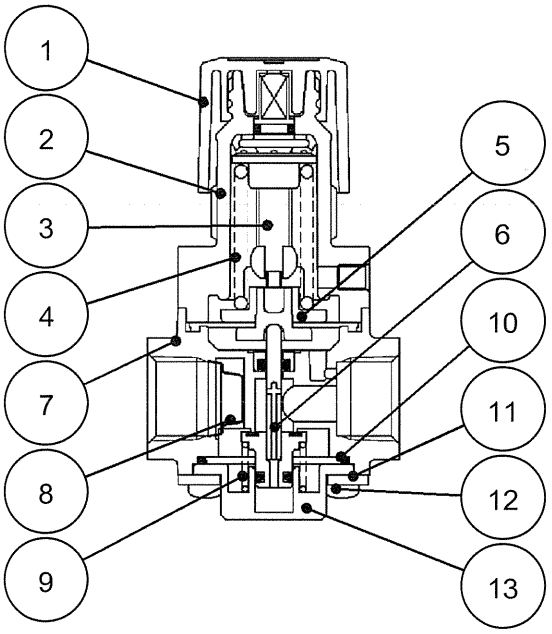
Trouble	Cause	Remedy
Can't set the secondary pres-Sure	IN and OUT ports are connec-ted reversibly.	Correct the mounting direction.
Can't increase the secondary pressure	Primary pressure is insufficie-nt.	Check the primacy pressure.
	Primary piping is too long or throttled.	Make the primary piping shorter or the piping size larger.
	The pressure gauge does not move.	Replace the pressure gauge with a new one.
Can't drop the secondary pre-Ssure	Backpressure is applied to the regulator.	Check if the system has any problem.
	There is no relief with the non-relief type.	Switch to the relief type product. (compressed air only)
The secondary pressure incr-ease abnormally	Dust is sticking to the valve.	Replace the parts.
Leaks start from cover	Diaphragm is broken.	Replace the parts.
The secondary pressure puls-Ates	Pulsation may occur dependi-ng on the piping conditions and usage methods.	Lower the primary pressure or restrict the piping.
Flowing quantity is little.	Mesh filter is choked up.	Remove the foreign substance, install the strainer before the regulator.

6.Internal structure

WR1



WR2



Part No.	Part name	Material	Part No.	Part name	Material
1	Knob	POM	8	Mesh filter	SUS
2	Cover	PBT	9	Bottom spring	SUS
3	Pressure adjust screw assembly	Steel, POM, NBR	10	O-ring	NBR
4	Spring	Steel	11	Plate	SUS
5	Diaphragm assembly	NBR, POM	12	Screw	SWRM
6	Valve assembly	Brass, SUS, NBR	13	Bottom cap	Brass
7	Body assembly	Brass, NBR, POM※			

※ only WR1

7.Product specifications and how to order

7.1 product specifications

Descriptions		WR1	WR2	
Working fluid		General industrial clean water, Compressed air		
Max. working pressure	MPa	1.0		
Withstanding pressure	MPa	1.75		
Working temperature	℃	5～60		
Set pressure range	MPa	Standard: 0.05～0.7 Option L: 0.02～0.35		
Relief		Without relief mechanism		
Port size		Rc1/8 , Rc1/4	Rc3/8	Rc1/2
Gauge port size		Rc1/8		
Product mass	Kg	0.22	0.41	0.44
Standard accessories		Mesh filter		

7.2 How to order

WR1 - 8 - N L - G

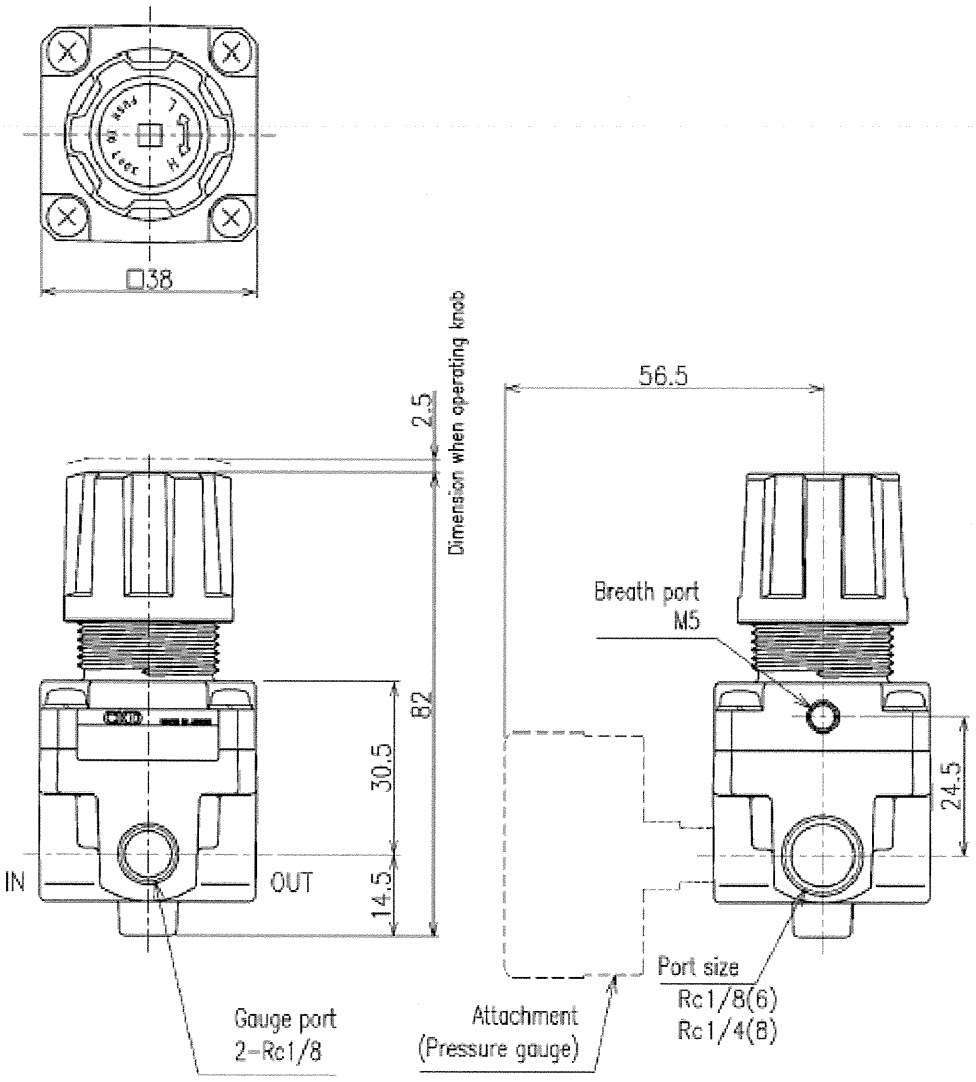
Symbol		Descriptions	①Model WR1	①Model WR2
②Port size				
6		Rc1/8	●	
8		Rc1/4	●	
10		Rc3/8		●
15		Rc1/2		●
③Option				
Pressure range	Blank	0.05~0.70MPa	●	●
	L	0.02~0.35MPa	●	●
④Attachment				
Blank		No attached	●	●
G (※1)		Pressure gauge(G49D-6-P10)	●	●

※ 1 If "L" is selected for the pressure range,
the 0.4MPa pressure gauge (pressure gauge model:G49D-6-P04) is used.

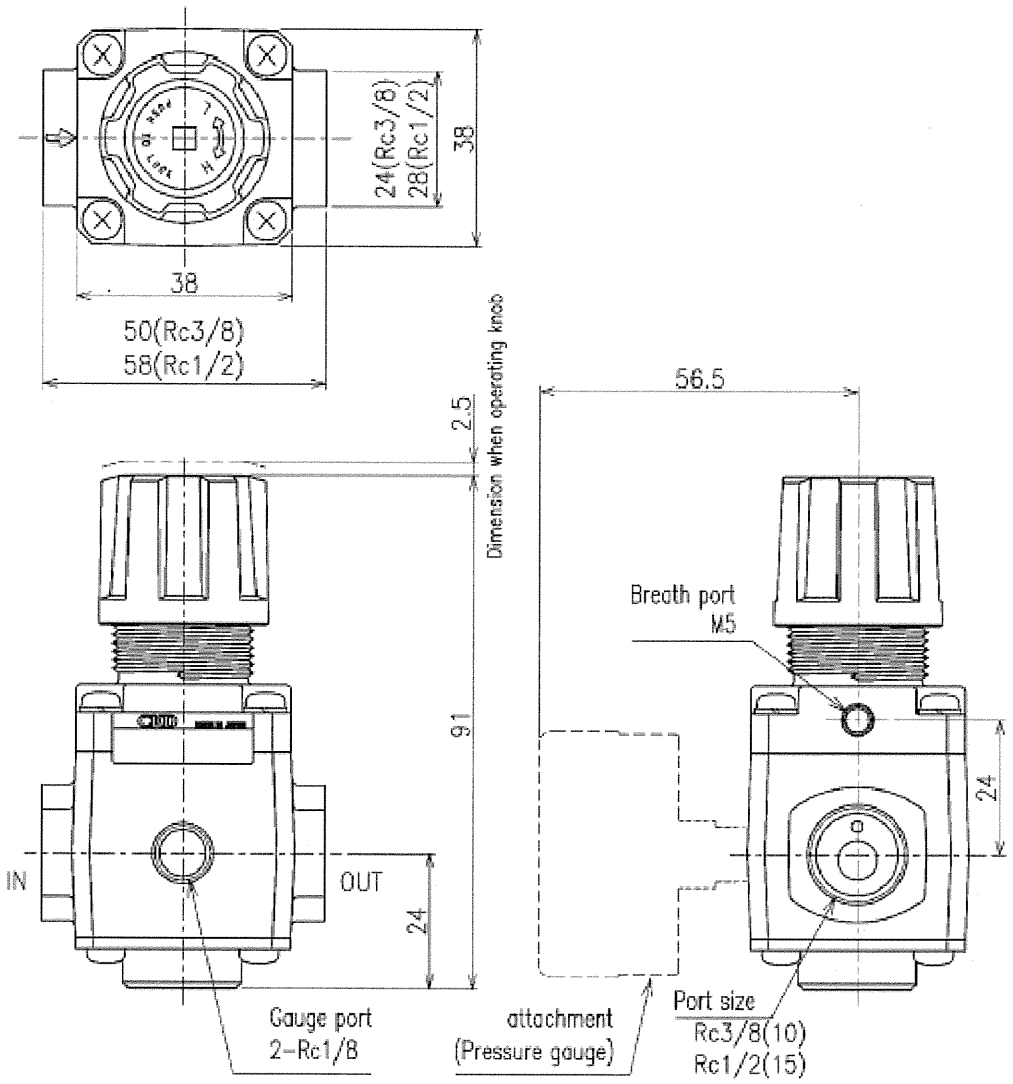
※ 2 One pipe plug(R1/8) is included with the product.

7.3 Outside dimensions

WR1

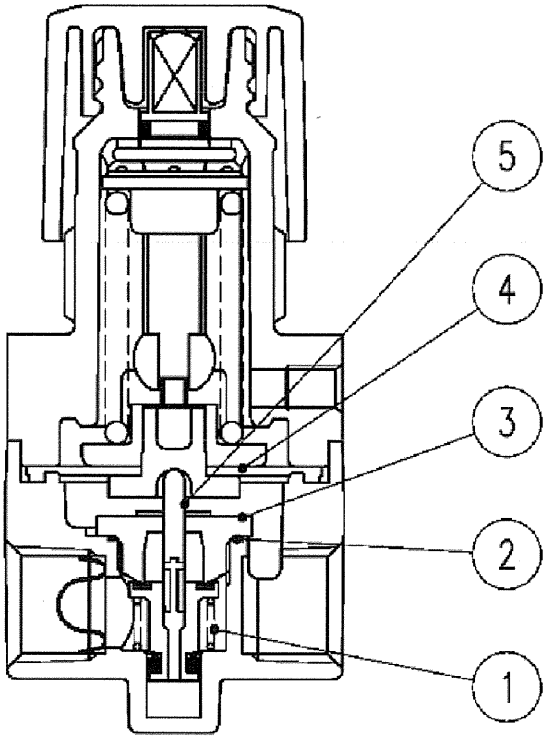


WR2


24(Rc3/8)
28(Rc1/2)
38
38
50(Rc3/8)
58(Rc1/2)
2.5
Dimension when operating knob
91
IN
OUT
24
Gauge port
2-Rc1/8
56.5
Breath port
M5
24
attachment
(Pressure gauge)
Port size
Rc3/8(10)
Rc1/2(15)

8 Repair parts

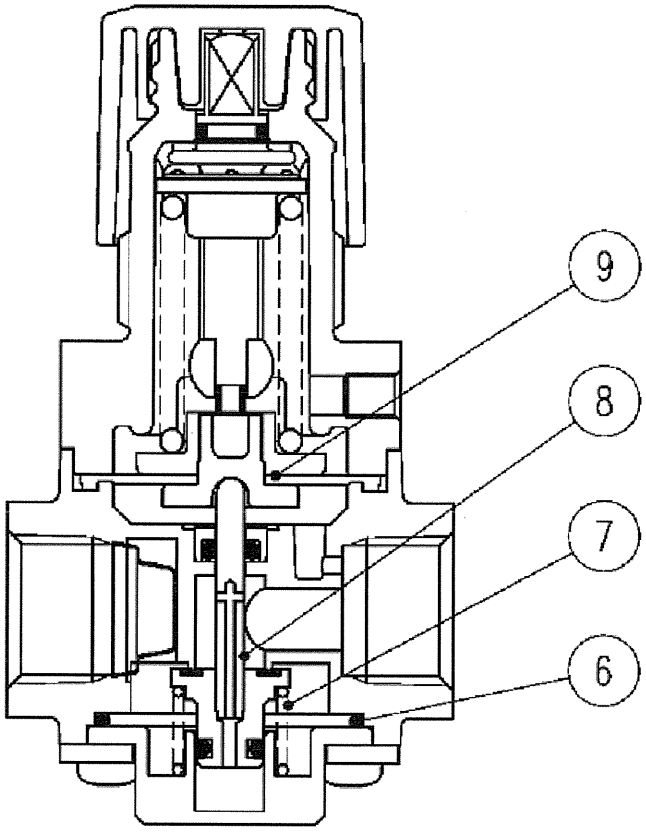
WR1



WR1 Repair parts list

Part No.	Part name	Repair parts No.	Model No.
1	Bottom spring	WR1-KIT	WR1-□-N-□ WR1-□-NL-□
2	Gasket		
3	Valve sheet		
4	Diaphragm assembly		
5	Valve assembly		
1	Bottom spring	WR1-VALVE-ASSY	
2	Gasket		
3	Valve sheet		
5	Valve assembly		
4	Diaphragm assembly	WR1-DIAPHRAGM-ASSY	

WR2



WR2　Repair parts list

Part No.	Part name	Repair parts No.	Model No.
6	O-ring	WR2-KIT	WR2-□-N-□ WR2-□-NL-□
7	Bottom spring		
8	Valve assembly		
9	Diaphragm assembly		
6	O-ring	WR2-VALVE-ASSY	
7	Bottom spring		
8	Valve assembly		
9	Diaphragm assembly	WR1-DIAPHRAGM-ASSY	