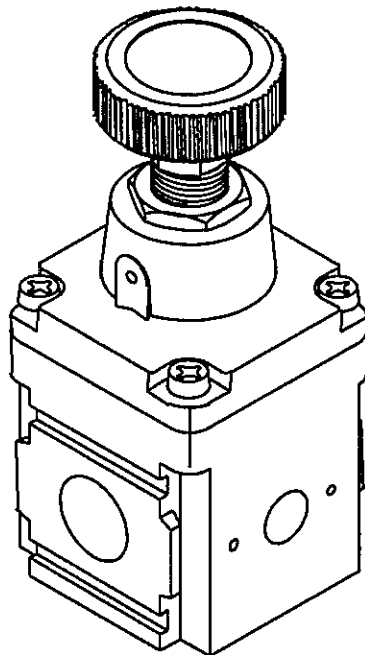


## Instruction Manual

### Precision Regulator

### RPE1000



- 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.

## Safety precautions

When designing and manufacturing a device using CKD products, the manufacturer is obligated to manufacture a safe product by confirming safety of the system comprising the following items:

- Device mechanism
- Pneumatic or water control circuit
- Electric control that controls the above

It is important to select, use, handle, and maintain the product appropriately to ensure that the CKD product is used safely.

Observe warnings and precautions to ensure device safety.




Check that device safety is ensured, and manufacture a safe device.

## WARNING

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1. **This product is designed and manufactured as a general industrial machine part. It must be handled by someone having sufficient knowledge and experience.**
2. **Use this product within its specifications.**  
 This product cannot be used beyond its specifications. Additionally, the product must not be modified or machined.  
 This product is intended for use in general industrial devices and parts. Use beyond such conditions is not considered. Consult with CKD for details when using the product beyond the unique specification range, outdoors, or in the following conditions or environments. In any case, measures for safety shall be provided when the valve malfunctions.
  - ① Use for special applications requiring safety including nuclear energy, railroad, aviation, ship, vehicle, medical equipment, equipment or applications coming into contact with beverage or food, amusement equipment, emergency shutoff circuits, press machine, brake circuits, or for safeguard.
  - ② Use for applications where life or assets could be adversely affected, and special safety measures are required.
3. **Observe corporate standards and regulations, etc., related to the safety of device design and control, etc.**  
 ISO4414, JIS B 8370 (pneumatic system rules)  
 JFPS2008 (principles for pneumatic cylinder selection and use)  
 Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, standards and regulations, etc.
4. **Do not handle, pipe, or remove devices before confirming safety.**
  - ① Inspect and service the machine and devices after confirming safety of the entire system related to this product.
  - ② Note that there may be hot or charged sections even after operation is stopped.
  - ③ When inspecting or servicing the device, turn off the energy source (air supply or water supply), and turn off power to the facility. Release any compressed air from the system, and pay enough attention to possible water leakage and leakage of electricity.
  - ④ When starting or restarting a machine or device that incorporates pneumatic components, make sure that system safety, such as pop-out prevention measures, is secured.
5. **Observe warnings and cautions on the pages below to prevent accidents.**

- The safety cautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.

-  **DANGER** : When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, or when there is a high degree of emergency to a warning.
-  **WARNING** : When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.
-  **CAUTION** : When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.
- 

Note that some items described as "CAUTION" may lead to serious results depending on the situation. In any case, important information that must be observed is explained.

## Precautions with regard to guarantee

### ● Guarantee period

The guarantee period of our product shall be one (1) year after it is delivered to the place specified by the customer.

### ● Guarantee coverage

If any failure for which CKD CORPORATION is recognized to be responsible occurs within the above warranty period, a substitute or necessary replacement parts shall be provided free of charge, or the product shall be repaired free of charge at the plant of CKD CORPORATION.

However, the guarantee excludes following cases:

- ① Defects resulting from operation under conditions beyond those stated in the catalogue or specifications.
- ② Failure resulting from malfunction of the equipment and/or machine manufactured by other companies.
- ③ Failure resulting from wrong use of the product.
- ④ Failure resulting from modification or repairing that CKD CORPORATION is not involved in.
- ⑤ Failure resulting from causes that could not be foreseen by the technology available at the time of delivery.
- ⑥ Failure resulting from disaster that CKD is not responsible of.

Guarantee stated here covers only the delivered products. Any other damage resulting from failure of the delivered products is not covered by this guarantee.


### ● Confirmation of product compatibility

Our customer shall be responsible of confirming compatibility of our product used in our customer's system, machinery or device.

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## 1. Unpacking

 <b>CAUTION</b>	<p>Do not take off the port protection until just before piping. Otherwise, foreign matter enters the valve and cause malfunction or bad operation. This product, in particular, may change its performance due to fine dust. Be careful when you pipe the product.</p>
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- (1) Check that the model No. shown on the name plate of the product is the same with what you ordered.
- (2) Check that the product has no external damages.
- (3) Read the Instruction Manual (SM-459729-A) attached to the product, and this Instruction Manual (SM-459809-A) before using the product.


## 2. Installation

### 2. 1 Conditions for installation

 <b>CAUTION</b>	<ol style="list-style-type: none"> <li>a) Use the product away from direct ultraviolet rays.</li> <li>b) Install the product away from rain, water, and direct sunlight.</li> <li>c) Install the product away from vibration and shock.</li> <li>d) Use the product away from locations with much ambient dust.</li> <li>e) If the compressor circuit is lubricated by water, be careful so chlorine chemicals do not mix with compressed air.</li> </ol>
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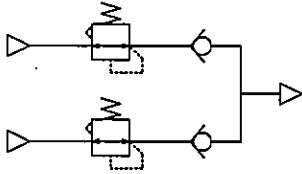
- (1) Do not use this product under conditions listed below.
  - Locations where ambient temperature is beyond -5 to 60°C.
  - Locations where air freezes.
  - Locations where the product is subjected to liquids such as water and cutting oil.
  - Humid locations where condensation occurs by temperature change.
  - Locations where the product is subjected to sea breeze and sea water.
  - Locations where the atmosphere is corrosive, wet, or chemical.

### 2. 2 Installation method

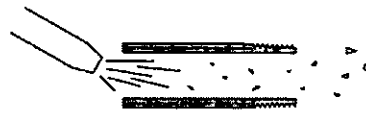
 <b>CAUTION</b>	<ol style="list-style-type: none"> <li>a) Do not carry or swing the product while holding the Pressure Adjusting Knob. Otherwise, the Flapper Nozzle portion will be damaged and performance will degrade.</li> <li>b) Do not close the EXH port. Otherwise, back pressure may remain at the secondary side when back pressure rises.</li> <li>c) Provide enough space for installation, detaching, and piping work.</li> </ol>
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- (1) Mounting posture is not restricted. However, if ambient atmosphere contains dust, do not position the EXH port upward.
- (2) When mounting this product to a panel, do the following: First, loosen and detach the Pressure Adjusting Knob; Second, insert the main body into the  $\phi 12.5$  hole on the panel; Next, fix the panel with the the Panel Mount Nut; Then, screw the Pressure Adjusting Knob onto the main body. Recommended tightening torque of the Panel Mount Nut: 2 to 3 N·m

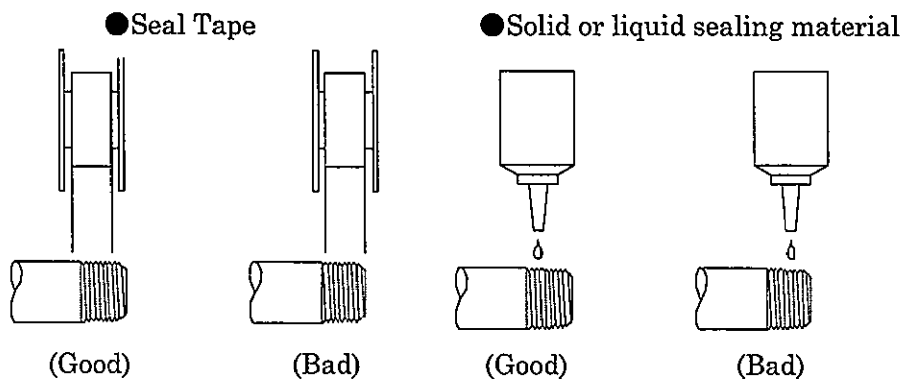
2. 3 Piping

 <p><b>CAUTION</b></p>	<p>a) Flush and wash the piping before use. If dust or foreign matter is left in the piping, it will cause product malfunction.</p> <p>b) Pipe after confirming the "IN" and "OUT" display, which shows the inlet and outlet of air. Reverse connection will result in malfunction.</p> <p>c) Make sure that foreign matter does not enter the piping when screwing on the pipes and joints. Be careful so chips and sealants do not enter the piping when screwing on the pipes and joints. Residual dust and foreign matter degrades product performance.</p> <p>d) When piping, tighten the port with proper tightening torque.</p> <p>e) When piping is finished, and before supplying cleaned compressed air, make sure to confirm air leakage from all connections.</p> <p>f) Make sure that connected pipes will not detach due to vibration, looseness, or tension. Detached pipes are dangerous.</p> <p>g) Make sure that no bending moments are applied to the body and piping due to weight of the pipes.</p> <p>h) When connecting the product parallel, do not form a closed circuit at the secondary side (see figure below). If a closed circuit is needed, be sure to insert a check valve at the secondary side of each product.</p> <div style="text-align: center;">  </div>
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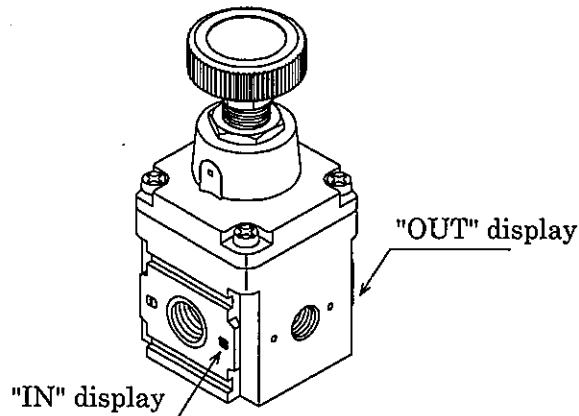
(1) When piping, flush and remove foreign matter with air blow or the like just before connecting to devices.



(2) Use seal tape or sealing material for piping. Leave two thread crests without seal tape or sealing material. Be careful not to have sealant dusts enter the piping and devices.

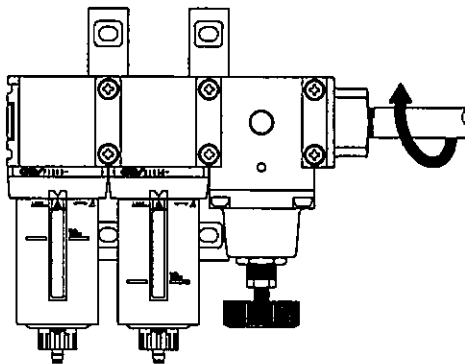


(3) Pipe after confirming the "IN" and "OUT" sides of the product.



(4) When piping, tighten the ports with proper tightening torque.

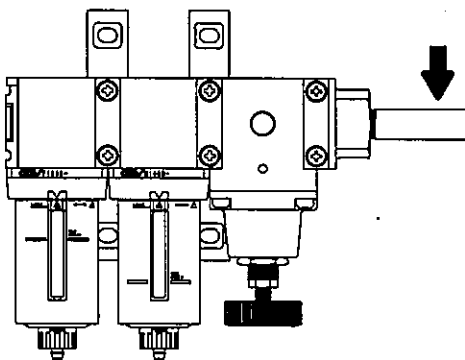
Observe this item to prevent air leakage and damage to screws. To prevent damage to the screw crests, first, tighten the pipes by hand. Next, use a tool to tighten further.



Pipe size	Tightening torque N·m
Rc1/8	3 to 5
Rc1/4	6 to 8

(5) Make sure no pipe weight or torque is applied to the body and piping.


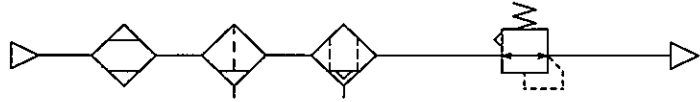
Do not perform cantilever piping, since it leads to excessive force, and is prone to breakage.




	Maximum torque N·m
RPE1000	15

### 3. Instructions for proper use

#### 3. 1 Handling precautions

 <p><b>WARNING</b></p>	<p>a) Always use within the specified pressure range. This product is designed only for cleaned compressed air circuits. Use of the product beyond the specified pressure and temperature may cause breakage or malfunction.</p> <p>b) Provide measures to prevent harm to operators or objects if this product fails.</p> <p>c) This product is for industrial use. Do not use this product for medical and fatal devices and circuits.</p> <p>d) If regulator secondary pressure exceeds set pressure, and if that pressure breaks or malfunctions devices located on the secondary side, be sure to install a failproof.</p> <p>e) Convey cleaned air that is free of solids, moisture, and oil using an air dryer, filter, and oil mist filter. Do not use lubricated air.</p> <p>&lt;Recommended air circuit&gt;</p> <div style="text-align: center;">  <p style="text-align: center;">Air dryer    Filter    Oil Mist Filter    Precision Regulator</p> </div> <p>In addition to above, maintain the piping clean. When the secondary pressure is released, air at the secondary side flows through the regulator, and is exhausted at the EXH port. So, if the regulator secondary side is dirty, regulator performance will degrade.</p>
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 <p><b>CAUTION</b></p>	<p>a) Do not use fluids other than compressed air. Use of corrosive gas, and air mixed with liquids and chemicals, will break the main body and degrade rubber parts, resulting in poor pressure adjustment.</p> <p>b) When piping is finished and cleaned compressed air is to be flown, supply pressure gradually.</p> <p>c) Confirm pressure at the primary side before setting pressure. Do not turn the Pressure Adjusting Knob when the primary side is atmospheric pressure. Otherwise, the performance will degrade.</p> <p>d) Pressure differential between the primary and secondary sides shall be 0.1 MPa or more.</p> <p>e) Depending on the intended usage, pulsing beat or noise may occur due to resonance with air flow (especially for air blow). Suppress pressure at the primary side, or enlarge the capacity at the secondary side.</p> <p>f) Switching flow directions of directional control valves at the primary side of the regulator will change the set pressure at the secondary side largely. Such valves should be placed at the secondary side.</p> <p>g) After adjusting the pressure, tighten the Lock Nut to fix the Pressure Adjusting Knob.</p> <p>h) For precise pressure control, air needs to be exhausted from the EXH port when air is not consumed at the secondary side. Do not close the EXH port. The EXH port exhausts 1 ℓ/min or less air to the atmosphere.</p> <p>i) We recommend to use this product at a constant temperature, since set pressure changes due to change in ambient temperature.</p>
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(1) Pressure at the secondary side cannot be set above that of the primary side.

(2) Turn the Pressure Adjusting Knob clockwise to raise the pressure, and counterclockwise to drop it.

## 4. Maintenance

### 4.1 Maintenance and inspection

 <b>CAUTION</b>	<p>a) Shut off power supply, stop supplying pressure, and confirm that all residual pressure is released before performing maintenance.</p>
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#### (1) Daily inspection

- When performing maintenance and inspection, read the instruction manual and understand its contents before work.
- Confirm normal operation before using this product.

#### (2) Periodical inspection

- To maintain optimum performance, inspect this product every half year normally.
- Inspect set pressure using a pressure gauge or other equipments.
- Check for abnormal leakage from the EXH port.
- We recommend to check for leakage from the piping.

### 4.2 Disassembling and assembling method

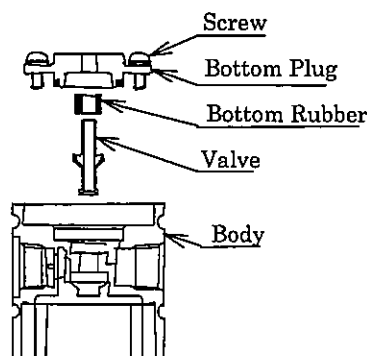
 <b>CAUTION</b>	<p>a) Person with sufficient knowledge shall disassemble and assemble pneumatic equipments. You need to understand the structure and the operation principle of pneumatic equipments. You additionally need knowledge to secure safety. Knowledge required is "Pneumatic circuits and apparatus devices assembling 2nd grade" or more.</p> <p>b) Read the instruction manual of pneumatic equipments well and understand its contents before disassembling and assembling work. You need to understand the structure and the operation principle of pneumatic equipments. You additionally need knowledge to secure safety.</p>
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#### (1) Disassembling and assembling method of the Valve and Bottom Rubber

As shown in the figure below, detach the four screws on the Bottom Plug using a phillips screwdriver.

When assembling, tighten the four screws on the Bottom Plug equally with tightening torque 0.8N·m.

Note: Be careful so foreign matter does not enter when assembling the product. This product may change its performance if fine dust enters the product.



(2) Disassembling and assembling the Pilot Assembly, Diaphragm Assembly, and Pressure Adjusting Spring  
 [Disassembling]

1. Rotate and loosen the Pressure Adjusting Knob until the compressing force of the Pressure Adjusting Spring is released.
2. As shown in the figure below, disassemble the product by detaching the four screws on the Cover using a phillips screwdriver.

Note: Be careful not to lose parts, since parts consisting the Pilot Assembly is not fixed.

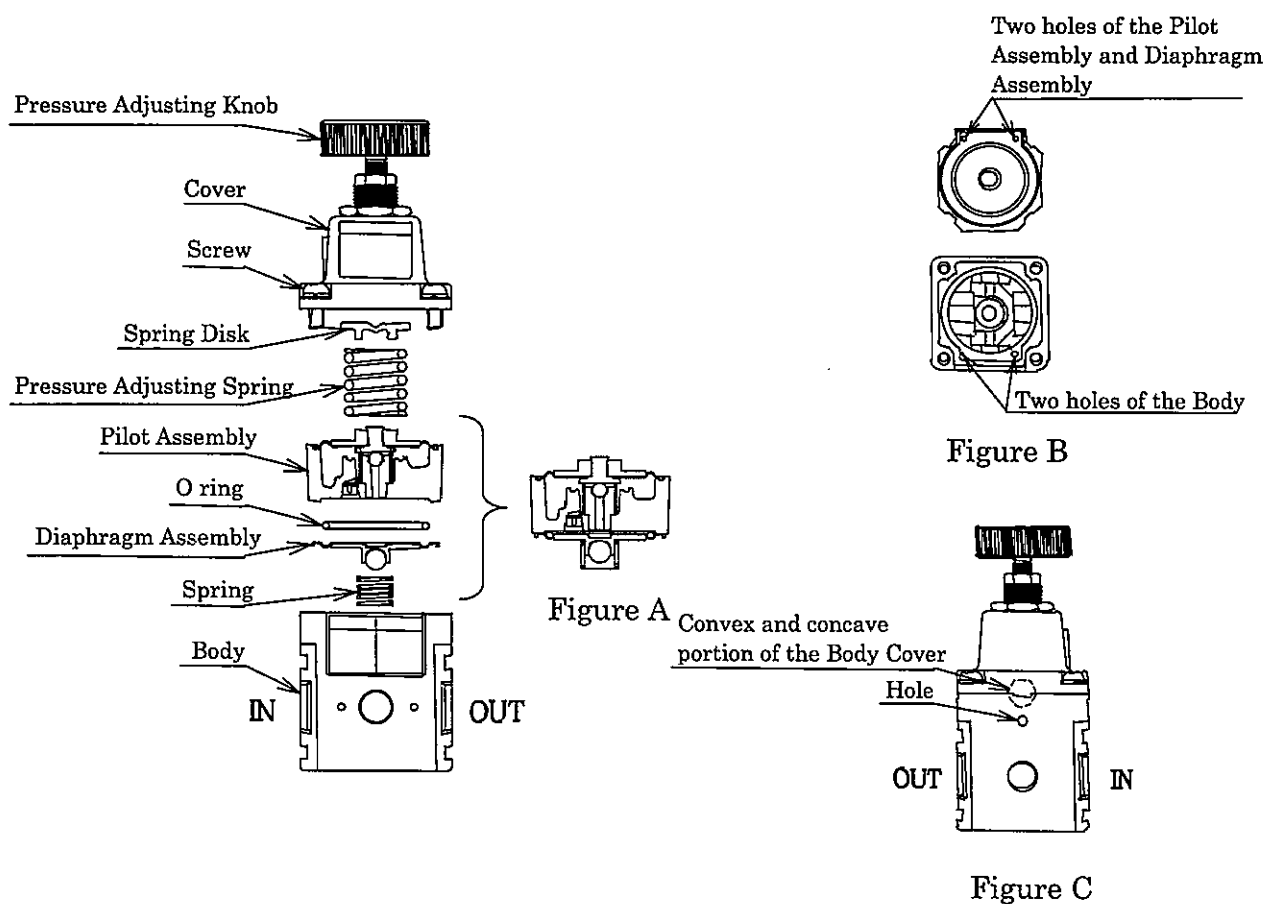
[Assembling]

The product can be assembled by the opposite process of disassembling. Follow the figure when assembling.

Note: Be careful so foreign matter does not enter when assembling the product. This product may change its performance if fine dust enters the product.

Precautions when assembling:

1. Fit the O ring into the groove of the Pilot Assembly.
2. When assembling the Diaphragm Assembly and Pilot Assembly, match the two holes. Next, place the Spring (Figure A).
3. When assembling the Body and Pilot Body Assembly, match the two holes (Figure B).
4. Place the Pressure Adjusting Spring and Spring Disk on top.
5. When assembling the Cover and Body, match the convex and concave (Figure C).
6. Tighten the four Screws on the cover equally with tightening torque 1.8N·m.



## 5. Troubleshooting

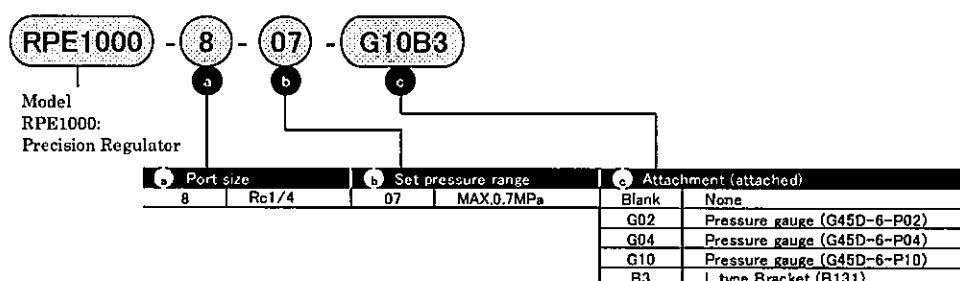
State of failure	Cause	Countermeasure
Pressure does not rise	Lack of pressure at the primary side	Pressure at the primary side must be at least 0.1MPa higher than that of the secondary side. Check pressure at the primary side.
	Pipe at the primary side is either too long, or restricted.	Shorten the pipe at the primary side, or broaden the pipe diameter.
	Malfunction of the pressure gauge	Replace the pressure gauge.
	Air consumption is too large.	Replace the product that has more flow capacity.
	Orifice is clogged. (Set the secondary side to 0 MPa. Confirm no air outlet from the EXH port.)	Refer to "Disassembling and assembling the Pilot Assembly" (page 9), and replace the Pilot Assembly.
Leaks abnormally from the EXH port.	IN·OUT is connected in reverse.	Correct the mounting direction.
	Back pressure is applied.	Confirm any abnormalities on the circuit.
	Dust sticks on the valve.	Refer to "Disassembling and assembling the Valve" (page 8), and disassemble and remove dust.
	Valve has flaws.	Refer to "Disassembling and assembling the Valve"(page 8), and replace the Valve.
Leaks from the Cover.	Diaphragm is damaged.	Refer to "Disassembling and assembling the Pilot Assembly" (page 9), and replace the Pilot Assembly.
The secondary side pressure beats like a pulse	Capacity at the secondary side is small, and pressure differential between the primary and secondary sides is large.	Enlarge the capacity at the secondary side, or suppress pressure at the primary side as low as possible.
Abnormal noise sounds from the secondary side.	Capacity at the secondary side is small, and pressure differential between the primary and secondary sides is large.	Enlarge the capacity at the secondary side, or suppress pressure at the primary side as low as possible.

## 6. Product specification and model number display

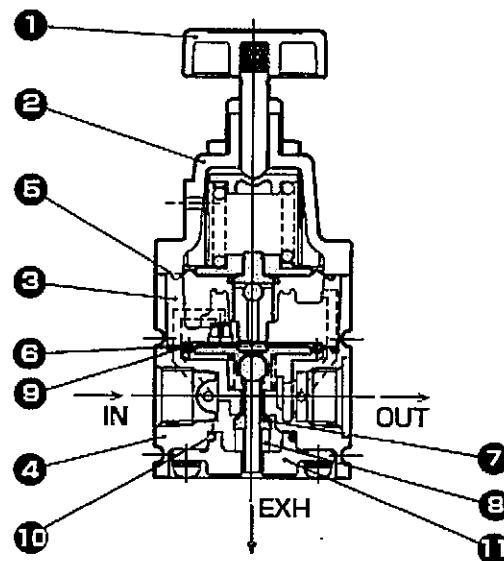
### 6.1 Product specification

Descriptions	RPE1000-8-07	
Working fluid	Cleaned compressed air	
Max. working pressure	MPa	1.0
Min. working pressure	MPa	Set pressure + 0.1
Withstanding pressure	MPa	1.5
Ambient and fluid temperature	°C	-5 to 60 (to be unfrozen)
Set pressure range	MPa	0.01 to 0.7
Sensitivity	Within 0.2% of full span	
Repeatability	Within 0.5% of full span	
Air consumption	l/min(ANR)	0.2 or less
Port size	Rc1/4	
Pressure gauge port size	Rc1/8	
Mass	g	250

### 6.2 Model number display



## 6. 3 Internal construction, parts list, and consumable parts list



No.	Parts name	Material
1	Pressure adjustment knob	POM, stainless steel
2	Cover	Aluminum alloy die casting
3	Pilot body assembly	Aluminum alloy die casting etc.
4	Body	Aluminum alloy die casting
5	Pilot diaphragm assembly	Special nitrile rubber and Zinc die casting etc.
6	Main diaphragm assembly	Special nitrile rubber and Zinc die casting etc.
7	Valve	Special nitrile rubber and stainless steel
8	Bottom rubber	Silicon rubber
9	O ring	Nitrile rubber
10	O ring	Special nitrile rubber
11	Bottom plug	PBT resin