

INSTRUCTION MANUAL CLEAN REGULATOR RC2000

- 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 instruction manual carefully and fully understand its contents for proper operation.**

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

Note that precautions are divided into three categories: "Caution," "Warning," and "Danger" to clearly indicate the degree of harm or damage and the likelihood of it occurring.



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 CAUTION 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>



CAUTION

- 1) To prevent foreign matter from entering the inside of the product, do not unpack the product immediately before installing the piping.
- 2) Unpack this product in a clean room.
This product has been double-packaged in a clean room. It is recommended to open the first packaging, bring it into the clean room, and then open the second packaging just before installing the piping.

<Installation>

Installation environment



CAUTION

- 1) Where vibration or impact exists.
- 2) Where the ambient temperature is beyond a range of 5°C - 60°C.
- 3) Where the working fluid freezes.
- 4) Where the water drop or cutting oil is splashed onto the product
- 5) Where humidity is high and temperature changes largely, causing dew condensation.
- 6) Where sea breeze or seawater is splashed onto the product.
- 7) Where corrosive gas, fluid or chemical exists.
- 8) Where the product is exposed to the direct sunlight.

Installation



CAUTION

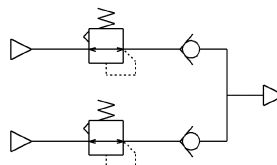
- 1) Do not move or swing the product with the pressure regulation knob kept held
- 2) Installing a regulator in panel
When the panel-mounting nut is loosened, the nut acts as a jack and allows the knob to be removed easily. Fix the nut to install in the panel. Install the nut before installing the knob.
- 3) Securing maintenance space
Ensure enough space for maintenance and inspection.

Piping



CAUTION

- 1) Flush and clean the piping to be used.
If dust or foreign matter remains in the piping, it may cause the product to malfunction.
- 2) Make sure that foreign matters do not enter when screwing the pipes or joints.
When screwing in piping and joints, be careful not to let chips from the piping threads or sealing material get mixed in. If dust or foreign matter remains in the piping, it may cause the product to malfunction.
- 3) Confirm the flow direction indicated with the arrow and correctly connect the product. If installed in the opposite direction, it will not function properly.
- 4) When connecting the piping, tighten it using a proper tightening torque.
- 5) Carefully connect the piping so that no bending moment caused by the piping load is applied to the body and piping section.
- 6) When connecting the products in parallel as shown below, do not make the secondary side a closed circuit. If the closed circuit is required, always put a check valve on each secondary side.



- 7) Plug the pressure gauge connection port with a pressure gauge or pipe plug.

<Proper operation>



WARNING

- 1) Always operate the product within its specifications
- 2) If the output pressure exceeding the set pressure value of the regulator may cause the secondary unit to break or malfunction, be sure to install an appropriate safety equipment.



CAUTION

- 1) Check the working circuit and working fluid.
Malfunctions could occur if fluid containing solid, or fluid not within the specifications is passed. Connect a filter to the primary side of the product to prevent solid matters from entering.
- 2) Set secondary side pressure of the regulator to 85% or less of the primary side, or else the pressure drop could increase.
- 3) Release the lock before adjusting the pressure.
Forcing the pressure adjustment knob to operate while locked may result in damage.
- 4) Adjust the pressure in the pressure upward direction.
The pressure cannot be set correctly if adjusted in the downward direction. When turning the pressure adjustment knob clockwise, the secondary pressure will rise, and when turning it counterclockwise, the pressure will drop.
(The pressure may not drop depending on how the non-relief type is used.)
- 5) Pulsations may occur depending on the working conditions and piping conditions.
If pulsations occur, lower the primary pressure.
When using the standard type with a setting pressure of 0.4 MPa or less, set the primary pressure so that the pressure difference from the set pressure is within 0.5 MPa. For low-pressure type, set the primary pressure so that the pressure difference from the set pressure is within 0.3 MPa. Note that pulsations may occur even under these conditions depending on the piping conditions or circuit. In that case, please consult with CKD.
- 6) With the non-relief type, pressure cannot be reduced if there is no consumption on the secondary side.
- 7) Lock the pressure adjustment knob after adjusting the pressure.
- 8) When the primary pressure is released, the secondary pressure will flow to the primary side.
If faults occur in other devices when the fluid on the secondary side flows to the primary side, provide a circuit to maintain the pressure.

<Maintenance>



CAUTION

- 1) Before starting the maintenance work, turn OFF the power, shut down the supply pressure, and make sure that no residual pressure remains.
- 2) Do not disassemble the product. The specifications may not be satisfied when reassembled. If disassembly is required, please contact us or our distributor.

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RC2000 CLEAN REGULATOR


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1. Unpacking

 CAUTION	<ol style="list-style-type: none">1) To prevent foreign matter from entering the inside of the product, do not unpack the product immediately before installing the piping.2) Unpack this product in a clean room. This product has been double-packaged in a clean room. It is recommended to open the first packaging, bring it into the clean room, and then open the second packaging just before installing the piping.
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- 1) Make sure that the model code indicated on the product matches the product that you have ordered.
- 2) Check the exterior of the product for damage.
- 3) Before starting operation, thoroughly read this instruction manual, as well as that supplied with the product.


2. Installation

2.1 Installation environment

 CAUTION	<ol style="list-style-type: none">1) Where vibration or impact exists.2) Where the ambient temperature is beyond a range of 5°C - 60°C.3) Where the working fluid freezes.4) Where the water drop or cutting oil is splashed onto the product5) Where humidity is high and temperature changes largely, causing dew condensation.6) Where sea breeze or seawater is splashed onto the product.7) Where corrosive gas, fluid or chemical exists.8) Where the product is exposed to the direct sunlight.
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- 1) Impacts, vibration or corrosive gases could result in the cover damage or external leaks.

2.2 Installation

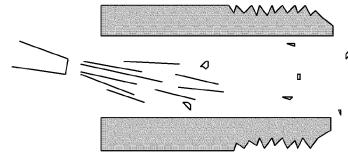
 CAUTION	<ol style="list-style-type: none">1) Do not move or swing the product with the pressure regulation knob kept held2) Installing a regulator in panel When the panel-mounting nut is loosened, the nut acts as a jack and allows the knob to be removed easily. Fix the nut to install in the panel. Install the nut before installing the knob.3) Securing maintenance space Ensure enough space for maintenance and inspection.
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- 1) The main body can be installed in any mounting direction.
- 2) The flat-to-flat distance of the panel-mounting nut is 35 mm. The screw is M30 x pitch 1.5

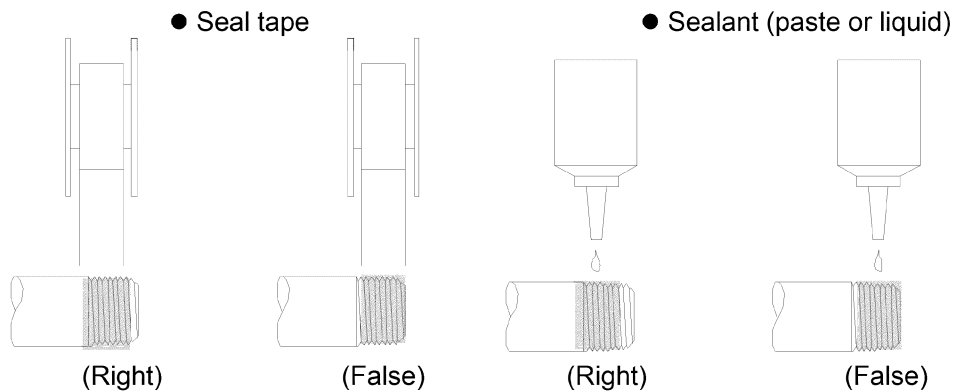
2.3 Piping

 CAUTION	<p>1) Flush and clean the piping to be used. If dust or foreign matter remains in the piping, it may cause the product to malfunction.</p> <p>2) Make sure that foreign matters do not enter when screwing the pipes or joints. When screwing in piping and joints, be careful not to let chips from the piping threads or sealing material get mixed in. If dust or foreign matter remains in the piping, it may cause the product to malfunction.</p> <p>3) Confirm the flow direction indicated with the arrow and correctly connect the product. If installed in the opposite direction, it will not function properly.</p>
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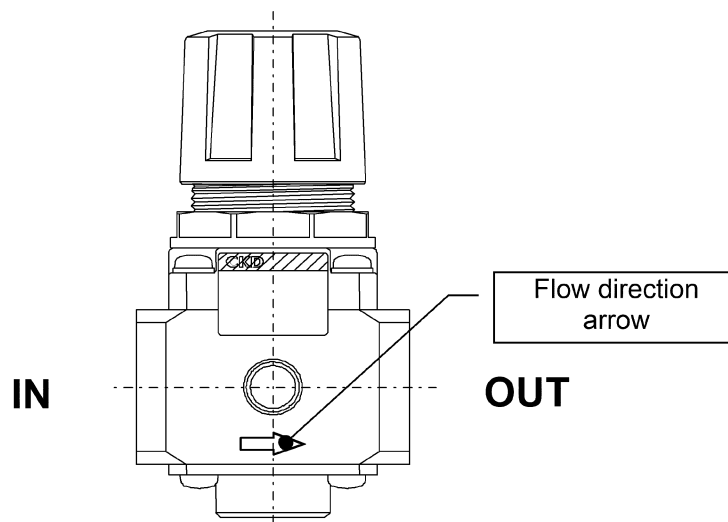
- 1) When piping, remove foreign matter using an air blow or the like just before piping.



- 2) Use sealing tape or sealant on the piping, avoiding the first two threads from the end of the thread. Be careful not to let any sealant debris or sealant residue get inside the pipe or equipment.

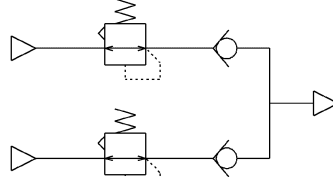


- 3) Before connecting the piping, always check the IN and OUT markings shown on the product.



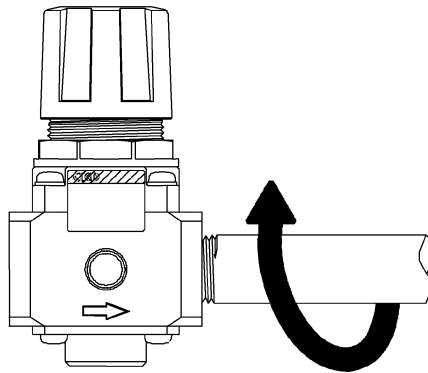


- 4) When connecting the piping, tighten it using a proper tightening torque.
- 5) Carefully connect the piping so that no bending moment caused by the piping load is applied to the body and piping section.
- 6) When connecting the products in parallel as shown below, do not make the secondary side a closed circuit. If the closed circuit is required, always put a check valve on each secondary side.



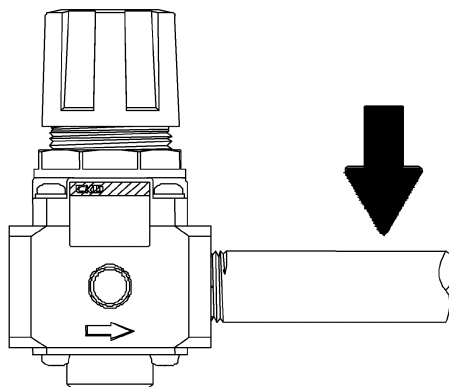
- 7) Plug the pressure gauge connection port with a pressure gauge or pipe plug.

- 4) When connecting the piping, tighten it using a proper tightening torque.
 - The purpose is to prevent air leakage and damage to the threads. To avoid damaging the threads, tighten the pipe by hand at first, and then use the tool.



Connection port size	Tightening torque (N·m)
Rc1/8	3 to 5
Rc1/4	6 to 8
Rc3/8	13 to 15
Rc1/2	16 to 18

- 5) Do not apply piping load or torque to the body and piping section.
 - Avoid cantilevered piping as it may cause damage due to excessive force.



	Max. torque N·m
RC2000	50

3. Proper operation



WARNING

- 1) Always operate the product within its specifications
- 2) If the output pressure exceeding the set pressure value of the regulator may cause the secondary unit to break or malfunction, be sure to install an appropriate safety equipment.



CAUTION

- 1) Check the working circuit and working fluid.
Malfunctions could occur if fluid containing solid, or fluid not within the specifications is passed. Connect a filter to the primary side of the product to prevent solid matters from entering.
- 2) Set secondary side pressure of the regulator to 85% or less of the primary side, or else the pressure drop could increase.
- 3) Release the lock before adjusting the pressure.
Forcing the pressure adjustment knob to operate while locked may result in damage.
- 4) Adjust the pressure in the pressure upward direction.
The pressure cannot be set correctly if adjusted in the downward direction. When turning the pressure adjustment knob clockwise, the secondary pressure will rise, and when turning it counterclockwise, the pressure will drop.
(The pressure may not drop depending on how the non-relief type is used.)
- 5) Pulsations may occur depending on the working conditions and piping conditions.
If pulsations occur, lower the primary pressure.
When using the standard type with a setting pressure of 0.4 MPa or less, set the primary pressure so that the pressure difference from the set pressure is within 0.5 MPa. For low-pressure type, set the primary pressure so that the pressure difference from the set pressure is within 0.3 MPa. Note that pulsations may occur even under these conditions depending on the piping conditions or circuit. In that case, please consult with CKD.
- 6) With the non-relief type, pressure cannot be reduced if there is no consumption on the secondary side.
- 7) Lock the pressure adjustment knob after adjusting the pressure.
- 8) When the primary pressure is released, the secondary pressure will flow to the primary side.
If faults occur in other devices when the fluid on the secondary side flows to the primary side, provide a circuit to maintain the pressure.


- 1) A pressure higher than the primary pressure cannot be set.
- 2) Pull the pressure adjustment knob to unlock it. Push the pressure adjustment knob in to lock it.
- 3) Manually operate the pressure adjustment knob. Use of tools, etc., may result in damage.
- 4) The set pressure may deviate slightly when the pressure adjustment knob is locked.
- 5) When the primary pressure is released, the secondary pressure will flow to the primary side.
However, if a backpressure is applied, it may not flow to the primary side.

4. Maintenance

4.1 Inspection

- 1) Daily inspection
 - Before operating the product, it is recommended to inspect the set pressure using a pressure gauge.
- 2) Periodic Inspection
 - To operate the product in its optimal operating state, carry out the periodic inspection normally once every six months.
 - Inspect the set pressure using a pressure gauge.
 - It is recommended that the piping be inspected for leaks.

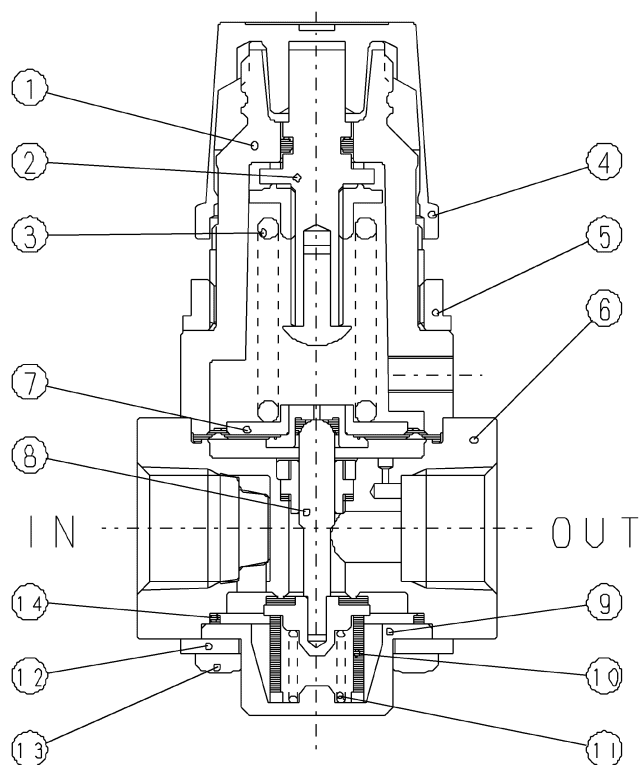
4.2 Disassembly and assembly

	CAUTION	<ol style="list-style-type: none"> 1) Before starting the maintenance work, turn OFF the power, shut down the supply pressure, and make sure that no residual pressure remains. 2) Do not disassemble the product. The specifications may not be satisfied when reassembled. If disassembly is required, please contact us or our distributor.
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5. Troubleshooting

Problem	Cause	Countermeasure
When the primary pressure is applied, air may leak from the exhaust treatment connection section on the cover.	IN and OUT ports are connected reversibly.	Correct the mounting direction.
Pressure does not increase.	Primary pressure is insufficient.	Check the primary pressure.
	Primary piping is too long or restricted.	Make the primary piping shorter or the piping size larger.
	The needle on the pressure gauge does not move.	The pressure gauge may be faulty. Replace the pressure gauge with a new one.
The pressure does not drop.	Backpressure is applied to the regulator.	Consider whether there is a systemic problem.
	Non-relief type, so it does not relieve.	Change to a relief-type product.
Leak occurs from the cover. The set pressure rises abnormally.	Dust is sticking to the valve. The diaphragm is broken.	Replace the product.
Secondary pressure pulsates.	Pulsation may occur depending on the piping conditions and usage methods.	Lower the primary pressure or restrict the piping.

6. Internal structure



Part No.	Part name	Material (treatment)
1	Cover	PA66
2	Pressure adjustment screw assembly	Steel, SUS, FKM, POM
3	Spring	Steel
4	Knob	POM
5	Mounting nut	Zinc die-cast, (nickel plated)
6	Body	SUS316, FKM, PTFE
7	Diaphragm	SUS316, FKM, SUS303
8	Valve	SUS316, FKM
9	Bottom cap	SUS316
10	Bottom rubber	FKM
11	Spring	SUS316
12	Plate	SUS304
13	Screw	Steel, (nickel plated)
14	O-ring	FKM

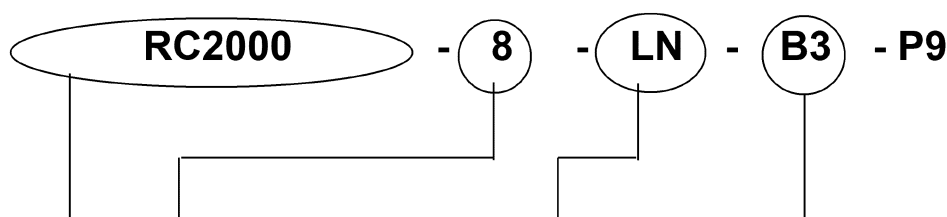
7. Product specifications and model number coding

7.1 Product specifications

Item	RC2000-8	RC2000-10	RC2000-15
Working fluid	Compressed air, N ₂		
Max. working pressure MPa	1.0 (In case of option L: 0.5 MPa)		
Guaranteed proof pressure MPa	1.5		
Ambient temperature/fluid temperature °C	5 to 60		
Set pressure range MPa	Standard: 0.05 - 0.7 Low pressure: 0.02 - 0.2		
Connection pipe size (IN/OUT)	Rc1/4	Rc3/8	Rc1/2
Pressure gauge connection pipe size	Rc1/8		
Product mass kg	0.47	0.45	0.59
Wetted areas materials	Metal	SUS316	
	Resin	PTFE	
	Rubber	FKM	
Assembling, inspection and packaging	Integrated production in a clean room		
Washing (wetted areas)	Precision cleaning		

Note 1: When using the standard type with a setting pressure of 0.4 MPa or less, set the primary pressure so that the pressure difference from the set pressure is within 0.5 MPa. For low-pressure type, set the primary pressure so that the pressure difference from the set pressure is within 0.3 MPa.

7.2 Model number coding



Model	Pipe size		Option			Attachment	
RC2000	8	Rc1/4	Pressure range Note 2	Blank	0.05 - 0.7 MPa	Blank	No attachment
	10	Rc3/8		L	0.02 - 0.2 MPa	G49P	Pressure gauge
	15	Rc1/2	Relief mechanism	No symbol	Relief type	B3	L-type bracket
		N		Non-relief type	E1	Joint (for exhaust treatment)	
Attachment symbol		Model code of sole attachment					
G49P		Standard		G49D-6-P10-P9			
		Low pressure		G49D-6-P02-P9			
B3		RC2000-B3					
E1		RC2000-E1					

