CKD

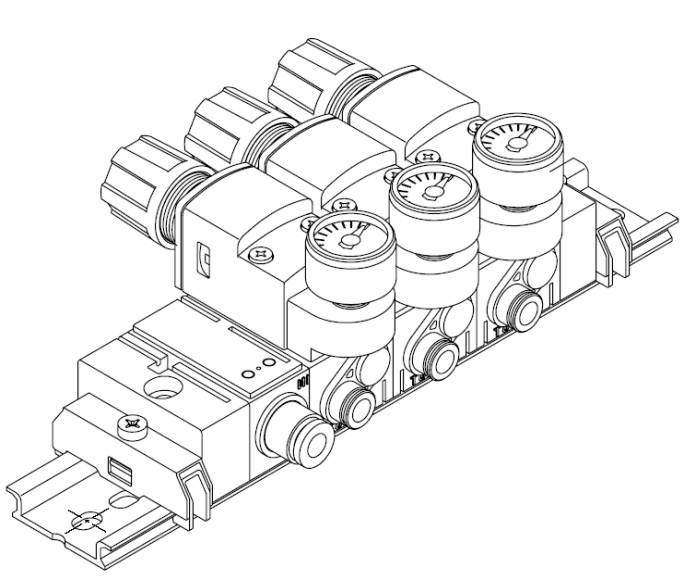
SM-288427-A

INSTRUCTION MANUAL

COMPACT DIRECT OPERATING PRECISION REGULATOR

MIX MANIFOLD OF RJB500

MNRJB500 Series



- **Please read this instruction manual carefully before using this product, particularly the section describing safety.**
- **Retain this instruction manual with the product for further consultation whenever necessary.**

CKD Corporation

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

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.
   Consult with CKD for details when using the product beyond the unique specification range, outdoors, or in the following conditions or environment: Additionally, the product must not be modified or machined.
   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, body 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. Discharge any compressed air from the system, and pay enough attention to possible water leakage and leakage of electricity.
   ④When starting or restarting a machine or device that incorporates pneumatic components, make sure that the 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. Failure resulting from causes that could not be foreseen by the technology available at the time of delivery.
⑤ 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

1) Make sure that the model number indicated on the product is matched with that you have ordered.
2) Check the exterior of the product for damage.
3) When the instruction manual supplied with the product thoroughly read this manual as well as that before starting operation.

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

2. INSTALLATION

2.1 Installation Environment

1) When ambient temperature exceeds range of 5 to 60℃.
2) The air may be frozen.
3) The water drop or coolant is splashed onto the product.
4) Corrosive gas, or fluid chemical exists.
5) An atmosphere where spatter could scatter.
6) Where the product is exposed to direct sun lay and when sea breeze or seawater or water contacts to the product.
7) The humidity is high and the temperature changes largely, causing dew condensation.
8) An environment where ozone generated.
9) Excessive vibration or impact exists.

⚠ WARNING Avoid using products in an atmosphere where vibration or impact is applied, chemicals or inorganic chemicals are contained in compressed air, or where they could lead to the product damage and accidents.

2.2 Piping

1) Connect the piping so that air will flow in the direction of the arrow marked on the regulator piping block.
2) Install a 5μm air filter in the IN port of the regulator.
3) Install a pressure gauge in the gauge port. If a puressure gauge is not used, install a pipe plug instead.
4) Flush the pneumatic piping completely before connection.

5) Applicable piping tubes.

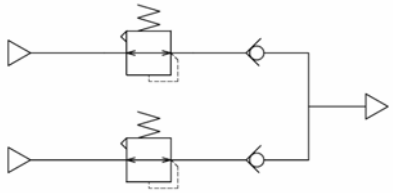
A push in joint is used in connection. Tube coming off or air leakage could occur depending with outer diameter precision, wall thickness or hardness of piping tube. Use CKD specified tube.

Tube	Outer diameter	Outer diameter tolerance	Inner diameter	Minimum bending radius
Soft nylon F-1500 series	φ4	±0.1	φ2.5	10
	φ6		φ4	20
	φ8		φ5.7	30
Urethane U-9500 series	φ4	+0.1 -0.15	φ2	10
	φ6		φ4	20
	φ8	+0.1 -0.2	φ5	30
Urethane NU series	φ4	±0.1	φ2.5	8
	φ6		φ4.5	15
	φ8		φ6	28

6) For tube used with push in joint, cut the tube to right angle by the dedicating tool, insert certainly, check does not dislocate before starting use. When mounting or dismounting a tube, press the release ring equally, while not twisting, then pull out the tube.

⚠ CAUTION

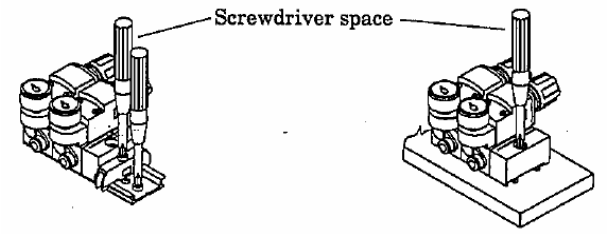
1) Flush the air piping to be used sufficiently before connecting the filter to it.
   If dust or sealant enters the inside of the pipe during piping work, this may cause the product performance down.
2) Confirm the flow direction indicated with the arrow and correctly connect the product. Installation in the reverse direction will shorten the product life.
3) When piping, do not apply excessive force to the product.
   When installing the product and piping, do not apply the product tension, compression, bending, moment cased by the tube.
4) When connection 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.



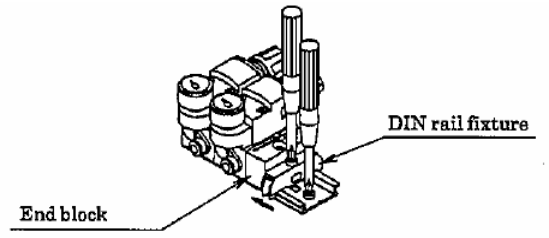
5) When installing a pressure gauge, screw the gauge into using wrench on across flats of square section. If another section is used on, air leakage or damage may be caused.

2.3 Installation

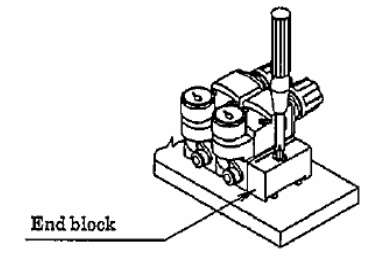
1) Do not move or swing the regulator by holding the pressure adjustment knob.
2) Install the regulator as close to the intended pneumatic unit as possible.
3) When disassembling the regulator, secure enouth spase for disassembly.



4) When installing the block manifold DIN rail-mounted type, fix the DIN rail, and secure the DIN rail fixtures on the outer side of the right and left end blocks that are attached to both end faces of the manifold.
   Tighten the DIN rail fixture set screws to 1.4~2.0N·m.
   Fix the DIN rail fixtures by holding them close to the end blocks. Follow this rule during addition of a regulator block, maintenance or disassembly.



5) To directly mount the regulator without using the DIN rail, fasten both end blocks with M4 screws. Tighten the screws to 1.4~2.0N·m.
   Mount the regulator on a flat bearing face. If external force is applied from the top to the regulator on a face that is not mounted on a bearing face, this will damage the couple portions of the manifold. If no bearing face is available, use a rail-mounted type DIN.



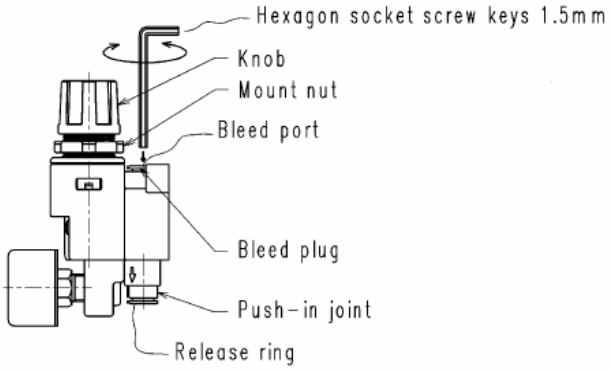
6) Do not install the regulator in a location affected by vibration or impact.

⚠WARNING When installing the product, certainly tighten with the bracket set screw. The pressure may cause the product vibration, and an accident.

3. OPERATION

3.1 Precautions

1) Check the primary pressure before setting the pressure.
2) Pressure higher then the primary pressure can not be set.
3) Pull the pressure adjustment knob to unlock it Push the pressure adjustment knob in to lock it.
4) Release the lock, turn the pressure adjustment knob clockwise to increase secondary pressure, and counter clockwise to lower pressure. After adjusting pressure, fix the adjustment knob. The set pressure may deviate slightly, when the pressure adjustment knob is locked.
5) Keep the pressure difference between the primary and secondary sides to 0.1~0.7MPa or less.
6) Air constantly leaks from the constant bleed port. This is necessary for precise pressure control, so do not plug the hole.
7) Turn the setscrew realized adjusting the constant bleed flow in the constant bleed port. The constant bleed flow increase in proportion to the set pressure. But this flow can decrease in 0.1MPa or less. Increase constant bleed flow in low pressure area enables increase the set pressure sensitivity. The constant bleed flow is set 1.5L/min(ANR) primary. Adjust the flow to insert the hexagon socket screw keys in the constant bleed port. After pressure setting, check does not increase. When setting the constant bleed, do not turn the setscrew completely. The pressure may be not able to adjust, and result in damage.



⚠ WARNING

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

⚠ CAUTION

1) Set secondary side pressure of the regulator to 0.1MPa or less of the primary side, or else the pressure drop could increase.
2) Pull the pressure adjustment knob and release the lock before setting the regulator pressure. The regulator could be damaged if the pressure is set without releasing the lock.
3) Pulsations may occur, depending on the working conditions and piping conditions even if a pressure difference between the primary pressure and the secondary pressure to within 0.7MPa. In this case, lower the primary pressure. Consult with CKD if pulsations or oscillating sound may still does not cease.
4) When pressure setting, confirm the set pressure to change directional control valve. Failure to observe this obstructs could result in set pressure change greatly.
5) If the regulator is repeatedly ON and OFF with the directional control valve on the primary side, the set pressure may change greatly. Thus, the directional control valve should be installed on the secondary 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

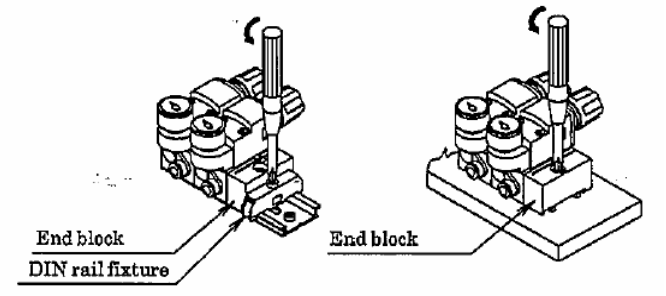
・To operate the product in its optimal operationg state, carry out the periodic inspection normally once every six months.

・Inspect the set pressure using a pressure gauge.

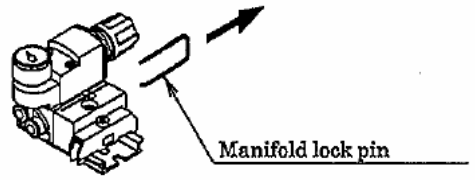
・Check that no leak occurs in the piping.

4.2 Disassembling and Replacing the Regulator Block and the Supply Block

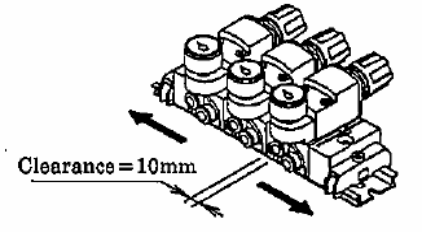
1) When replacing the rail-mounted type DIN, first unfasten the DIN rail fixture set screws. In the case of the direct mounted type that does not use the DIN rail, remove the end block fixing screws.



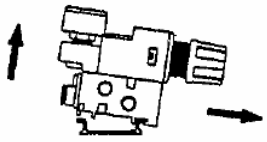
2) Using a thin screwdriver, draw out the manifold lock pin coupling the regulator block or supply block that is to be replaced.



3) Slide the blocks to the end blocks, and allow a clearance of about 10mm on both sides of the block for replacement. Or, draw out both of the direct mounted type end blocks.



4) Raise the pressure gauge side, and draw the block toward the pressure adjustment knob. The block can be removed. By sliding both DIN rail fixtures more than 2mm away from the end blocks, the entire manifold block can be removed.



5) Replace the block with a new one.

6) Keeping the blocks in close contact with each other, insert the manifold lock pin until it touches the bottom of the groove.

7) Fasten the blocks to the manifold by following 4) and 5) of 2.3 Installation.

5. TROUBLE SHOOTING

Trouble symptom	Cause	Remedy
Air leaks from the bottom of the knob ①.	The compressed air flows from the OUT port to the IN port.	Cut off the compressed air, and connect the piping to the IN and OUT ports correctly.
Air leaks ② from a clearance between the regulator and the sub base.	The body packing is shrunken or damaged.	Shut off the compressed air, disassemble the regulator, and replace the damaged part with a new one.
	The body mounting screw is loose.	Shut off the compressed air, and tighten the screw.
The pressure does not increase.	The primary pressure is insufficient.	Check the primary pressure.
	The primary piping is long, or its diameter is small.	Reduce the primary piping length, or increase the piping diameter.
	The indicator of the pressure gauge does not function at all.	Replace the pressure gauge with a new one.
Air leaks from the gauge plug ③.	The gauge plug packing is shrunken or damaged.	Replace the gauge plug packing.
Air leaks from the bottom of the knob ① and set pressure increases abnormally.	Dust is sticking to the valve. Diaphragm is broken.	Replace the product.
Secondary pressure pulsates or sounds of oscillantion.	Pulsates or sounds of oscillation may occur depending on the piping conditions and usage methods.	Lower the primary pressure.
Air leaks from the push-in joint ④.	The tube is not inserted completely.	Confirm whether the tube is inserted completely.
	The seal material of the push-in joint is expanded, shrunken or damaged.	Rplace the puch-in joint with a new one.
Air leaks ⑤ from a clearance between the coupled blocks.	An O-ring is damaged.	Shut off the compressed air, disassemble the regulator, and replace the damaged part with a new one.
	The clearance between the coupled blocks has become wider.	Check the DIN rail fixture set screws and the end block fixing screws for looseness.