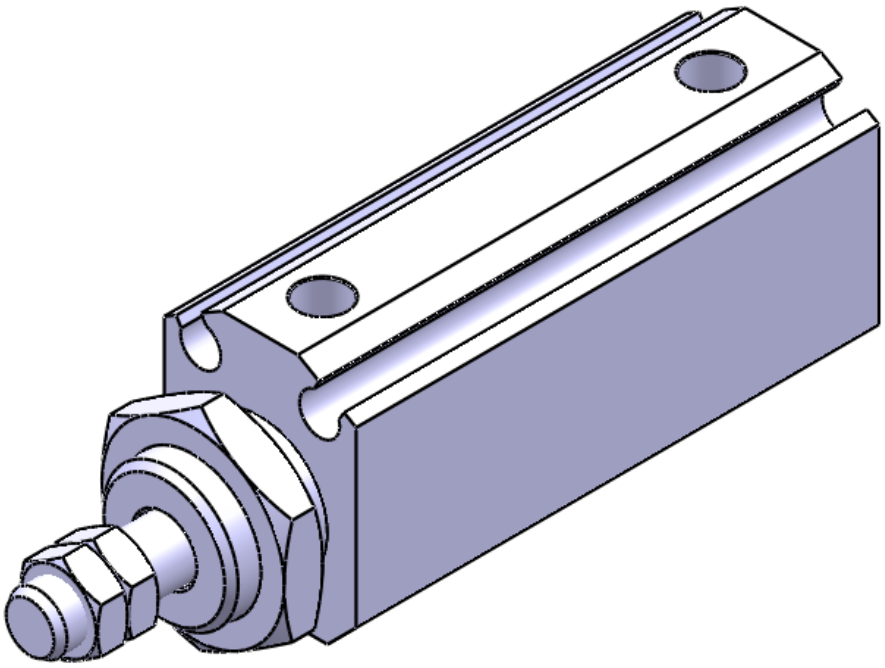
No.	CJP2－OM0002K－A

OPERATION MANUAL

PIN CYLINDER

【CJP2 Series】

Φ4, Φ6, Φ10, Φ16



☆Read this manual thoroughly before mounting and operating the actuator.

☆Pay particular attention to the section concerning safety.

☆Keep this manual in an accessible location.

SMC Corporation

Contents

1. Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of "**Danger**", "**Warning**" or "**Caution**". To ensure safety, be sure to observe ISO 4414*1), JIS B 8370*2) and other safety practices.

■Indications

Indication	Indications
⚠ **Danger:**	In extreme conditions, there is a possible result of serious injury or loss of life.
⚠ **Warning:**	Operator error could result in serious injury or loss of life.
⚠ **Caution:**	Operator error could result in injury*3) or equipment damage*4).

*1) ISO4414: Pneumatic fluid power – General rules relating to systems

*2) JIS B 8370: General Rules for Pneumatic Equipment

*3) An injury does not necessitate staying or going to a hospital for a long period of time to recover. This includes burns and electric shocks.

*4) Equipment damage is extensive damage related to equipment and machines.

■Selection/Handling/Application

①The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalogue information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

②Only trained personnel should operate pneumatically operated machinery and equipment.

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

(A trained and experienced operator is required to have understanding of JIS B 8370 "General Rules for Pneumatic Equipments" and other safety regulations.)

③Do not service machinery/equipment of attempt to remove components until saferyty is confirmed.

1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driver objects have been confirmed.
2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment, exhaust all residual compressed air in the system and relieve all energy (liquid pressure, spring force, capacitor, gravity).
3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc.

④Contact SMC if the product is to be used in any of the following conditions:

1. Conditions and environments beyond the given specifications, or if product is used outdoors or placed where direct sunshine strikes.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.
4. Interlock circuit. In this case, provide double interlock circuit by providing a mechanical protective function for possible failure of either of them. Also, perform periodical checks to ensure it works properly.

■Exemption

①SMC doesn't take any responsibility for the damage resulting from an earthquake, fire due to other causes than our products, the third party behavior and the customer's intentional or unintentional fault, misuse and operation in other abnormal conditions.

②SMC doesn't take any responsibility for the damage associated with use of our product or out-of-service product (including loss of company profits, suspension of company activity).

③SMC doesn't take any responsibility for the damage resulting from the use in the manner other than specified in the catalogue or Operation Manual.

④SMC doesn't take any responsibility for the damage resulting from malfunction due to use of our product in combination with equipments or software from another manufacturer.

2. Specifications

2－1. Specifications

Bore size (mm)	4	6	10	16
Action	Double acting, Single rod			
Max. operating pressure	0.7MPa			
Min. operating pressure	0.15MPa	0.12MPa	0.06MPa	
Proof pressure	1.05MPa			
Ambient and fluid temperature	Without auto switch：−10～70℃ With auto switch：−10～60℃ (No freezing)			
Lubrication	Not required (Non-lube)			
Stroke length tolerance	$^{+1.0}_{0}$ mm			
Thread tolerance	JIS Class 2			
Rod end configuration	With thread / Without thread			
Piston speed	50～500mm/s			
Cushion	Rubber bumper			
Mounting	Basic style, Flange style, Foot style, Clevis style, Trunnion style			

* Only the basic style is available when mounting the 4mm tube.

3. Precautions

3－1. Caution on Design

⚠ Warning

① There is a possibility of dangerous sudden action by air cylinders if sliding parts of machinery are twisted due to external forces, etc.

In such cases, human injury may occur; e.g., by catching hands or feet in the machinery, or damage to the machinery itself may occur. Therefore, the machine should be adjusted to operate smoothly and designed to avoid such dangers.

② A protective cover is recommended to minimize the risk of personal injury.

If a stationary object and moving parts of a cylinder are in close proximity, personal injury may occur. Design the structure to avoid contact with the human body.

③ Securely tighten all stationary parts and connected parts so that they will not become loose.

Especially when a cylinder operates with high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.

④ A deceleration circuit or shock absorber may be required.

When a driven object is operated at high speed or the load is heavy, a cylinder's cushion will not be sufficient to absorb the impact. Install a deceleration circuit to reduce the speed before cushioning, or install an external shock absorber to relieve the impact.

In this case, the rigidity of the machinery should also be examined.

⑤ Consider a possible drop in circuit pressure due to a power outage, etc.

When a cylinder is used in a clamping mechanism, there is a danger of workpieces dropping if there is a decrease in clamping force due to a drop in circuit pressure caused by a power outage, etc. Therefore, safety equipment should be installed to prevent damage to machinery and human injury. Suspension mechanisms and lifting devices also require consideration for drop prevention.

⑥ Consider a possible loss of power source.

Measures should be taken to protect against bodily injury and equipment damage in the event that there is a loss of power to equipment conrtolled by pneumatics, electricity, or hydraulics.

⑦ Design circuitry to prevent sudden lurching of driven objects.

When a cylinder is driven by an exhaust centre type directional control valve or when starting up after residual pressure is exhausted from the circuit, etc., the piston and its driven object will lurch at high speed if pressure is applied to one side of the cylinder because of the absence of air pressure inside the cylinder. Therefore, equipment should be selected and circuits designed to prevent sudden lurching, because there is a danger of human injury and/or damage to equipment when this occurs.

⑧ Consider emergency stops.

Design so that human injury and/or damage to machinery and euqipment will not be caused when machinery is stopped by a safety device under abnormal conditions, a power outage or a manual emergency stop.

⑨ Consider the action when operation is restarted after an emergency stop or abnormal stop.

Design the machinery so that human injury or equipment damage will not occur upon restart of operation. When the cylinder has to be reset at the starting position, install manual safety equipment.

⚠ Caution

① Do not wipe off the grease attached on the sliding face of the cylinder.

If the grease is removed from the sliding part of the cylinder forcibly, a malfunction could occur. When the cylinder has been in operation for a long distance, the sliding parts become discolored black.. In such cases, to prolong cylinder life, wipe off the grease from the sliding parts, and add new grease. (When the grease is wiped off, use water. If it is wiped off with alcohol or special solvent, the seal could be damaged.)

② Avoid giving external force over maximum output to the cylinder.

A pieces of cylinder broken by the force may damage the human and the device.

③ Don't use plural cylinders synchronously without guide.

It is difficult to control speed of the cylinder using air, whitch is compressive fluid, because speed is given an effect by change of supplied pressure, load, temperature, lubrication and each part, and difference of the performance of each cylinder. For a short time, it is possible to adjust speed of plural cylinders by speed controller, but for a long time, above mentioned factors may break synchronisum of those cylinders. If synchronism is broken, lateral load caused by difference of position is given to piston rod and may wear seal and bearing, and make galling to cylinder tube and piston. If it is necessary to use plural cylinders synchronously, use the guide with hardness and high accuracy not to make difference to speed of each cylinder which has individual output.

④ Prevent intrusion of obstruction such as cutting chip from supply port into inside of the cylinder.

If the cylinder is put on the floor at field during positioning for installation, cutting chip made by the drill for mounting hole may intrude from supply port of the cylinder and cause failure.

⑤ Cut the length of piping short.

Too long cylinder piping makes volume of mist in the cylinder (the mist is caused by adiabatic expansion) less than one in the piping tube, and prevent the mist from being released to air. Residual mist in the tube becomes pooled by repeating actuation, and may leads to occurrence of water which removes the grease of the cylinder. As the result of it, the condition of lubrication becomes worse and air leakage caused by wear of seal and malfunction by increase of friction resistance occure. In order to solve this issue, following countermeasure is necessary.

(1) Cut piping tube from solenoid valve to cylinder short as much as possible and make mist release to atmosphere properly. Following formula is eferred.

Converted value of content volume of cylinder to atmospheric pressure × 0.7 ≧ Content volume of piping tube

(2) Make exhaust pressure discharge directly to atmosphere by installing speed exhaust controller ASV or quick exhaust valve.

(3) Direct piping port downwardly so that moisture occurring in piping wouldn't return to cylinder.

3－2. Selection

Speed control

When cylinder is adjusted to desired speed, install speed controller such as SMC's AS series near supply port of air. For this adjustment, either of supply air or exhaust air is squeezed, generally exhaust air is done.

Direction control

When actuatig direction of cylinder is changed, install adequate solenoid valve selected among SMC's various models.

⚠ Warning

① Confirm the specifications.

The preducts featured in this catalog are designed for use in industrial compressed air systems. If the products are used in conditions where pressure and/or temperature are outside the range of specifications, damage and/or malfunctions may occur. Do not use in these conditions. (Refer to the specifications.)
Please consult with SMC if you use a fluid other than compressed air.

② About intermediate stop

In the case of 3 position closed center of a valve, it is difficult to make a piston stop at the required position as acurately and precisely as with hydraulic pressure due to compressibility of air.
Furthermore, since valves and cylinders, etc. are not guaranteed for zero air leakage, it may not be possible to hold a stopped position for an extended period of time. Please contact SMC in the case it is necessary to hold a stopped pssition for an extended period.

⚠ Caution

① Operate within the limits of the maximum usable stroke.

Refer to the catalog for the air cylinder to be used for the maximum usable stroke.

② Operate the piston within a range such that collision damage will not occur at the stroke end.

The operation range should prevent damage from occurring when a piston, having inertial force, stops by striking the cover at the stroke end. Refer to the 4. Model selection.

③ Use a speed controller to adjust the cylinder drive speed, gradually increasing from a low speed to the desired speed setting.

④ Provide intermediate supports for long stroke cylinders.

An intermediate support should be provided in order to prevent damage to a cylinder having a long stroke, due to problems such as sagging of the rod, deflection of the cylinder body, vibration and external load.

3－3. Mounting

⚠ Caution

① Be certain to match the rod shaft center with the load and direction of movement when connecting.

When not properly matched, problems may arise with the rod and body, and damage may be caused due to friction on areas such as the inner body surface, bushings, rod surface, and seals.

② When an external guide is used, connect the rod end and the load in such a way that there is no interference at any point within the stroke.

③ Do not scratch or gouge the sliding portion of the cylinder body or the piston rod by striking it with an object, or squeezing it.

The body bore is manufactured under precise tolerances. Thus, even a slight deformation could lead to a malfunction.

Moreover, scratches or gouges, etc. in the piston rod may lead to damaged seals and cause air leakage.

④ Prevent the seizure of rotating parts.

Prevent the seizure of rotating parts (pins, etc.) by applying grease.

⑤ Do not use until you verify that the equipment can operate properly.

After mounting, repairs, or modification, etc., connect the air supply and electric power, and then confirm proper mounting by means of appropriate function and leak tests.

⑥ Instruction manual

Install the preducts and operate them only after reading the instruction manual carefully and understanding its contents. Also keep the manual where it can be referred to as necessary.

⑦ Set the mounting base suitable to large force given by the cylinder.

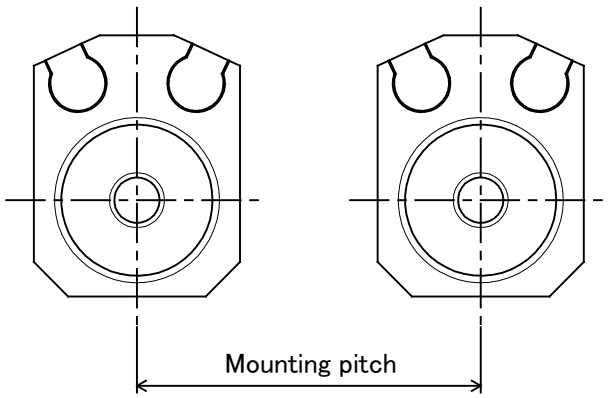
If the mounting base doesn't have enough hardness, the human and the device may be damaged.

⑧ If auto switch cylinders are used in parallel keep the distance between cylinders in accordance with the chart below.

(mm)

	Φ4	Φ6	Φ10	Φ16
D-A9□, D-A9□V	—	20	25	30
D-M9□, D-M9□V D-M9□W, D-M9□WV	25	25	30	35

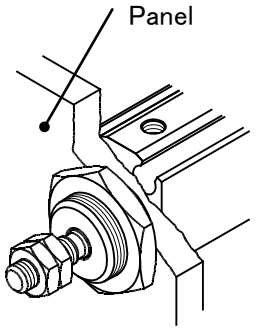
Use caution not to use them, getting closer than the specified pitch.
Otherwise, it may cause auto switch to malfunction.



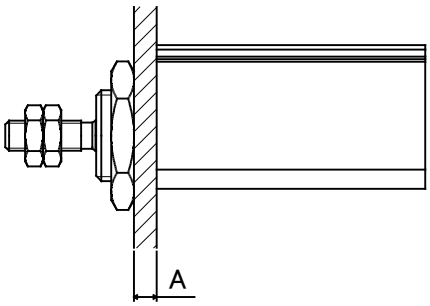
⑨ **When the cylinder and bracket are mounted, do not exceed the max. tightening torque stated below.**

At the same time, the thickness of the panel used for mounting should be less than the max. A dimension shown in the following table.

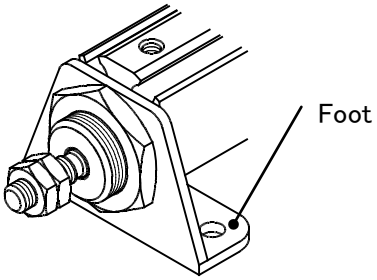
Bore size	Thread size	Max. tightening torque(N･m)	Max. A dimension (mm)
Φ4	M8×1	6.2	3
Φ6	M10×1	12.5	4
Φ10	M12×1	21.0	4
Φ16	M14×1	34.0	5



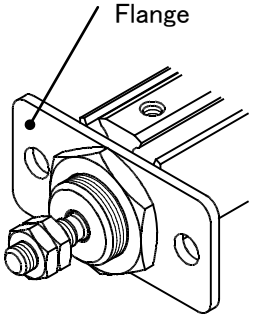
Panel mounting style



Max. panel thickness



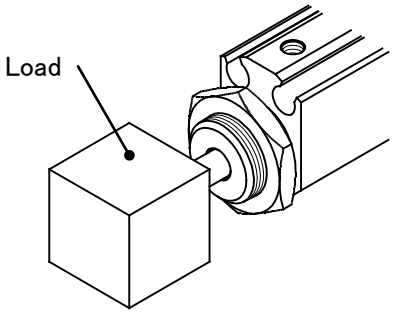
Foot mounting style



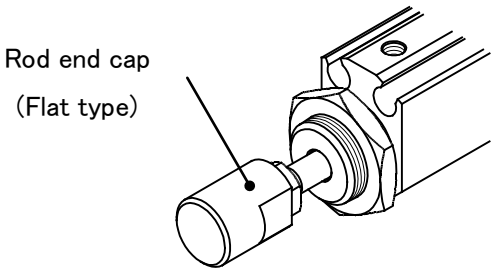
Flange mounting style

⑩ **When a load, cap, single knuckle joint or double knuckle joint is mounted on the end of the rod, do not exceed the max. tightening torque in the following table.**

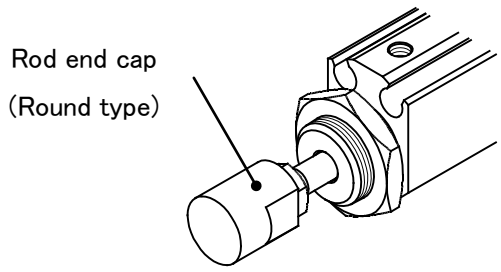
Bore size	Thread size	Max. tightening torque(N・m)
Φ4	M2×0.4	0.1
Φ6	M3×0.5	0.3
Φ10	M4×0.7	0.8
Φ16	M5×0.8	1.6



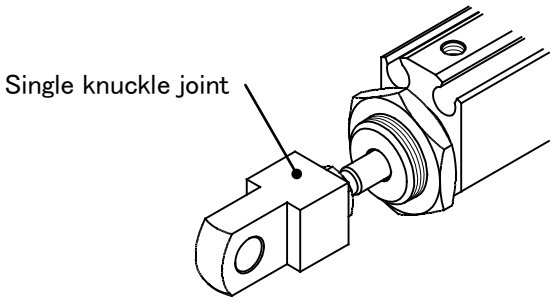
Load mounting style



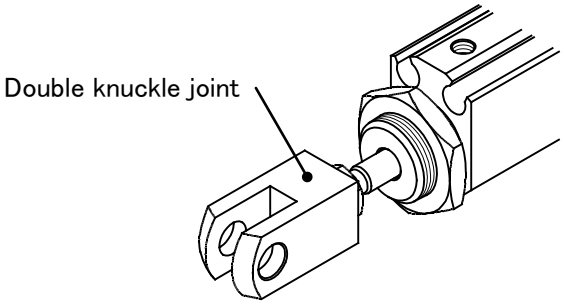
Rod end cap (Flat type) mounting style



Rod end cap (Round type) mounting style



Single knuckle joint mounting style



Double knuckle joint mounting style

3－4. Piping

⚠ Caution

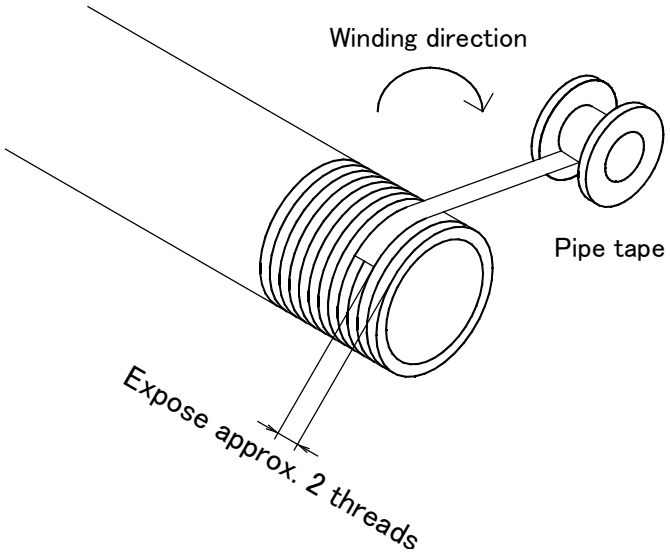
① Before piping

Before piping, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

② Wrapping of pipe tape

When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not get inside the piping.

Also, when the pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



3－5. Lubrication

⚠ Caution

① Lubrication of cylinder

The cylinder has been lubricated for life at the factory and can be used without any further lubrication.

However, in the event that it is lubricated additionally, be sure to use Polyalphaolefin oil or equivalent oil.

Stopping lubrication later may lead to malfunctions because the new lubricant will cancel out the original lubricant.

Therefore, lubrication must be continued once it has been started.

3－6. Air Supply

For compressed air supplied to the cylinder, use the air which is filtrated by SMC's filter such as AF series and adjust to specified setting pressure by SMC's regulator such as AR series.

⚠ Warning

① Use clean air.

Do not use compressed air which contains chemicals, synthetic oils containing organic solvents, salts or corrosive gases, etc., as this can cause damage or malfunction.

⚠ Caution

① Install air filters.

Install air filters close to valves at their upstream side. A filtration degree of 5 μ m or less should be selected.

② Install an aftercooler, air dryer, or water separator (Drain Catch).

Air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an air dryer, aftercooler or water separator,etc.

③ Use the product within the specified range of fluid and ambient temperature.

Take measures to prevent freezing when below 5℃, since moisture in circuits can freeze and cause damage to seals and lead to malfunctions.

For compressed air quality, refer to "Air Preparation Equipment" catalog.

3－7. Operating Environment

⚠ Warning

① Do not use in atmospheres or locations where corrosion hazards exist.

Refer to the construction drawings regarding cylinder materials.

② In dusty locations or where water or oil, etc., splash on the equipment, take suitable measures to protect the rod.

③ When using auto switches, do not operate in an environment with strong magnetic fields.

④ Avoid much humidity for storage of cylinder.

Store the cylinder with piston rod retracted under the environment with little humidity and countermeasure for rusty.

3－8. Maintenance

⚠ Warning

① Perform maintenance procedures as shown in the instruction manual.

If they are handled improperly, malfunction or damage of machinery or equipment may occur.

② Removal of equipment, and supply/exhaust of compressed air

Before any machinery or equipment is removed, first ensure that the appropriate measures are in place to prevent the falling or erratic movement of driven objects and equipment, then cut off the electric power and reduce the pressure in the system to zero. Only then should you proceed with the removal of any machinery and equipment.

When machinery is restarted, proceed with caution after confirming that appropriate measures are in place to prevent cylinders from suddenly moving.

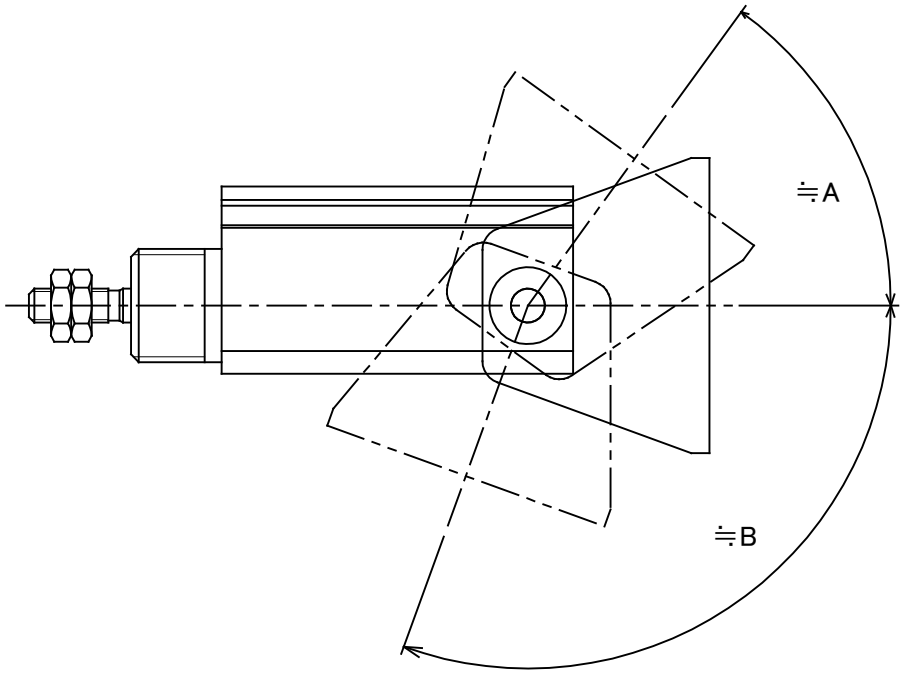
⚠ Caution

① Drain flushing

Remove drainage from air filters regularly.

3－9. Rotation angle

⚠ Caution



	Φ6	Φ10	Φ16
A	54°	62°	55°
B	110°	110°	102°

3－10. Snap ring installation/removal

⚠ Caution

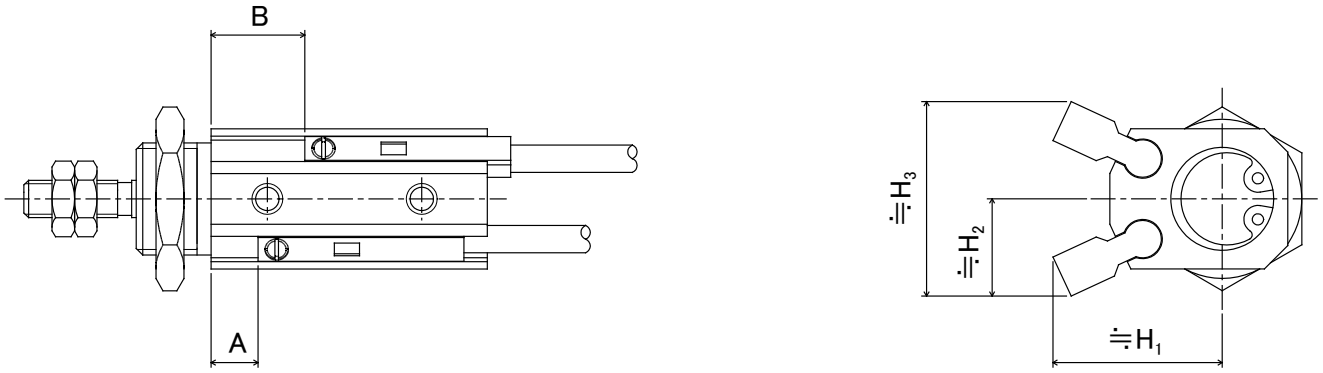
① To replace seals or grease the cylinder during maintenance, use an appropriate pair of pliers (tool for installing a type C snap ring for hole).
After re-installing the cylinder, make sure that the snap ring is placed securely in the groove before supplying air.

② To remove and install the snap ring for the knuckle pin or the trunnion pin, use an appropriate pair of pliers (tool for installing a type C snap ring for hole).
In particular, use a pair of ultra-mini pliers, for removing and installing the snap rings on the Φ6 cylinder.

3－11. Auto switches

The type and specifications of applicable auto switch and the cautions for handling them can be found in the catalogue and operation manual respectively.

① Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height



＊ When a screw is not mounted on the end of the rod, a nut cannot be mounted.

＊ A mounting nut is not attached for the clevis and trunnion types.

Part number of auto switch: D-A9□, D-A9□V　　Unit: mm

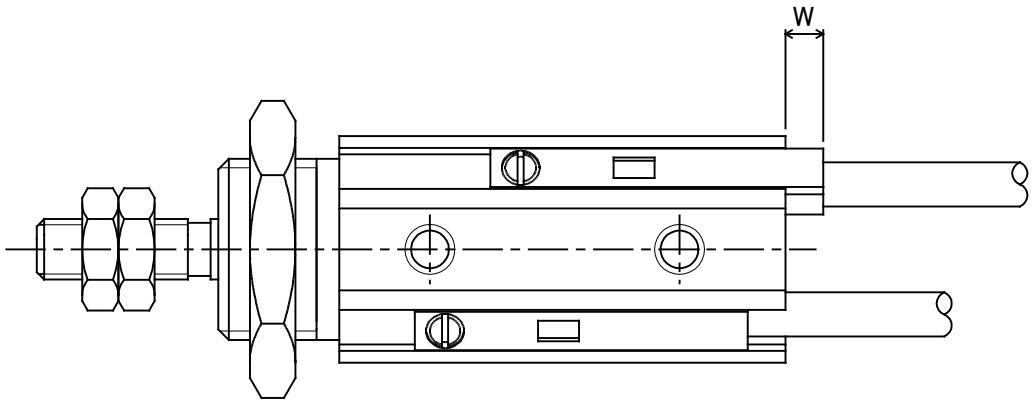
	A (When detecting extended stroke end)	B (When detecting retracted stroke end)								H_1	H_2	H_3
		5st	10st	15st	20st	25st	30st	35st	40st			
Φ4	—	—	—	—	—	—	—	—	—	—	—	—
Φ6	1	6	11	16	21	26	—	—	—	13.0	10.0	20.0
Φ10	1	6	11	16	21	26	31	36	41	16.0	9.5	19.0
Φ16	1	6	11	16	21	26	31	36	41	18.0	12.0	24.0

Part number of auto switch: D-M9□, D-M9□V, D-M9□W, D-M9□WV　　Unit: mm

	A (When detecting extended stroke end)	B (When detecting retracted stroke end)								H_1	H_2	H_3
		5st	10st	15st	20st	25st	30st	35st	40st			
Φ4	4	9	14	19	—	—	—	—	—	14.5	11.5	23.0
Φ6	5	10	15	20	25	30	—	—	—	15.0	11.5	23.0
Φ10	5	10	15	20	25	30	35	40	45	18.0	10.5	21.0
Φ16	5	10	15	20	25	30	35	40	45	20.0	13.0	26.0

＊ The above numbers are references for the mounting positions of those auto switches that detect a stroke end.
In the actual setting, determine the actual operation of the auto switch and adjust the position.

② The amount of protrusion of the auto switch



Mounting: Basic style, Flange style, Foot style

	D-M9□ D-M9□W	D-M9□V D-M9□WV	D-A90 D-A96 D-A9□V	D-A93
	W			
Φ4	6	4	—	—
Φ6	6	4	2	4.5
Φ10	2.5	0.5	0	1
Φ16	2.5	0.5	0	1

Mounting: Clevis style, Trunnion style

	D-M9□ D-M9□W	D-M9□V D-M9□WV D-A9□ D-A9□V
	W	
Φ4	—	—
Φ6	1	0
Φ10	0	0
Φ16	0	0

* Zero "0" indicates that the switch doesn't protrude.

③ Operating Range

Unit：mm (at 25℃)

	Φ4	Φ6	Φ10	Φ16
D-A9□ D-A9□V	—	5	6	7
D-M9□ D-M9□V	2	2	2	2
D-M9□W D-M9□WV	2.5	2.5	3	3.5

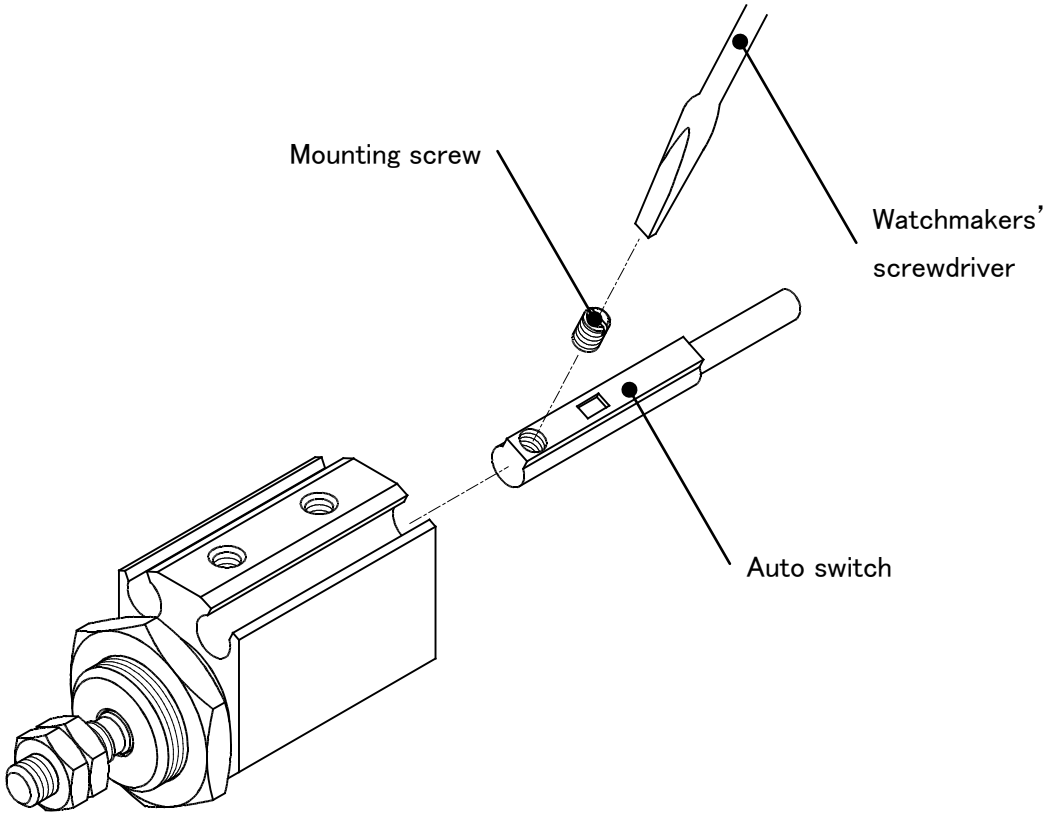
＊Since this is a guideline that includes hysteresis, it is not meant to be guaranteed. (Assuming approximately a ±30% dispersion) Substantial changes may be needed depending on the ambient environment.

④ Minimum stroke of auto switch mounting

	1 pc.	2 pcs.
D-A9□ D-A9□V	5	10
D-M9□ D-M9□V	5	5
D-M9□W D-M9□WV	5	10

＊D-A9□・D-A9□V cannot be installed on the Φ4 cylinder.

⑤ Auto switch mounting



①Fit an auto switch mounting groove to set it roughly to the mounting position for an auto switch.

②After confirming the detedting position, tighten up the mounting screw attached to an auto switch, and secure the seitch.

③When changing the detecting position, carry out in the state of 1.

When tightening an auto switch mounting screw, use a watchmaker's screwdriver with a grip diameter of 5 to 6mm.
(The tightening torque should be about 0.1 to 0.2 N・m.)

4. Model selection

4－1. Allowable Kinetic Energy

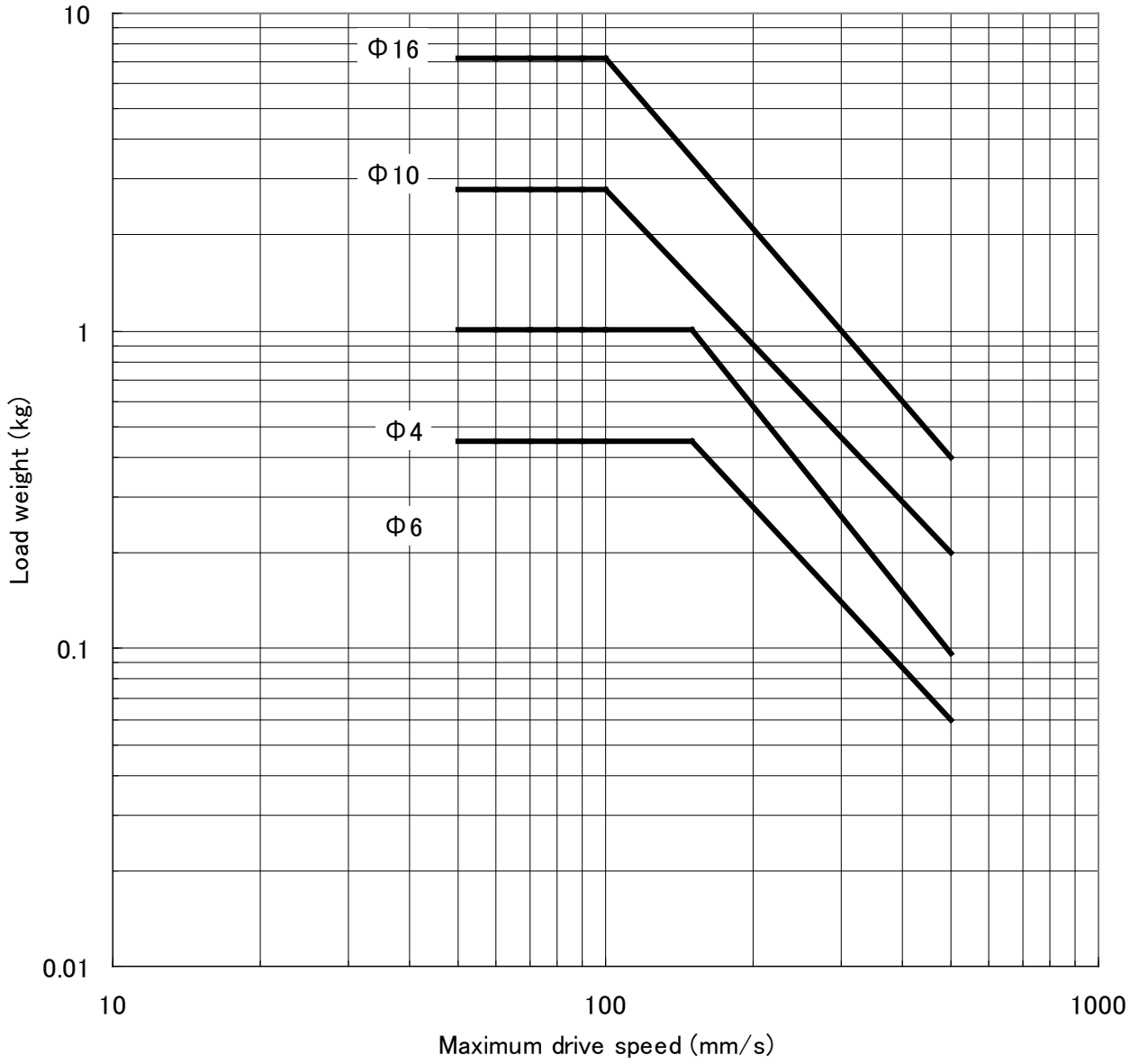
Caution

When driving an inertial load, operate a cylinder with kinetic energy within the allowable value.

The range in the chart below that is delineated by bold solid lines indicates the relation between load weights and maximum driving speeds.

Bore size	Φ4	Φ6	Φ10	Φ16
Allowable Kinetic Energy(J)	0.75×10^{-2}	1.2×10^{-2}	2.5×10^{-2}	5.0×10^{-2}

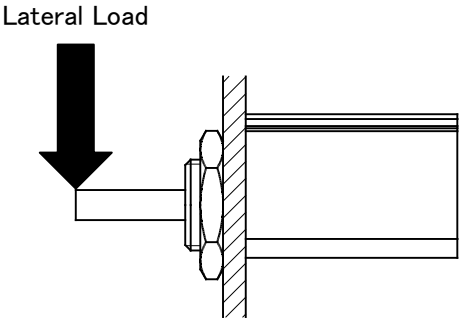
(Supply pressure：at P=0.7MPa)

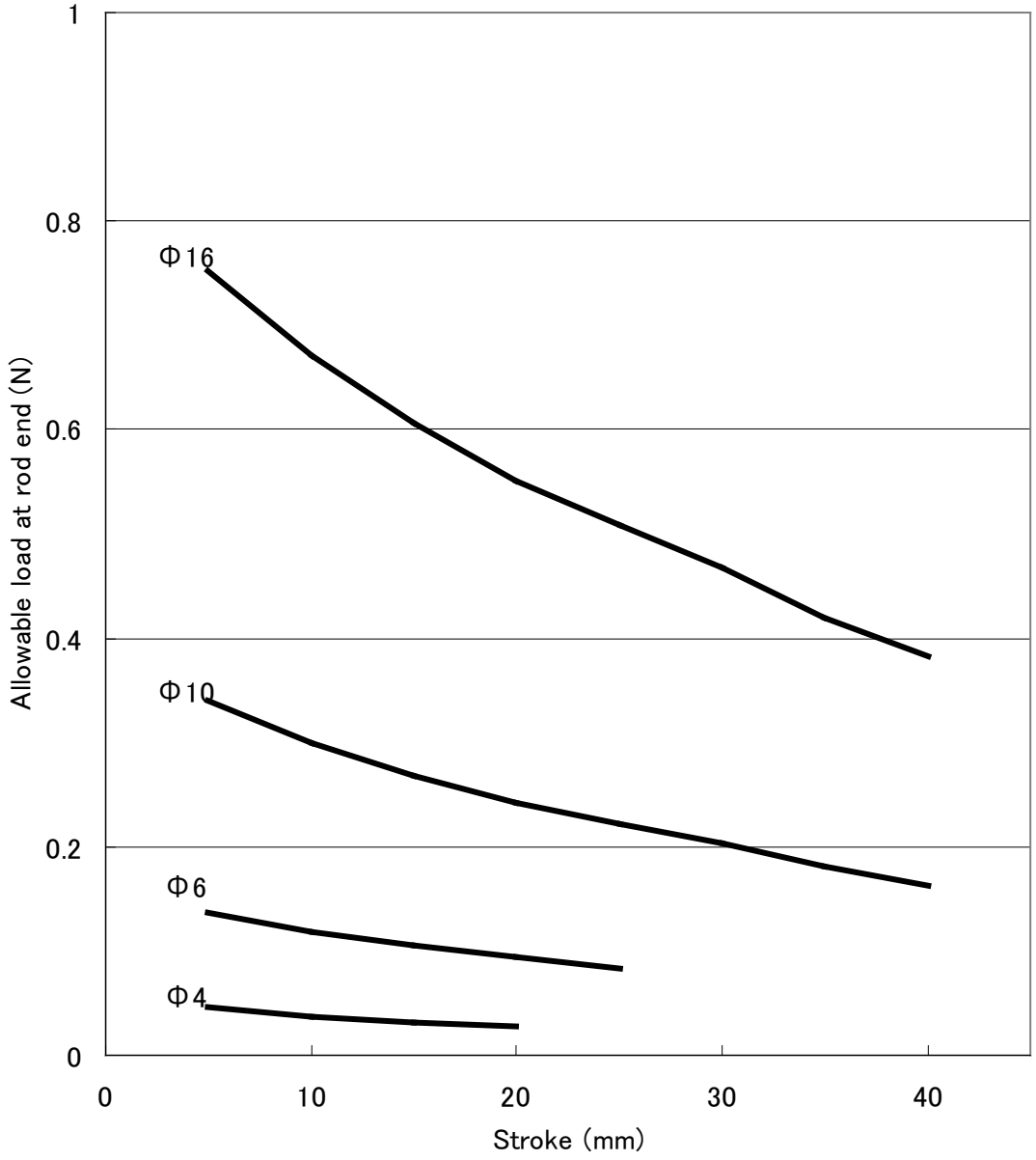


4－2. Lateral Load at Rod End

Caution

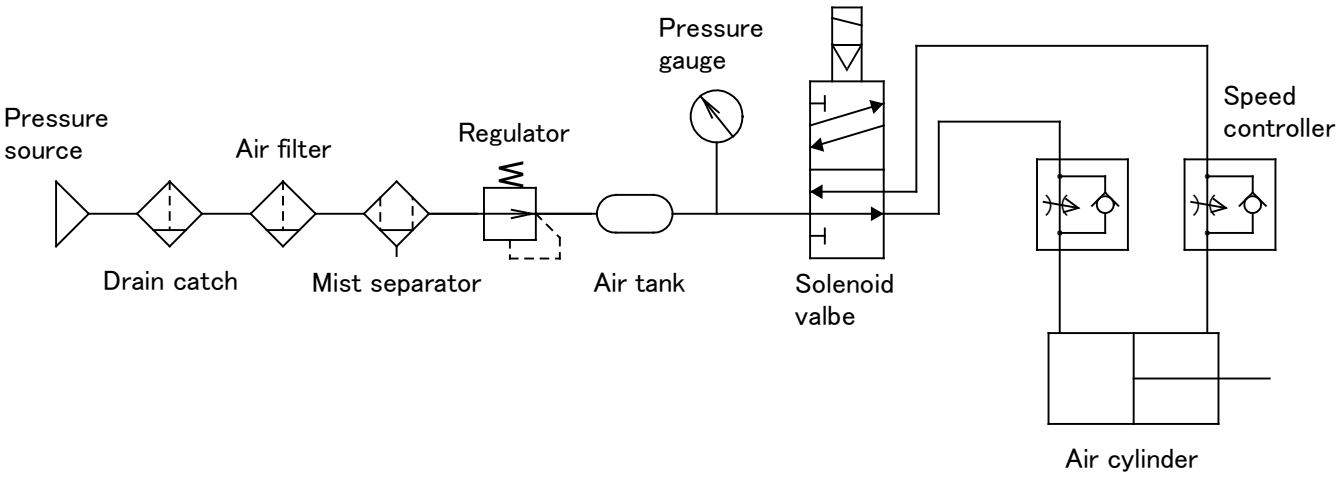
In principle, the load applied to the piston rod should always be kept in the axial direction. If this situation cannot be avoided, keep the lateral load applied on the bushing of the cylinder, to 1/50 or less of the maximum output of the cylinder.





5. Pneumatic circuit

The typical circuit for CJP2 series where air filter, regulator, solenoid valve and speed controller (meter-out) are used for operation is as follows.



6. Maintenance and Check

6－1. Daily check

①Is the operation smooth?

②Is there any abnormal change in the piston speed and cycle time?

③Is there any abnormality in the stroke?

6－2. Periodic check

①Are the cylinder mounting bolts and workpieces firmly fixed?

②Is the operation smooth?

③Are there any abnormal changes in the piston speed and cycle time?

④Is there any external leakage?

⑤Is there any abnormality in the stroke?

⑥Are there any flaws on the piston rod

⑦Is the drainage of the air filter removed periodically?

Check the above-mentioned items, and if any defects are found, take appropriate measures.

If there are any unclear points, consult SMC's sales separtment.

6－3. How to replace the seal

⚠ Caution

① Ask SMC to replace the seal if the inside diameter of the tube is 4mm.

Tubes with a 4mm I.D cannot be disassembled. If they need to be disassembled in order to replace the packing or for other purposes, please contact an SMC representative for the repair.

1. Disassembly of the cylinder

①Cleaning

Prior to disassembly, wipe off any dirt from the outside of the actuator.

This will prevent the intrusion of dust and foreign materials during disassembly.

Take particular care on the surface of the piston rod.

②Removal of snap ring

Remove the snap ring with proper pliers.

③Removal of head cover

Remove the head cover from the body by pushing the piston rod to the head side.

④Disassembly

Pull out the piston rod.

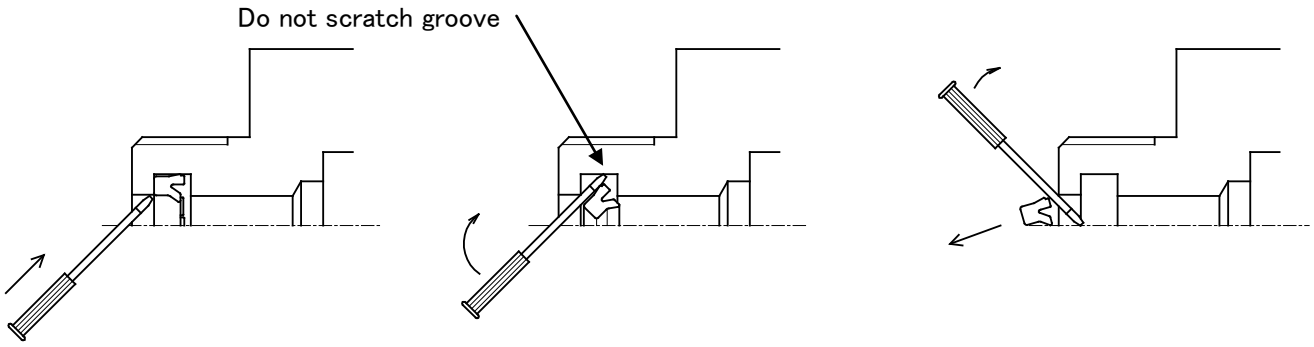
Take care not to scratch or mark the internal face of the tube.

2. Removal of the seal

①Rod seal

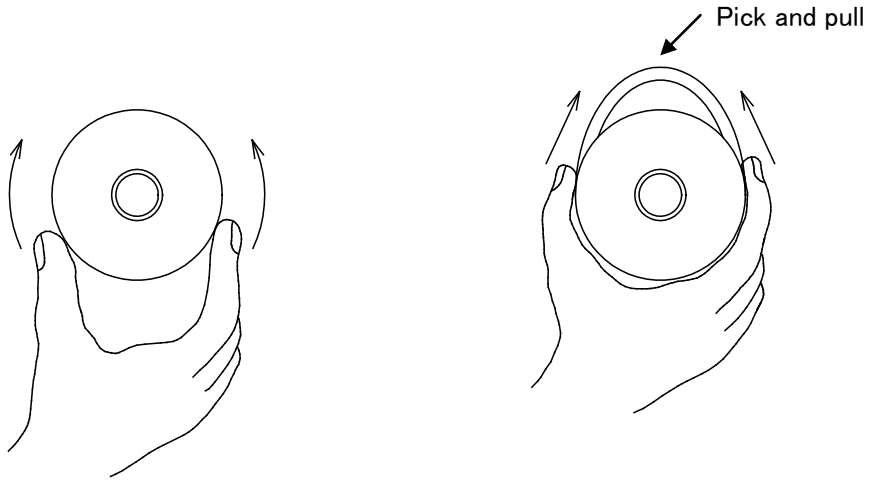
Insert a precision driver etc. from front the body and prise the seal out.

Take care not to scratch or score the seal groove in the body.



②Piston seal

Push the tube gasket partially to make it come off and pull it out manually.



③Gasket(See above)

Push the gasket partially to make it come off and pull it out manually.

3. Application of grease

①Rod seal and Piston seal

Apply the grease evenly all around the new seal.

Rod seal **Piston seal**

②Gasket

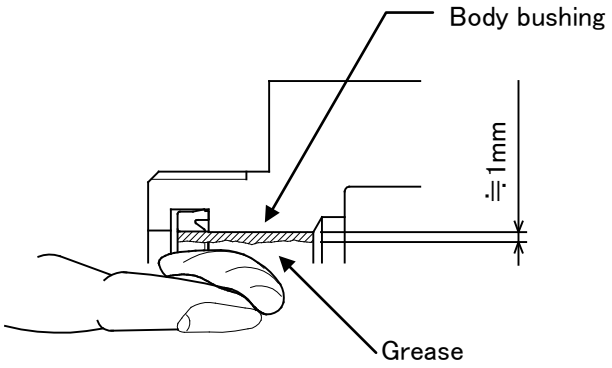
Spread a thin film of grease over the tube gasket.

4. Mounting of seal

①Rod seal

Mount the rod seal with attention to direction.

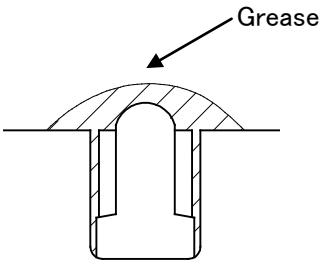
Then, apply the grease on the seal evenly.



②Piston seal

When mounting the seal, ensure there are no twists in the seal.

Also add the grease inside the groove.



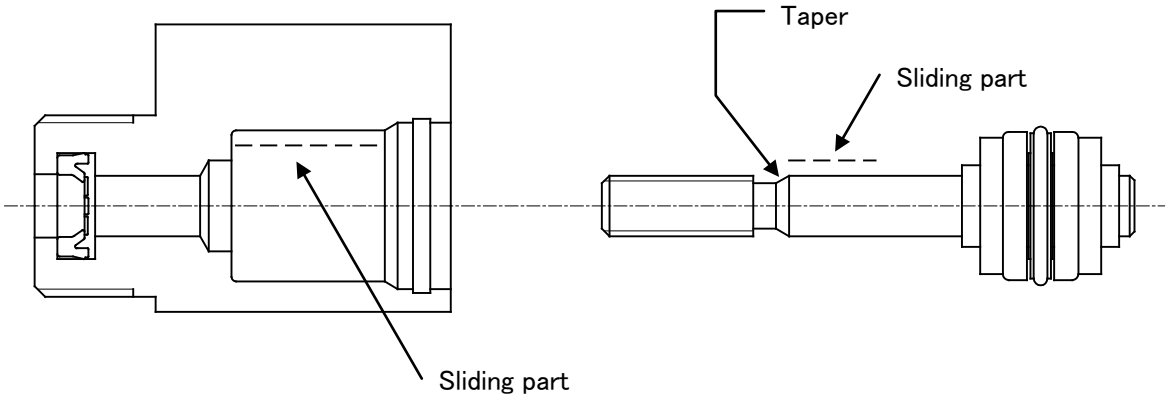
③Gasket

Pay attention not to make the gasket come off.

5. Application of grease

①Each component of the cylinder

Spread grease entirely over the parts shown.



6. Reassembly of the cylinder

①Insertion of piston rod ASS 'Y

Please insert piston rod ASS 'Y in the body.

②Insertion of head cover ASS 'Y

Please insert head cover ASS 'Y in the body.

③Mounting of the snap ring

Mount the snap ring with proper pliers.

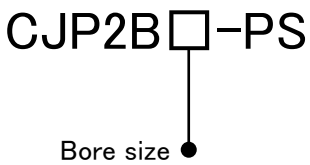
④Check the assembly condition.

Confirm that there is no air leakage from the seal and that the cylinder can operate smoothly at a minimum operating pressure.

6－4. Consumable parts

① Replaced parts

The service parts are as follows.



Seal Kit

Bore size (mm)	Kit no.	Content and qty.			
		Rod seal	Piston seal	Gasket	Grease package
6	CJP2B6-PS	1	1	1	1
10	CJP2B10-PS	1	1	1	1
16	CJP2B16-PS	1	1	1	1

② Storage of seal (for extended period)

1) Put the seal into an enclosed package for storage

2) Avoid exposure to direct sunlight, high temp. and humidity.

Especially, shut off the equipment which possibly causes heat, radiation and ozone from the package.

3) Do not deform or damage the seal by crushing..

4) The seal may have white powder on the surface during storage. This will not effect the performance of the seal.

③ Grease package

When the grease is added during replacement of the seal and maintenance of the cylinder, use the grease package.

Grease package

Kit no.	Net
GR-L-005	5g

6－5. Bracket

Foot, Flange and trunnion were prepared in this product.

Foot

Bore size (mm)	Kit no.	Net
6	CP-L006A	Foot (1 pc.)
10	CP-L010A	
16	CP-L016A	

*Material of foot is iron.

*Please consult separately about for Φ4.

Flange

Bore size (mm)	Kit no.	Net
6	CP-F006A	Flange (1 pc.)
10	CP-F010A	
16	CP-F016A	

*Material of flange is iron.

*Please consult separately about for Φ4.

Trunnion

Bore size (mm)	Kit no.	Net
6	CP-T006A	・Trunnion (1 pc.) ・Trunnion pin (1 pc.) ・Snap ring (2 pcs.)
10	CP-T010A	
16	CP-T016A	

*Material of trunnion is iron.

*Please consult separately about for Φ4.

6－6. Accessory Bracket

Single knuckle joint, Double knuckle joint, Knuckle pin, Trunnion pin, Mounting nut, Rod end nut and Rod end cap (Flat type, Round type) were prepared in this product.

Single knuckle joint

Bore size (mm)	Kit no.	Net
6	I-P006A	Single knuckle joint (1 pc.)
10	I-P010A	
16	I-P016A	

*Material of single knuckle joint is iron.

*Please consult separately about for Φ4.

A Double knuckle joint

Bore size (mm)	Kit no.	Net
6	Y-P006A	・Double knuckle joint (1 pc.) ・Knuckle pin (1 pc.) ・Snap ring (2 pcs.)
10	Y-P010A	
16	Y-P016A	

*Material of double knuckle joint is iron.

*Please consult separately about for Φ4.

Knuckle pin

Bore size (mm)	Kit no.	Net
6	IY-P006	・Knuckle pin (1 pc.) ・Snap ring (2 pcs.)
10	IY-P010	
16	IY-P016	

*Material of knuckle pin is stainless steel.

*Please consult separately about for Φ4.

Trunnion pin

Bore size (mm)	Kit no.	Net
6	CT-P006	・Trunnion pin (1 pc.) ・Snap ring (2 pcs.)
10	CT-P010	
16	CT-P016	

*Material of trunnion pin is stainless steel.

*Please consult separately about for Φ4.

Mounting nut

Bore size (mm)	Kit no.	Net
4	SNPS-004	Mounting nut (1 pc.)
6	SNP-006	
10	SNP-010	
16	SNP-015	

*Material of mounting nut is brass.

Rod end nut

Bore size (mm)	Kit no.	Net
4	NTJ-004	Rod end nut (2 pcs.)
6	NTP-006	
10	NTP-010	
16	NTP-015	

*Material of rod end nut is steel.

Rod end cap (Flat type)

Bore size (mm)	Kit no.	Net
4	CJ-CF004	Rod end cap【Flat type】 (1 pc.)
6	CJ-CF006	
10	CJ-CF010	
16	CJ-CF016	

*Material of rod end cap (flat type) is polyacetal.

Rod end cap (Round type)

Bore size (mm)	Kit no.	Net
4	CJ-CR004	Rod end cap【Round type】 (1 pc.)
6	CJ-CR006	
10	CJ-CR010	
16	CJ-CR016	

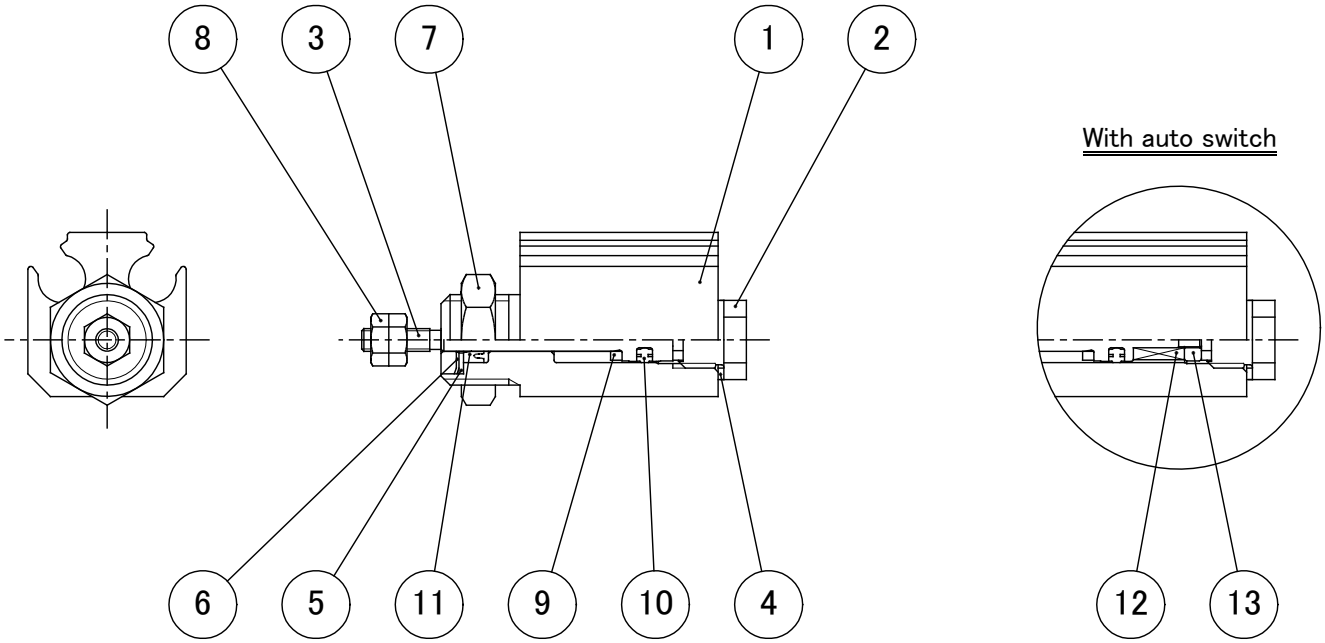
*Material of rod end cap (flat type) is polyacetal.

7. Troubleshooting

Trouble	Phenomenon	Possible cause	Remedy	Related section
・The operation is not smooth. ・The force output is reduced. ・The cylinder doesn't operate.	Air leakage (external)	1、The rod seal is damaged by flaws on the piston rod. 2、The rod seal is damaged by a lack of grease on the piston rod. 3、The rod seal is damaged by use at temp out of the specified range. 4、Shortage of grease 5、Foreign materials are allowed to enter.	1、Replace piston rod and rod seal. 2、Apply the grease on piston rod and replace seal. 3、Keep operating temp. range and replace rod seal. 4、Add grease. 5、Remove foreign materials from rod seal.	2-1 6-3 6-4
	Air leakage (internal)	1、The piston seal is worn due to grease washed away by water.	1、Install air cleaning equipment, in the line, and replace the piston seal.	3-6 6-3
	A lack of pneumatic pressure	1、The pressure from the factory source is reduced. 2、The regulator setting has been displaced. 3、The piping is clogged.	1、Supply adequate pressure. 2、Set regulator properly. 3、Flush the piping.	2-1 3-4 3-6
	Overload	1、The lateral load has been exceeded.	1、Use within the allowable value.	4-2
	Low operating speed	1、The speed is lower than specified piston speed.	1、Use within specifications.	2-1
	Improper pneumatic circuit design.	1、The system construction is not suitable.	1、Select adequate size of tube, fitting, directional control valve, speed controller etc.	3-2 3-4
・A part is damaged.	Breakage of damper, piston rod, rod cover and body	1、The speed is too high due to insufficient adjustment of the speed controller. 2、The kinetic energy exceeds the allowable value. 3、The pressure from the factory source is reduced. 4、An abnormal external force is applied.	1、Adjust the speed with the speed controller again so that the speed will decrease within the specifications. 2、Use within the allowable value. 3、Use within the allowable value. 4、Mechanism interference, eccentric load and overload could cause deformation and damage of the cylinder. Remove these factors.	2-1 3-2 4-1 4-2

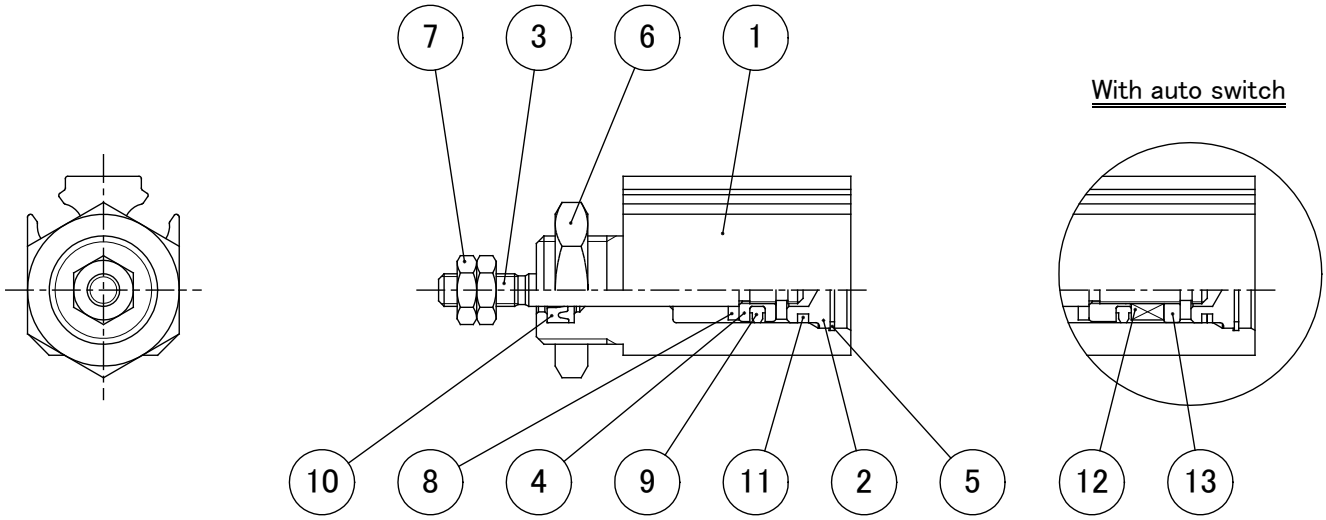
8. Basic construction

Φ4



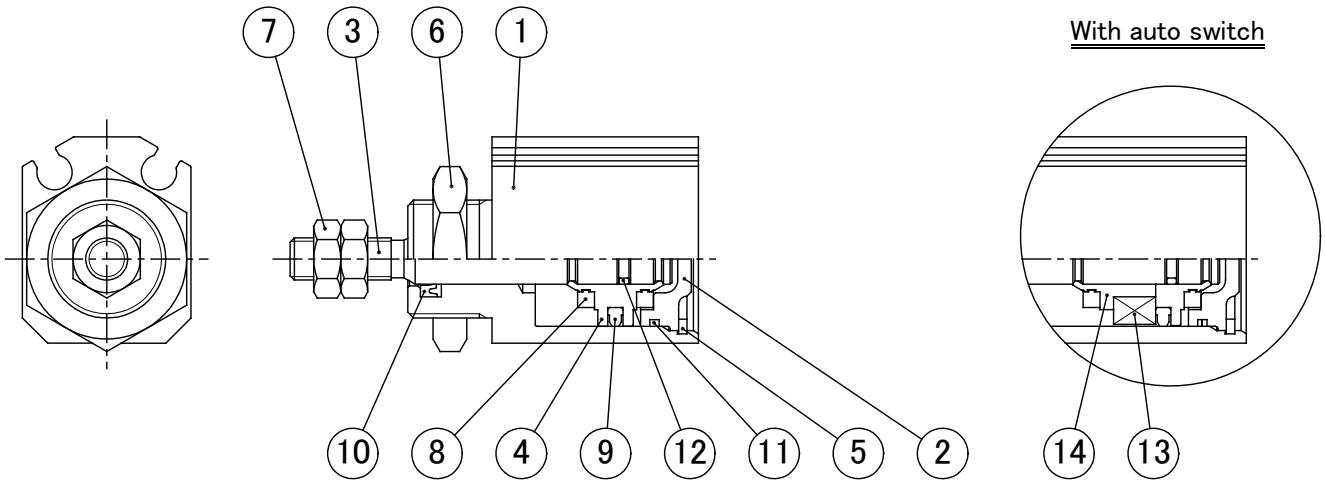
13	Magnet holder	Brass	1	
12	Magnet	Magnetic material	1	
11	Rod seal	NBR	1	
10	Piston seal	NBR	1	
9	Bumper	Urethane	2	
8	Rod end nut	Steel	2	Nickel plated
7	Mounting nut	Brass	1	Electroless nickel plated
6	Snap ring	Tool steel	1	Phosphate coated
5	Seal holder	Special-purpose steel	1	Nickel plated
4	Gasket	SUS+NBR	1	
3	Piston	Stainless steel	1	
2	Head cover	Brass	1	Electroless nickel plated
1	Body	Aluminum alloy	1	Hard anodized
No	Description	Material	Qty	Note

Φ6



No	Description	Material	Qty	Note
13	Magnet holder	Brass	1	
12	Magnet	Magnetic material	1	
11	Gasket	NBR	1	
10	Rod seal	NBR	1	
9	Piston seal	NBR	1	
8	Bumper	Urethane	2	
7	Rod end nut	Steel	2	Nickel plated
6	Mounting nut	Brass	1	Electroless nickel plated
5	Snap ring	Tool steel	1	Phosphate coated
4	Piston	Brass	1	
3	Piston rod	Stainless steel	1	
2	Head cover	Brass	1	Electroless nickel plated
1	Body	Aluminum alloy	1	Hard anodized

Φ10・16



No	Description	Material	Qty	Note
14	Magnet holder	Aluminum alloy	1	Φ16：Chromated
		Brass	1	Φ10
13	Magnet	Magnetic material	1	
12	Piston gasket	NBR	1	
11	Gasket	NBR	1	
10	Rod seal	NBR	1	
9	Piston seal	NBR	1	
8	Bumper	Urethane	2	
7	Rod end nut	Steel	2	
6	Mounting nut	Brass	1	Electroless nickel plated
5	Snap ring	Tool steel	1	Phosphate coated
4	Piston	Aluminum alloy	1	Φ16：Chromated
		Brass	1	Φ10
3	Piston rod	Stainless steel	1	
2	Head cover	Aluminum alloy	1	Φ16：Chromated
		Brass	1	Φ10：Electroless nickel plated
1	Body	Aluminum alloy	1	Hard anodized

Revision

SMC Corporation

4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021 JAPAN
Tel: + 81 3 5207 8249 Fax: +81 3 5298 5362
URL http://www.smcworld.com