SMC

Doc. No. RB**-OM0001I

Operation Manual

RB0604

Shock Absorber

○ Read this operation manual carefully and understand its content before installation and use of the product.

○ Give special attention to safety instructions.

○ Keep this operation manual available whenever necessary.

SMC Corporation

Series RB

Safety Instruction

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard by labeling **"Caution"**, **"Warning"**, and **"Danger"**. To ensure safety, be sure to observe ISO4414[*1)], JIS B8370[*2)] and other safety precautions.

⚠ **Caution :** Operator error could result in injury or equipment damage.

⚠ **Warning :** Operator error could result in serious injury or loss of life.

⚠ **Danger**: In extreme conditions, there is a possibility of serious injury or loss of life.

*1) IS0 4414 :Pneumatic fluid power—Recommendations for the application of equipment to transmission and control systems

*2) JIS B 8370: Pneumatic system axiom.

Warning

1. **The 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 with the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements.
2. **Only 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.
3. **Do not service machinery/equipment or attempt to remove components until safety is confirmed.**
   1) Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked out control positions.
   2) When equipment is to be removed, confirm the safety process as mentioned above. Cut the pressure supply for the equipment and exhaust all residual compressed air in the system.
   3) Before machinery/equipment is re-started, take measures to prevent quick extensions of the cylinder piston rod etc.
4. **Contact 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.
   2) Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, 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.

INDEX

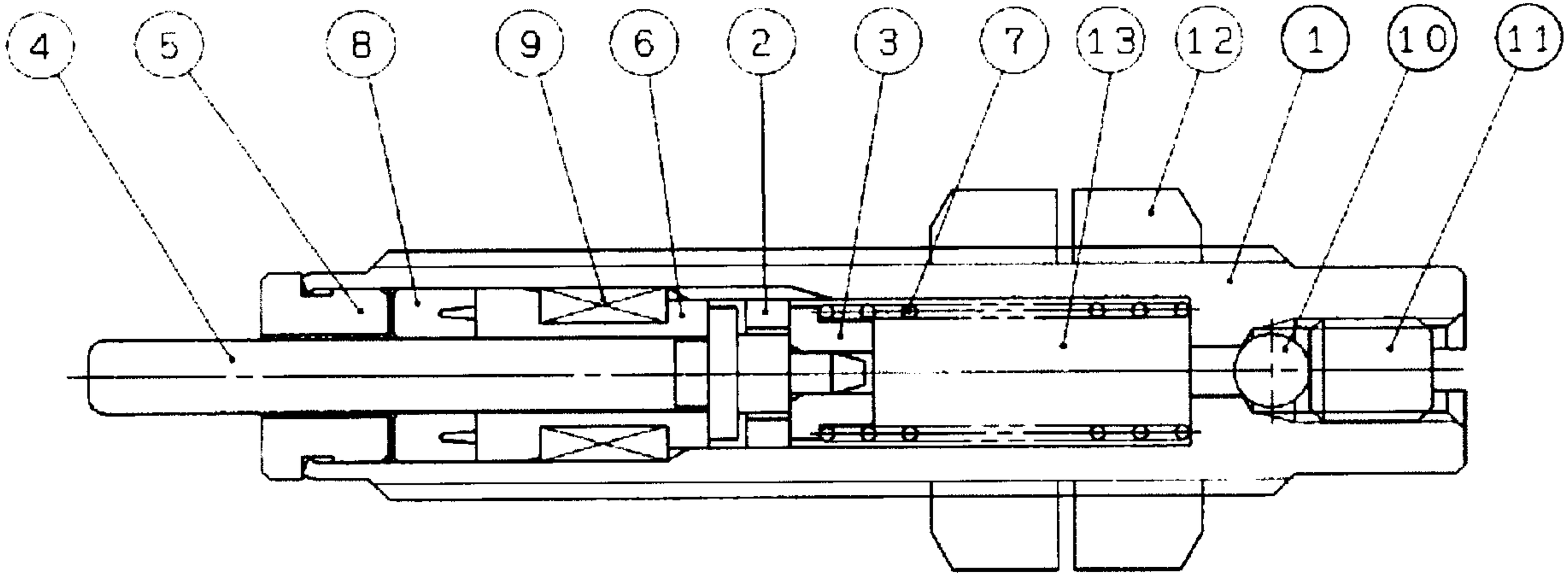
Series RB
Shock Absorber

1. Model / Specification

Specification \ Model		RB0604
Max. absorbed energy (J)		0.5 (at 20 deg.C)
Stroke (mm)		4
Impact speed (m/s)		0.3 to 1.0
Max. operating frequency (cycle/min.)		80 (at 20 deg.C)
Max. allowable thrust (N)		150
Ambient temperature range (deg.C)		-10 to 80 deg. C (No freezing)
Spring force (N)	When extended	3.05
	When compressed	5.59
Weight (g)		5.5

2. Construction / Parts List

When stroke is zero:



No.	Description	Material	Treatment	No.	Description	Material	Treatment
1	Outer tube	Free-cutting steel	Tufftride	8	Rod seal	NBR	
2	Piston	Copper alloy		9	Accumulator	NBR	
3	Spring guide	Stainless steel		10	Steel ball	Bearing copper	
4	Piston rod	Carbon steel	Tufftride	11	Hexagon socket set screw	Special steel	
5	Stopper	Stainless steel		12	Hexagon nut	Carbon steel	Nickel plating
6	Bearing	Copper alloy		13	Hydraulic fluid	Mineral oil	
7	Return spring	Piano wire					

3. Precautions

Operating Conditions

⚠Danger

1. Energy absorption

Do not use under the condition of total energy of the collision thing over the indicated maximum absorbed energy. It may cause change in characteristics and damage of the shock absorber.

2. Collision thing equivalent mass

Do not use under the condition that the collision thing equivalent mass exceeds allowable range. It may cause generation of pulse in buffer power and damping force and lead to difficulty in smooth relaxation.

3. Impact speed

Do not use within the range that the impact speed exceeds minimum and maximum impact speed. It may cause change in buffer characteristics and damage of the shock absorber.

⚠Warning

4. Static load

Do not apply any force or impact other than buffer power to the piston rod stopped in the drawn in state.

⚠Caution

5. Maximum operation

Do not use with frequency over the indicated maximum operating frequency.

Operating Environment

⚠Warning

1. Pressure

Do not use in vacuum or pressurized atmosphere which widely differs from atmospheric pressure (above sea level).

2. Clean room application

Do not use in clean room. It may cause contamination of the clean room.

⚠Caution

3. Temperature range

Do not use over the range which exceeds the indicated maximum and minimum usage range. It may cause hardening or softening of the seal, wearing out, leakage or deterioration of hydraulic fluid, and change in buffer characteristics.

4. Degradation due to atmosphere

Do not use in atmosphere which corrodes metal such as salt, sulfurous acid gas, etc. and which deteriorates seals such as solvent, etc.

5. Ozone degradation

Do not use under direct sun shine in beach, mercury light or near ozonizer. It may cause degradation of rubber material.

6. Cutting oil, water, dust

Do not use under the conditions that liquid such as cutting oil, water or solvent are splashed directly or in mist on the piston rod and that dust and such adheres around the piston rod. It may cause malfunction.

7. Vibration

Install a steady guide on collision thing when the collision thing vibrates and the force of the axle right angle direction acts on the piston rod.

Mounting

⚠Warning

1. Cut the power supply to the equipment and confirm that the machine is stopped before installation, removal of the equipment and adjustment of the stroke.

2. Installation of protective cover

It is recommended to install a protective cover if there is a possibility of human body comes close to the equipment during usage.

3. Rigidity of installation rack

It may cause damage of facility and equipment if it is used with lack of strength of the installation materials. Calculate the strength based on allowable stress of the installation materials, and secure strength twice as much or more as the force applied to the installation rack. Calculate force applied to the installation rack with the following formula.

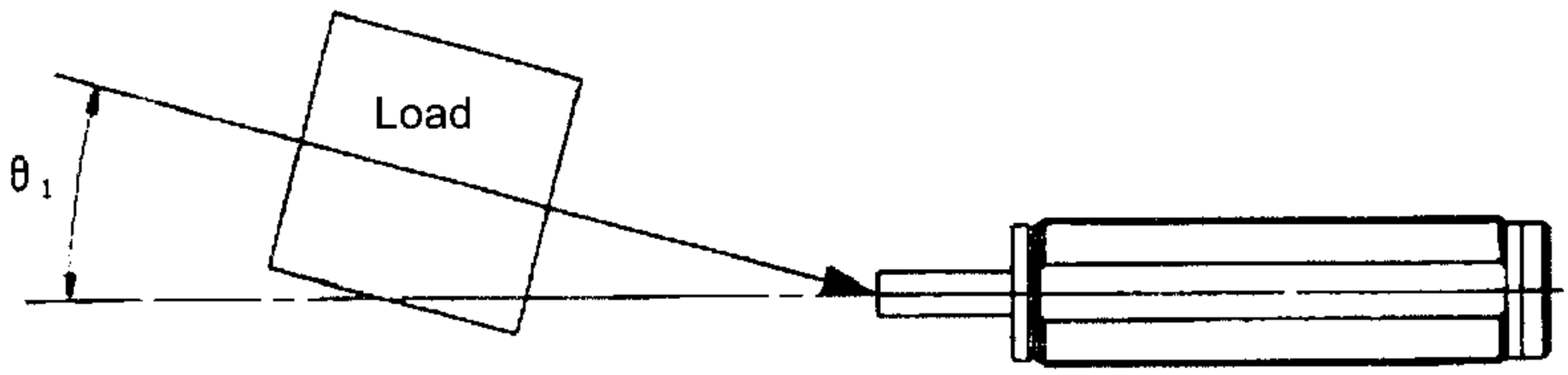
$$\text{Force applied to the installation rack } N \fallingdotseq 2\frac{E\ (\text{Absorbed energy J})}{S\ (\text{Stroke m})}$$

⚠Caution

4. Eccentric collision

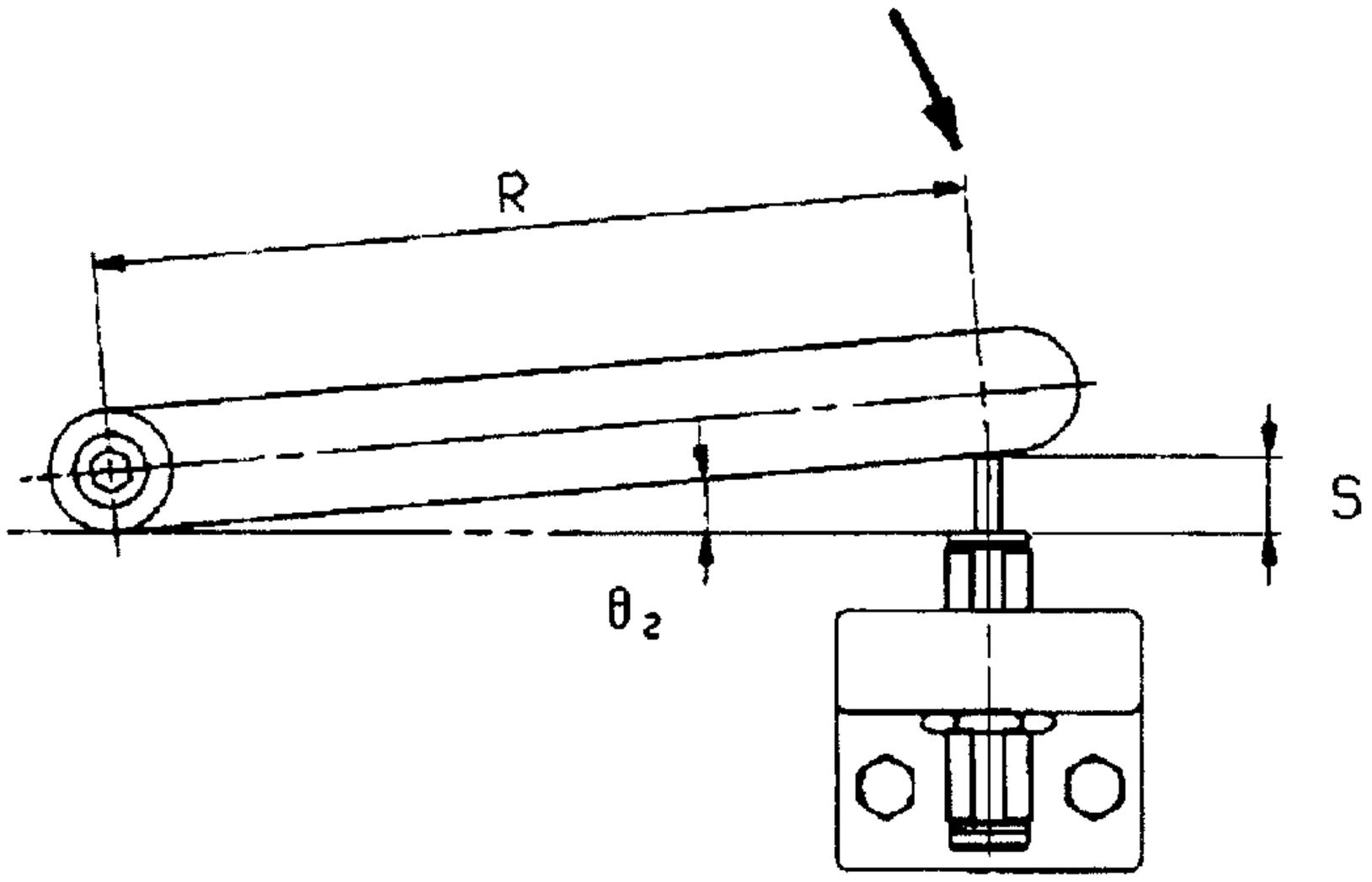
Install the shock absorber to make the contact point of the collision thing comes within the allowable eccentric angle. It may cause oil leakage in a short time with larger load to the bearing if the eccentric angle is at 3° or more.

Allowable eccentric angl θ_1<3°



5. Rotation angle

For rotation collision, install the shock absorber to make the load applied direction right angled with the axle core of the shock absorber. Allowable eccentric rotation angle to the stroke end should be θ_2<3°.



Allowable eccentric rotation angle θ_2<3°

6. Tightening torque and thread for installation

Refer to the table below for the prepared hole dimensions when shock absorber is directly mounted to the installation rack with thread.

Follow the table below for the tightening torque of nut of the shock absorber.

Shock absorber may be damaged when the tightening torque exceeds the following values.

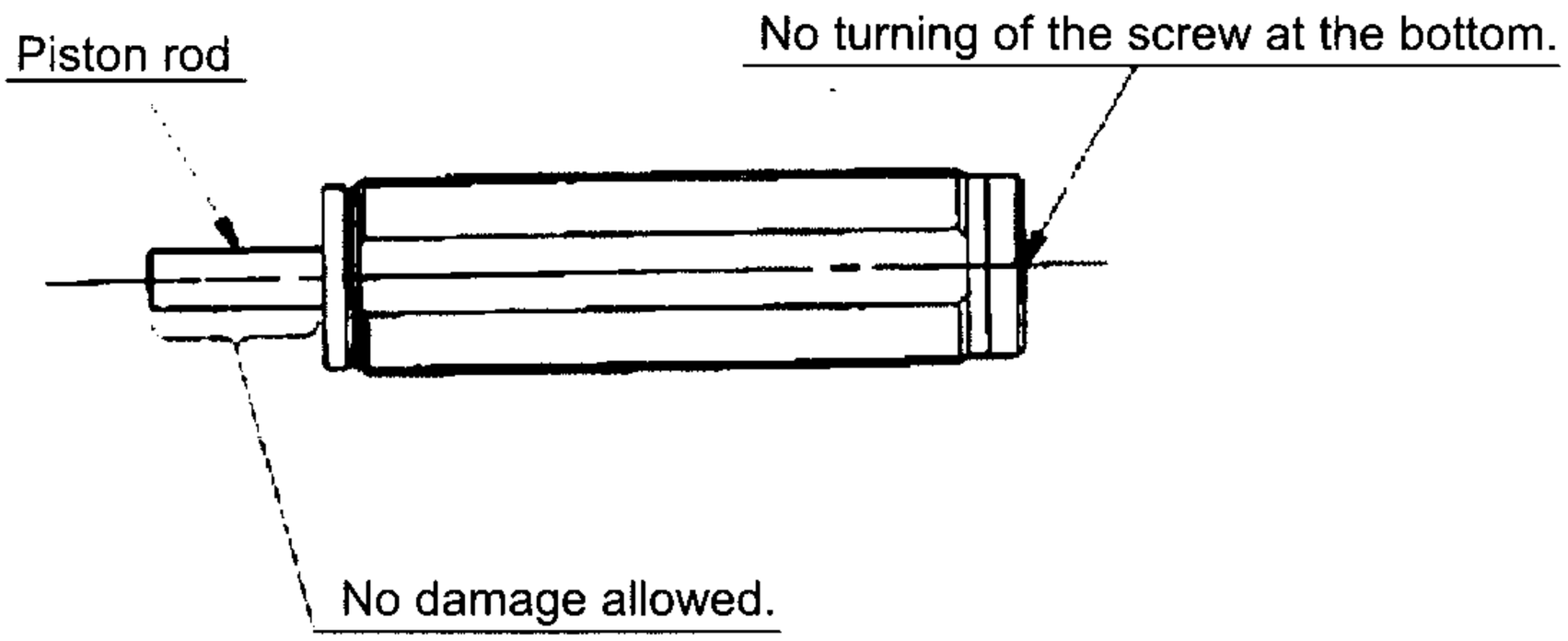
Model	RB0604
Thread dimension (mm)	M6X0.75
Thread diameter of prepared hole (mm)	Ø5.3 $^{+0.1\ /\ 0}$
Nut tightening torque (Nm)	0.85

7. Scratch on sliding part of piston rod and threaded part of outside circumference of the outer tube

Do not hit with anything against the sliding part of the piston rod and threaded part of the outside circumference of the outer tube, nor place anything nor dig anything like set screw between them. It may cause scratch or gouge which leads to damage of seals, oil leakage and malfunction. Such scratch or gouge may also make it impossible to install in the installation rack and deformation of the inner component parts may cause malfunction.

8. Never turn the screw at the bottom of the body.

It is not an adjustment screw. It may cause oil leakage.



Maintenance Inspection

⚠Caution

1. Confirm there in no loosening of the mounting nut.

If used with loosening, it may damage the product.

2. Take notice of abnormal collision noise and vibration.

When collision sound or vibration becomes abnormally large, the life may have reached the limit. Replace it with new one. If it is continued to be used as it is, it may cause damage of the equipment on which it is installed.