Safety Precautions

Be sure to read this section before use.
Refer to Intro Page 73 for general information of the cylinder, and to Intro Page 80 for general information of the cylinder switch.

Product-specific cautions: Table rotary actuator GRC Series

Design/selection

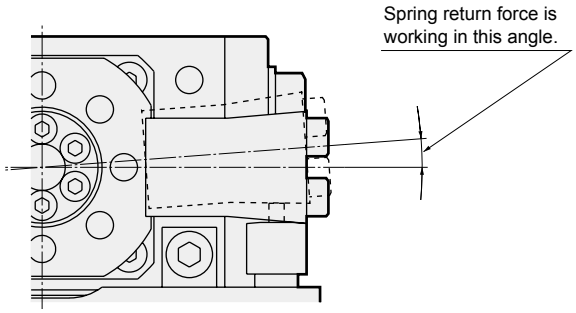
1. Common

⚠ CAUTION

■ Generally, select the model so that the output torque is twice or more than that required by the load.
The GRC Series uses a double piston, so if the oscillating angle is adjusted by the stopper bolt, torque at the oscillation end will be half the effective torque.

■ Even if the required torque load is low during oscillation motion, the load inertia may lead to actuator damage. Upon consideration of moment of inertia, kinetic energy and oscillating time, be sure to use with the allowable energy or less.

■ Note that when an external shock absorber is connected, torque is reduced by the return force of the spring built into the shock absorber at the oscillating end.



■ The external shock absorber absorbs the kinetic energy of the workpiece at the oscillation end, buffering the impact. A smooth stop may not be achieved under certain load conditions.

2. Fine speed GRC-F

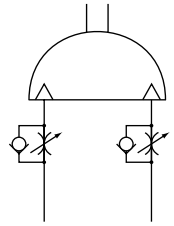
⚠ CAUTION

■ Use without lubrication. (Lubrication not possible)
Applying lubrication may cause changes in characteristics.

■ Assemble the speed controller near the rotary actuator.
When installed at a distant place from the rotary actuator, the adjustment becomes unstable.
Use the SC-M3/M5, SC3W, SCD-M3/M5 or SC3U Series speed controller.

■ At the higher air pressure and the lower load factor, the speed generally becomes more stable.
Use at a 50% or less load factor.

■ Stable speed control is achieved with a meter-out circuit.



■ Avoid use in places subject to vibrations.
The product will be adversely affected by vibration and operation will become unstable.

Mounting, installation and adjustment

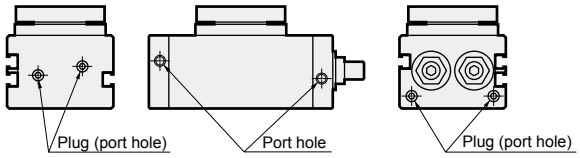
1. Common

⚠CAUTION

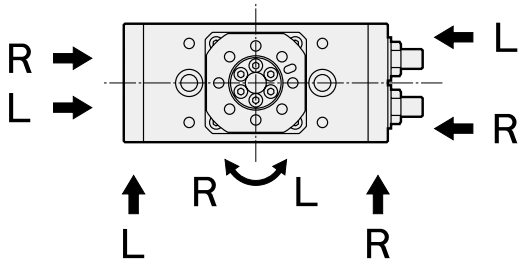
■ Do not apply additional processing to the product.
If modified, the product's strength will decrease, possibly causing product damage. This may result in injury or damage to operator, components, or equipment.

■ Do not widen the fixed orifice on the piping port by re-machining, etc. If the fixed orifice is widened, the actuator operation speed and impact will increase, damaging the actuator. Moreover, be sure to attach a speed controller during piping before use.

■ Select among 3 surfaces for piping port. Ports other than the side piping port are plugged when the product is shipped. When changing the piping port, interchange these plugs. When changing ports for the GRC-5 to 30, apply the recommended adhesive to plugs. When changing ports for GRC- 50 or 80, apply recommended adhesive or wrap sealing tape around plugs. Failure to do so may lead to air leakage.
[Recommended adhesive]
LOCTITE 222 [Loctite Japan Corp.]
ThreeBond 1344 [ThreeBond Co., Ltd]



■ The relationship of piping ports and oscillation direction is shown below.



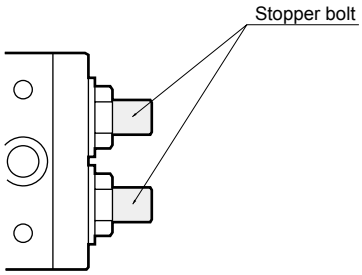
R: Clockwise rotation (right)
L: Counterclockwise rotation (left)

■ An angle adjustment screw (stopper bolt or shock absorber) for adjustment of the oscillating angle is provided as standard equipment. When the product is shipped, the angle adjustment screw is adjusted randomly within the oscillation adjusting range. Readjust this to the required angle before use.

■ Adjust the angle to within the adjusting range specified for the product.
If used outside of the adjusting range, the product may be damaged or malfunction. Refer to product specifications (page 1302) and oscillating angle adjustment (page 1329).

■ The adjustment angle per rotation of the angle adjusting screw (stopper bolt of shock absorber) is shown below.

Basic/high accuracy



With external shock absorber

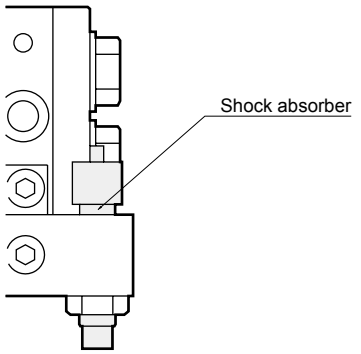


Table 1

Size	Stopper bolt adjustment angle per rotation	Shock absorber adjustment angle per rotation
5	8.7°	1.1°
10	4.9°	1.0°
20	5.7°	1.1°
30	3.8°	0.9°
50	3.5°	0.7°
80	3.5°	0.9°

■ Observe steps (1) to (5) when adjusting the angle. If adjustments are not made this way, the seal washer will be damaged after one or two adjustments.

[Angle adjustment procedure]

(1) First loosen the hexagon nut as shown in Fig.1.

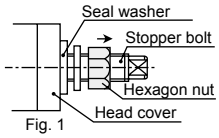


Fig. 1

(2) Second, remove the seal washer from the head cover by hand as shown in Fig.2.

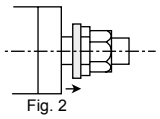


Fig. 2

(3) Turn the stopper bolt, hexagon nut, and seal washer together as shown in Fig.3, and adjust the angle. Check that the rubber section of the seal washer does not bite into the thread part.

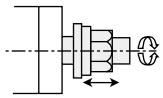


Fig. 3

(4) After adjusting the angle, move the seal washer near to the head cover by hand as shown in Fig. 4.

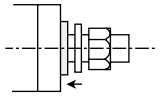


Fig. 4

(5) Tighten securely with the hexagon nut as shown in Fig. 5. Check that the rubber section of the seal washer does not bite into the thread part.

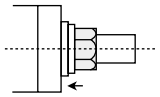


Fig. 5

After adjusting the angle, securely tighten the hexagon nut with the tightening torque in Table 2. If tightening torque is not adhered to then the hex nut could loosen in the course of usage, resulting in external leakage.

■ When replacing the stopper bolt for angle adjustment (the hex bolt if an external shock absorber is used) with a sealed washer, be sure that the hex nut (hex bolt if an external shock absorber is used) is tightened to the correct torque according to Table 2. Failure to do so may lead to air leakage.

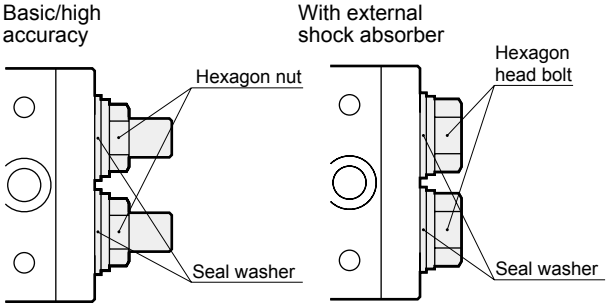


Table 2

Size	Tightening torque (N·m)	
	Basic/high accuracy	With external shock absorber
5	5.9±10%	3.4±10%
10	9.4±10%	4.9±10%
20	11.8±10%	6.9±10%
30	11.8±10%	6.9±10%
50	22.1±10%	8.8±10%
80	22.1±10%	8.8±10%

■ Make sure the tightening torque of the shock absorber nut is in accordance with Table 3. If the tightening torque exceeds the value below, the shock absorber may be damaged.

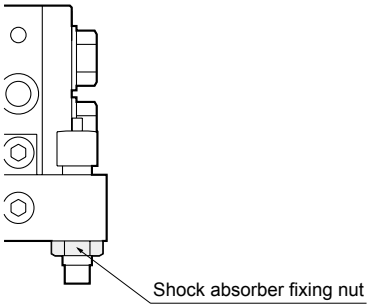


Table 3

Size	5	10	20	30	50	80
Tightening torque N·m	1.47		1.96		5.14	8.58

■ When retrofitting A3 types with an external shock absorber, the tightening torque for the mounting hex socket bolt or lever mounting hex socket bolt is shown in Table 4.

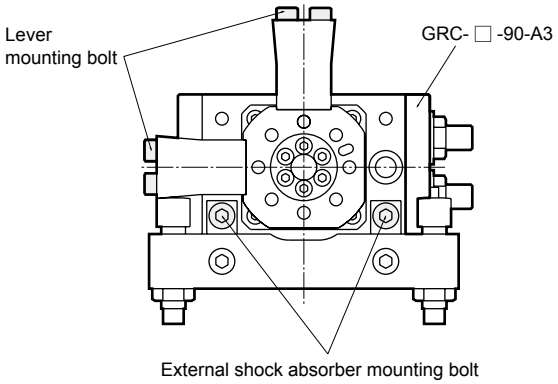
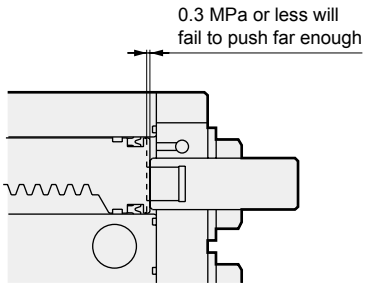


Table 4

Size	Lever mounting bolt	External shock absorber mounting bolt
	Tightening torque (N·m)	Tightening torque (N·m)
5	0.6±20%	1.4±20%
10	1.4±20%	2.9±20%
20	2.8±20%	4.8±20%
30	2.8±20%	4.8±20%
50	12.0±20%	12.0±20%
80	12.0±20%	12.0±20%

■ A rubber cushion is built into GRC types. (Basic, high accuracy) If less than 0.3 MPa of pressure is used, the rubber cushion may not function correctly. If oscillating end accuracy is required, use at pressure of 0.3 MPa or higher.

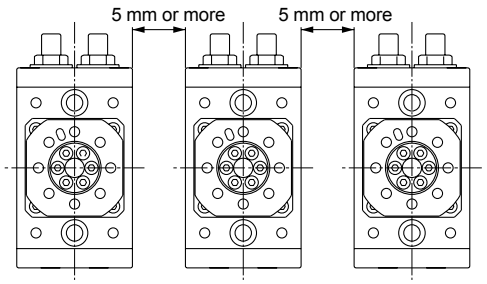
Back pressure may remain if using with all ports closed, potentially failing to push fully against the rubber cushion.

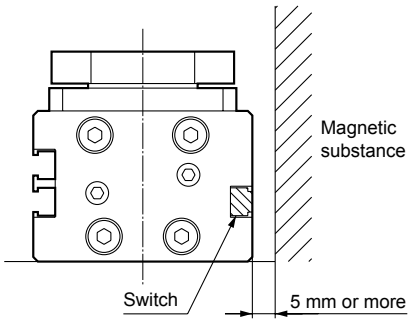


■ Pay attention to the proximity of cylinders, etc.

When installing two or more rotary actuators with switches in parallel, or if there is a magnetic substance such as a steel plate nearby, provide the following distances from the cylinder body surface. (The dimensions are the same for all sizes.)

Mutual magnetic interference may cause the switch to malfunction.





■ CKD's shock absorber is a repair part.

Replace it when the energy absorption performance has degraded or the operation is not smooth.