Pneumatic components

Safety Precautions

Be sure to read this section before use.
Refer to page 2 for general information of the cylinder, and to page 320 for general information of the cylinder switch.

Rotary actuator GRC Series

Design & selection

1. Common

⚠CAUTION

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

■ Even if the torque required by the load for the oscillation is small, the inertia of the load may break the actuator. Upon consideration of moment of inertia, kinetic energy and oscillating time, be sure to use with the allowable energy or less.

2. Fine speed GRC-F

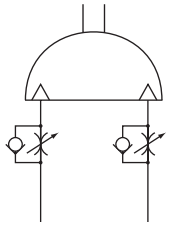
⚠CAUTION

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

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

■ At the higher air pressure and the lower load factor, the speed generally becomes more stable.
The load factor should be 50% or less.

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



PUSH: Meter-out
PULL : Meter-out

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

Mounting, installation & adjustment

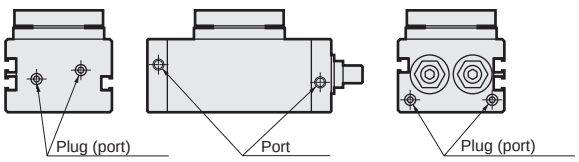
1. Common

⚠CAUTION

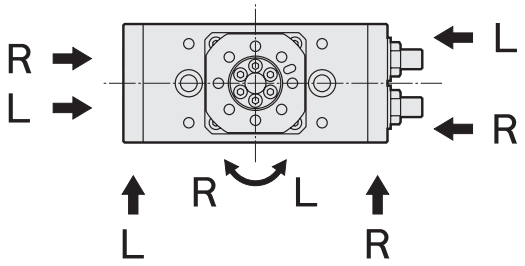
■ Do not apply additional processing to the product.
If modified, the product's strength will decrease, possibly causing product damage. This may result in injury or damage to operator, components, or equipment.

■ 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 threadlocker]
LOCTITE 222 [Locktite Japan Corp.]
Three Bond 1344 [Three Bond Corp.]



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



R : Clockwise rotation
L : Counter-clockwise rotation

■ 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 adjustment range specified for the product.
If adjusted beyond the adjusting range, the product may be damaged. Refer to "Product specifications" (page 286) and "Oscillation angle adjustment" (page 304).

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

Basic high accuracy

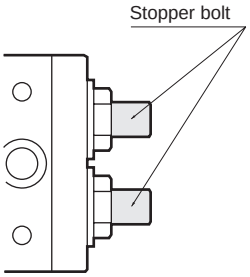


Table 1

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.

[How to adjust the angle]

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

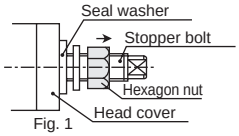


Fig. 1

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

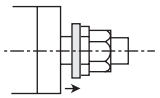


Fig. 2

(3) Turn the stopper bolt, hexagon nut, and seal washer together as shown in Fig. 3, and adjust the angle. Make sure that the rubber section of the seal washer does not get caught in the thread.

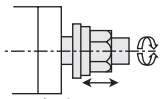


Fig. 3

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

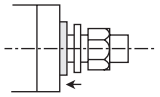


Fig. 4

(5) Tighten the lock nut as shown in Fig. 5. Make sure that the rubber section of the seal washer does not get caught in the thread.

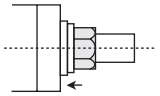


Fig. 5

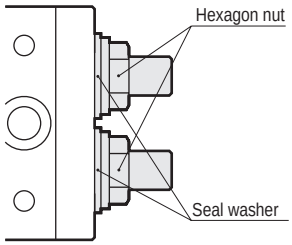
After adjusting the angle, securely tighten the hexagon nut up to the tightening torque in Table 2. Be sure to tighten the nut up to the specified torque. Otherwise, it will become loose leading to external leak.

Table 2

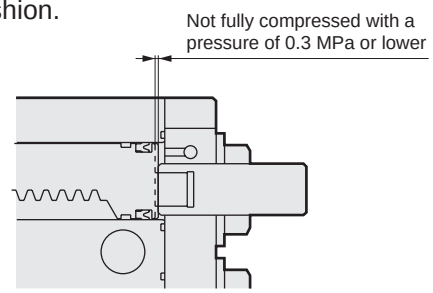
Size	Tightening torque (N·m)
5	5.9 ±10%
10	9.4 ±10%
20	11.8 ±10%
30	11.8 ±10%
50	22.1 ±10%
80	22.1 ±10%

■ When you replace the seal washer which seals the angle adjusting stopper bolt, be sure to tighten the hexagon nut up to the tightening torque specified in the Table 2. Failure to do so may lead to air leakage.

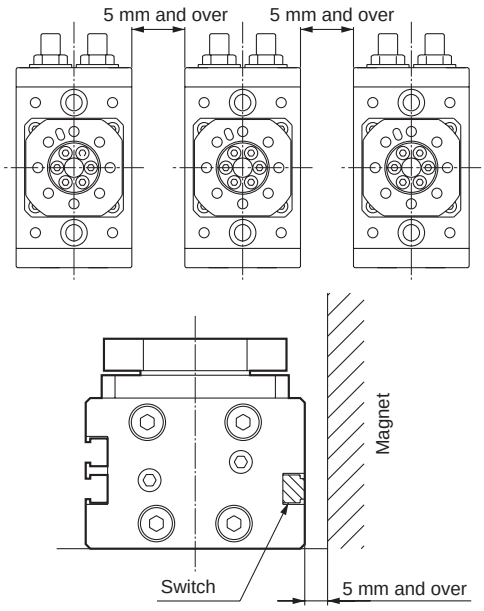
Basic high accuracy



■ A rubber cushion is placed inside GRC. (Basic and 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.

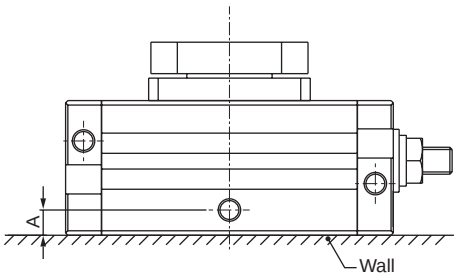


■ Pay attention to the proximity of cylinders, etc. When installing two or more rotary actuators with switches in parallel, or if there is a magnetic substance such as a steel plate nearby, provide the following distances from the cylinder body surface. (The dimensions are the same for all sizes.) Mutual magnetic interference may cause the switch to malfunction.

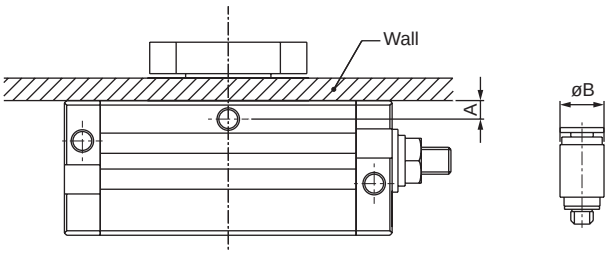


⚠CAUTION

■ As compatible fittings for the relief port are limited, refer to the table below to select the fitting.



GRC-5, 10



GRC-20 to 80

Descriptions / Model No.	Port size	Port location dimensions	When there is a wall			When there is no wall and a 2-color switch is used		
		A	Applicable fittings	Fitting O.D. øB	Inapplicable fittings	Applicable fittings	Fitting O.D. øB	Inapplicable fittings
GRC-5	M5 depth 4	4.1	GWS3-M5-S-P7* GWS4-M5-S-P7* FTS4-M5-P80 FTS6-M5-P80	ø8.2 or smaller	GWS6-M5-S GWS*-M5	GWS3-M5-S-P7* GWS4-M5-S-P7* FTS4-M5-P80 FTS6-M5-P80	ø9 or smaller	GWS6-M5-S GWS*-M5
GRC-10	M5 depth 3.5	4.1	GWS3-M5-S-P7* GWS4-M5-S-P7* FTS4-M5-P80 FTS6-M5-P80	ø8.2 or smaller	GWS6-M5-S GWS*-M5	GWS3-M5-S-P7* GWS4-M5-S-P7* GWS6-M5-S-P7* GWS4-M5-P7* FTS4-M5-P80 FTS6-M5-P80	ø10 or smaller	GWS6-M5
GRC-20	M5 depth 4	5.8	GWS3-M5-S-P7* GWS4-M5-S-P7* GWS6-M5-S-P7* GWS4-M5-P7* FTS4-M5-P80 FTS6-M5-P80	ø11.6 or smaller	GWS6-M5	GWS3-M5-S-P7* GWS4-M5-S-P7* GWS6-M5-S-P7* GWS4-M5-P7* FTS4-M5-P80 FTS6-M5-P80	ø11.6 or smaller	GWS6-M5
GRC-30	M5 depth 4	6.2	GWS3-M5-S-P7* GWS4-M5-S-P7* GWS6-M5-S-P7* GWS4-M5-P7* FTS4-M5-P80 FTS6-M5-P80	ø12.4 or smaller (ø10.4 or smaller)	GWS6-M5	GWS3-M5-S-P7* GWS4-M5-S-P7* GWS6-M5-S-P7* GWS4-M5-P7* FTS4-M5-P80 FTS6-M5-P80	ø10.4 or smaller	GWS6-M5
GRC-50	M5 depth 4	6.5	GWS3-M5-S-P7* GWS4-M5-S-P7* GWS6-M5-S-P7* GWS4-M5-P7* GWS6-M5-P7* FTS4-M5-P80 FTS6-M5-P80	ø17 or smaller (ø13.8 or smaller)		GWS3-M5-S-P7* GWS4-M5-S-P7* GWS6-M5-S-P7* GWS4-M5-P7* GWS6-M5-P7* FTS4-M5-P80 FTS6-M5-P80	ø13.8 or smaller	
GRC-80	M5 depth 4	12.9	GWS3-M5-S-P7* GWS4-M5-S-P7* GWS6-M5-S-P7* GWS4-M5-P7* GWS6-M5-P7* FTS4-M5-P80 FTS6-M5-P80	ø25.8 or smaller (ø14 or smaller)		GWS3-M5-S-P7* GWS4-M5-S-P7* GWS6-M5-S-P7* GWS4-M5-P7* GWS6-M5-P7* FTS4-M5-P80 FTS6-M5-P80	ø14 or smaller	

* The fitting O.D. in parenthesis ( ) is for the case when a 2-color switch is used.
* There is no specific restriction when there is no wall and a 1-color switch is used.
* Joints Refer to page 946 of this catalog.
For FTS4 and FTS6, copper-based materials are used.