Safety Precautions

Always 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.

Compact cylinder SMG Series

Design & selection

1. Common

⚠ CAUTION

The minimum working pressure in the specifications column indicates the initial value. Depending on the conditions of use or duration of use, the specifications may be exceeded. When using around the minimum working pressure, contact CKD.

2. Fine speed SMG-F

⚠ CAUTION

■ Use without lubrication.

Applying lubrication may cause changes in characteristics.

■ Assemble the speed controller near the cylinder.

When installed far from the cylinder, the speed becomes unstable.
For the speed controller, SC-M3/M5-F, SCD-M3/M5-F Series are recommended.

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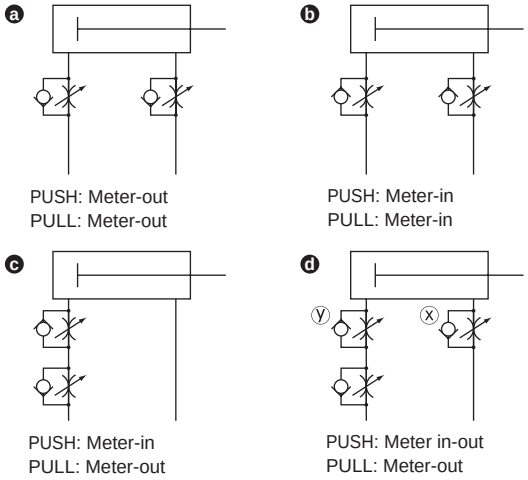
■ Stable speed control is achieved with a meter-out circuit.

When fine speed activation is performed with operating direction PUSH for the single rod cylinder, the popping out phenomenon occurs when operation starts if the load resistance is low. For countermeasures, use the ⓑ, ⓒ, or ⓓ circuit. Note that circuit ⓓ is the most stable.

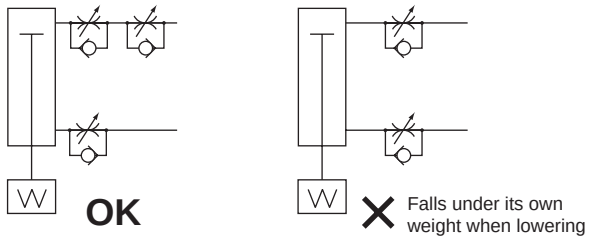


Speed adjustment method for PUSH operation of ⓓ circuit:

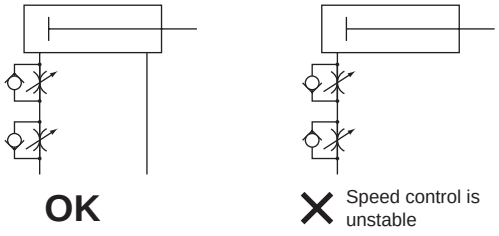
1. Set the speed with the speed controller x.
2. Restrict the speed with the speed controller y until there is no popping out.
3. Check the speed again.

(*1) When comparing ⓑ ⓒ ⓓ, the circuit ⓓ is the most stable.

(*2) For vertical mounting, combine the cylinder with a meter-out circuit, as it will fall under its own weight when a meter-in circuit is used.



(*3) Use the circuit as shown in the figure below for the serial connection of the speed controllers.



(Occurrence of popping out)

When the following condition is met, popping out could occur.

- Thrust > Resistance

* Resistance: a force produced by a residual pressure on the outlet side (for fine speed, Inlet pressure = Residual pressure) + { For vertical use: friction caused by the load / For horizontal use: self-weight of the load }

■ Do not apply a lateral load to the cylinder.

With a lateral load, operation will become unstable.

■ Avoid using the products where vibration is present.

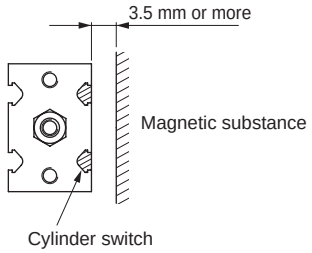
The product will be adversely affected by vibration and operation will become unstable.

Mounting, installation & adjustment

1. Common

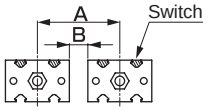
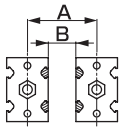
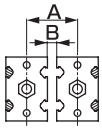
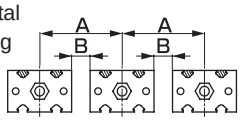
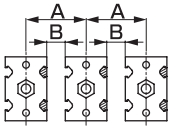
⚠ CAUTION

■ The cylinder switch may malfunction if there is a magnetic substance such as a metal plate installed adjacently. Check that a distance of 3.5 mm is provided from the surface of the cylinders.
(Same for all bore sizes)



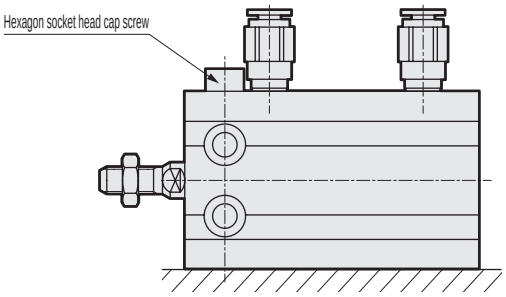
■ The cylinder switch may malfunction when cylinders are installed adjacently. In order to prevent switch malfunctions, provide a mounting pitch value according to the table below and the next page.

Unit: mm

Adjacent conditions			Switch model No.	ø6	ø10	ø16	ø20	ø25	Remarks
Two cylinders in parallel	• Horizontal mounting 	A	K0, K5	27	29	37	45	55	
			K2, K3						
		B	K0, K5	4.5					
			K2, K3						
	• Vertical mounting Switches are attached on the opposite side of the horizontal cylinders 	A	K0, K5	28	21	25	33	41	Note that switch position cannot be adjusted if the length of the screwdriver is longer than B dimension with cylinders mounted.
			K2, K3	25	28	35	40	50	
		B	K0, K5	5.5	5.5	5.5	6.5	8.5	
			K2, K3	11.5	12.5	14.5	14.5	17.5	
	• Vertical mounting Switches are attached on the side of the adjacent cylinders 	A	K0, K5	14	16	21	27	33	
			K2, K3						
		B	K0, K5	0.5					
			K2, K3						
More than two cylinders in parallel	• Horizontal mounting 	A	K0, K5	27	29	37	45	55	
			K2, K3						
		B	K0, K5	4.5					
			K2, K3						
	• Vertical mounting 	A	K0, K5	19	22	26	34	42	Note that switch position cannot be adjusted if the length of the screwdriver is longer than B dimension with cylinders mounted.
			K2, K3	27	29	35	44	51	
		B	K0, K5	6.5	6.5	6.5	7.5	9.5	
			K2, K3	13.5	13.5	14.5	17.5	18.5	

■ Depending on the stroke length or mounting method, compatible piping fittings are limited. Use the following recommended fittings.

Fig. 1



Descriptions / Port size	Port size	Recommended fittings
6	M5	SC3W-M5-4,6-P7* GWS4-M5-P7* GWS6-M5-P7* (*1) GWS4,6-M5-S-P7* GWL4-M5-P7* GWL6-M5-P7* (*1)
10	M5	SC3W-M5-4,6-P7* GWS4,6-M5-P7* GWS4,6-M5-S-P7* GWL4,6-M5-P7*
16	M5	SC3W-M5-4,6-P7* GWS4-M5-P7* (*1) GWS6-M5-P7* (*2) GWS4-M5-S-P7* GWS6-M5-S-P7* (*1) GWL4-M5-P7* (*1) GWL6-M5-P7* (*2)
20	M5	SC3W-M5-4,6-P7* GWS4-M5-P7* GWS6-M5-P7* (*1) GWS4,6-M5-S-P7* GWL4-M5-P7* GWL6-M5-P7* (*1)
25	M5	SC3W-M5-4,6-P7* GWS4,6-M5-P7* GWS4,6-M5-S-P7* GWL4,6-M5-P7*

*1: Excluding the case of 5 stroke length or mounting method in "Fig. 1".
*2: Excluding the case of 5,10 stroke length or mounting method in "Fig. 1".

■ When mounting the body with a through bolt, tighten the bolts to the tightening torque specified in the table below.

Port size	Applicable bolts	Tightening torque
ø6/10	M3	0.6 to 1.1 N·m
ø16	M4	1.5 to 2.7 N·m
ø20/25	M5	3.0 to 5.4 N·m

2. Fine speed SMG-F

⚠CAUTION

■ Perform adjustment such as centering so that a lateral load is not applied to the cylinder.
In addition, install and adjust the sliding guide to avoid twisting.

- When the load or the resistance fluctuates, operation becomes unstable.
- With a large difference between static friction and kinematic friction of the guide, operation becomes unstable.