



# 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.

SCP\*3  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS2  
CKV2  
CAV2/  
COVPIN2  
SSD2  
SSG  
SSD  
CAT  
MDC2  
MVC  
SMG  
MSD/  
MSDG  
FC\*  
STK  
SRL3  
SRG3  
SRM3  
SRT3  
MRL2  
MRG2  
SM-25  
ShkAbs  
FJ  
FK  
Spd  
Contr  
Ending

Product-specific cautions: Small compact cylinder MSD/MSDG Series

## Design/selection

### 1. Common

#### CAUTION

- When selecting a cylinder, follow the “Selection guide” on page 1446.
- Consult with CKD when using the cylinder as stopper.
- When selecting the cylinder switch, refer to the “Switch selection table” on pages 1407, 1415, 1425, 1437.
- Observe tightening torque when mounting the switch. If the tightening torque range is exceeded, the mounting bolt, bracket, switch, etc., could be damaged. In addition, when tightening the set screw with a torque less than the tightening torque range, displacement of switch mounting position could occur.  
Tightening torque: 29.4 (N•m)

### 2. Single acting MSD-X/Y

#### CAUTION

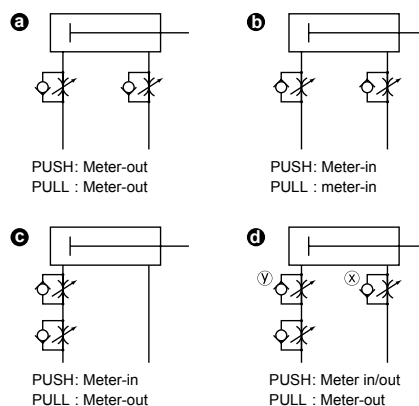
- Do not use the cylinder so as to apply load when the piston rod is pulled for the push type or when the piston rod is pushed for the pull type. Because the cylinder built-in cylindrical spring has only returning force for the piston rod, it cannot be returned to the stroke end when a load is applied.
- Take care when mounting so as not to block the breathing hole provided on the body. Otherwise, malfunctions may result.
- Do not leave in a pressurized state. If it is left pressurized for long periods, the piston rod may not return due to spring load when the pressure is released.

### 3. Fine speed MSD-(K) F/MSDG-LF

#### 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. Use the SC-M3/M5-F, SC3W, or SCD-M3/M5-F series speed controller.

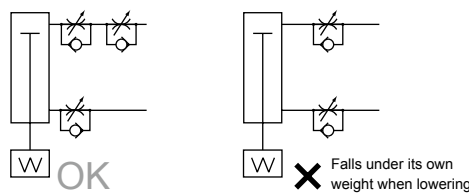
- In general, the speed is stabler at higher air pressure and lower load factor. Use at a 50% or less load factor.
- Stable speed control is achieved with a meter-out circuit. When fine speed activation is performed with operating direction PUSH for the single rod cylinder, the popping out phenomenon occurs when operation starts if the load resistance is low. For countermeasures, use the **b**, **c** or **d** circuit. Note that circuit **d** is the most stable.



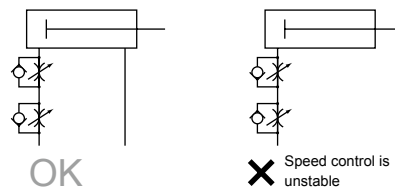
Speed adjustment method for PUSH operation of **d** circuit:  
1. Set the speed with the speed controller x.  
2. Restrict the speed with the speed controller y until there is no popping out.  
3. Check the speed again.

(\*1) When comparing **b**, **c**, **d**, the circuit **d** 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 shown in the figure below for the serial connection of the speed controllers.



(Guidelines for pop-out generation)

Popping out occurs in the following cases.

· Thrust > Resistance

\* Resistance: Thrust caused by residual pressure on the exhaust side (in the fine speed, suction pressure = residual pressure) + { When using horizontally: frictional force caused by load  
When using vertically: load self-weight

- Do not apply a lateral load to the cylinder.  
With a lateral load, operation will become unstable.
- Avoid using this product where vibration is present.  
The product will be adversely affected by vibration and operation will become unstable.

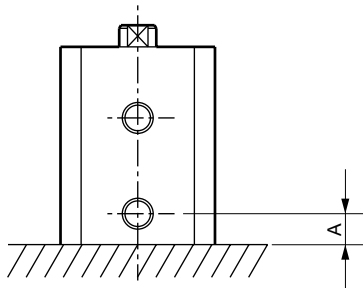
## Mounting, installation and adjustment

### 1. Common

#### ⚠ CAUTION

#### ■ Piping

Cautions for piping speed controller/fitting  
As compatible fittings are limited, refer to the table below to select a fitting.



### Fitting selection table

Code Bore size (mm)	Port size	Port position dimension A	Available speed controller/fitting	Fitting O.D.
φ6 φ8	M3	4	SC3W-M3-3	φ8 or less
			SC3W-M3-4	
			SC3U-M3-3	
			SC3U-M3-4	
φ12 φ16	M5	5	GWS3-M3-S	φ10 or less
			GWS4-M4-S	
			FTS4-M3	
			SC3W-M5-3	
			SC3W-M5-4	
			SC3W-M5-6	
SC3U-M5-3				
SC3U-M5-4				
SC3U-M5-6				
GWS4-M5-S				
GWS6-M5-S				
FTS4-M5				
FTS6-M5				

#### ■ Installation

Do not damage the surface flatness by denting or scratching the body (tube) mounting surface or the table surface. Make sure that the flatness of the mating surface for table mounting is 0.05 mm or less.

### 2. Fine speed MSD-(K) F/MSDG-LF

#### ⚠ 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 so that it is not twisted.

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.

SCP\*3

CMK2

CMA2

SCM

SCG

SCA2

SCS2

CKV2

CAV2/  
COVP/IN2

SSD2

SSG

SSD

CAT

MDC2

MVC

SMG

MSD/  
MSDG

FC\*

STK

SRL3

SRG3

SRM3

SRT3

MRL2

MRG2

SM-25

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