Pneumatic Components

To Use This Product Safely

Be sure to read this before use.
For general cylinder information, see Intro 41, and for cylinder switches, see P. 924.

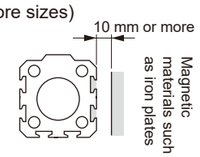
Individual Precautions: Compact Cylinder SSD Series

During Design/Selection

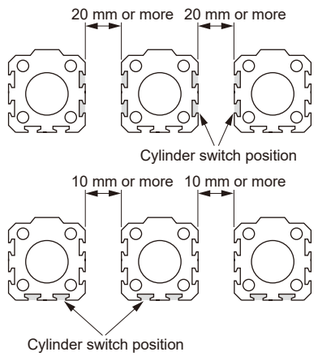
1. Common

Caution

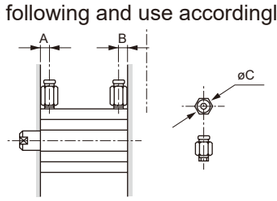
■ If there is a magnetic material such as an iron plate near the cylinder switch, it may cause malfunction. Maintain a distance of 10 mm or more from the cylinder surface.
(Common to all bore sizes)



■ If cylinders are adjacent, it may cause cylinder switch malfunction. Maintain the following distance from the cylinder surface. (Common to all bore sizes)



■ There are restrictions on usable piping fittings. Refer to the following and use accordingly.



Item / Bore size (mm)	Port Size	Port position dimension A	Port position dimension B	Usable Fittings	Fitting outer diameter øC	Unusable Fittings
ø12	M5	5.5	5.5	SC3W-M5-4 SC3W-M5-6 GWS4-M5-S GWS4-M5 GWL4-M5 GWL6-M5	ø11 or less	GWS6-M5
ø16						
ø20		8	5.5			
ø25		11	6			
ø32	Rc1/8	8	8	SC3W-6-4, 6, 8 GWS4-6 GWS6-6 GWS8-6 GWL4-6 GWL6-6	ø15 or less	GWS10-6 GWL8-6 GWL10-6
ø40		12	8.5			
ø50	Rc1/4	10.5	10.5	SC3W-8-6, 8, 10 GWS4-8 GWS6-8 GWS10-8 GWL4 to 12-8	ø21 or less	GWS12-8
ø63		13	11			
ø80	Rc3/8	16	13	SC3W-10-6, 8, 10 GWS6-10 GWS8-10 GWS10-10 GWL6 to 12-10	ø21 or less	-
ø100		23	15			

■ Install a speed controller on the cylinder.
● Install a speed controller on the cylinder. Use within the operating piston speed range of each cylinder.

2. High load type SSD-K, SSD-K□C, SSD-KF SSD-KU, SSD-KG1/KG2/KG3/KG4/KG5

■ Super compact cylinder high load type has a built-in rubber cushion. The table on P. 697 shows the kinetic energy that can be absorbed by the cushion. If the kinetic energy exceeds this value, consider a separate shock absorber.

Bore size (mm)	Allowable Absorption Energy (J)	
		SSD-KU
ø12	0.04	–
ø16	0.09	–
ø20	0.16	
ø25	0.16	
ø32	0.40	
ø40	0.63	
ø50	0.98	
ø63	1.56	
ø80	2.51	
ø100	3.92	

$$\text{Kinetic energy (J)} = \frac{1}{2} \times \text{Weight (kg)} \times [\text{Speed (m/s)}]^2$$

(Note) Regarding the calculation method of kinetic energy

The average speed of the cylinder is calculated by $Va = \frac{L}{T}$.

Va: Average speed (m/s)
L: Cylinder stroke (m)
T: Operating Time (s)

On the other hand, the cylinder speed just before the stroke end is calculated by the following simple formula.

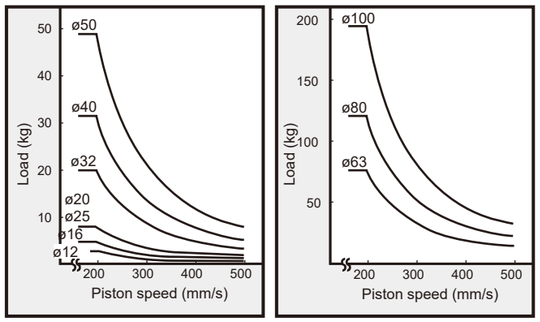
$$Vm = \frac{L}{T} \times (1 + 1.5 \times) \frac{\omega}{100}$$

Vm: Speed immediately prior to stroke end (m/s)
ω: Cylinder load factor (%)

For calculating kinetic energy, use this Vm value as the speed.

The following is a graph showing the relationship between piston speed and load for the allowable energy value of the Compact Cylinder High Load Type.

High Load Type Allowable Energy Value Graph



● Note: The range to the lower left of the curve is usable The upper right range requires an external cushion.

3. Single acting type SSD-X, SSD-Y

Caution

■ Do not leave single-acting cylinders pressurized.
If left pressurized, the piston rod may not return by spring load when the pressure is released. If it is necessary to use the product while pressurized, use a double-acting type.

4. Heat resistant cylinder with switch SSD-T1L

Warning

■ Cylinder
In an environment with an ambient temperature of 150°C, external leakage will gradually occur after about 500,000 cycles. Please be careful.

■ Heat Resistant Cylinder Switch
The indicator light uses an LED. Continuous use at high temperatures will gradually reduce visibility. Even if the LED goes out, the switch output has a separate circuit configuration from the LED, so the switch output will operate normally.

5. With rubber air cushion SSD-K-□C

Caution

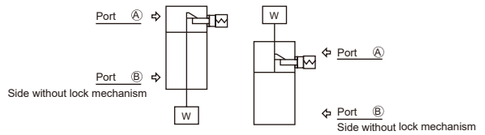
■ Please note that due to its structure, if the air supply is cut off, the stroke end position cannot be maintained. When detecting the stroke end with a switch, it may be outside the detection range, so set the switch position in an air-pressurized state.

■ Do not rapidly exhaust the air in the cylinder after operating at low speed outside the catalog specification range. (Example: Removing piping or coupler, etc.) The rubber-air cushion may become detached. Please be especially careful as this is more likely to occur when the air pressure is high.

6. Drop prevention type SSD-Q

Warning

■ In the locked state, if pressure is supplied to port Ⓐ when both side ports are unpressurized, the lock may not release, or the lock may suddenly release and the piston rod may fly out, which is very dangerous.
When releasing the lock mechanism, be sure to supply pressure to port F and release it from a state where no load is applied to the lock mechanism.



■ When using a quick exhaust valve to increase the lowering speed, the cylinder body may start moving before the lock pin operates, and normal release may not be possible. Do not use a quick exhaust valve with a drop prevention type cylinder.

■ Do not use 3-position valves.
Do not use in combination with 3-position valves (especially closed-center metal seal type). If pressure is sealed in the port on the side with the lock mechanism, the lock will not engage. Also, even if locked once, air leaking from the valve may enter the cylinder, and the lock may be released over time.

Caution

■ The cylinder load factor should be 50% or less.
If the load factor is high, the lock may not be released, or it may lead to damage to the lock part.

■ If back pressure is applied to the lock mechanism side, the lock may disengage. Use a single valve or an individual exhaust type manifold.

■ Do not use multiple cylinders synchronized.
Do not use a method where two or more fall prevention type cylinders are synchronized to move one workpiece. The lock of one of the cylinders may become unremovable.

■ Since the lock mechanism works at the stroke end, if an external stopper is applied in the middle of the stroke, the lock mechanism will not work and there is a risk of falling. When setting the load, always confirm that the lock mechanism works.

■ Supply pressure equal to or greater than the minimum operating pressure to the port on the side with the lock mechanism.

■ If the piping on the side with the lock mechanism is thin and long, or if the speed controller is far from the cylinder port, the exhaust speed may be slow, and it may take time for the lock to engage. Please be careful. Also, the valve EXH/ Clogging in the silencer mounted on the port may cause the same result.

■ Use the speed controller with meter-out.
Lock may not be released with meter-in control.

■ On the side with the lock, always use at the cylinder's stroke end.
If the cylinder piston has not reached the stroke end, the lock may not engage, or it may not be possible to release the lock.

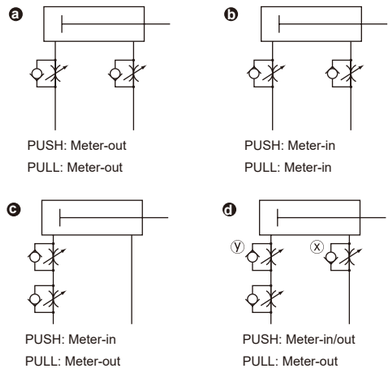
7. Low speed type SSD-F, SSD-KF

Caution

■ Install the speed controller near the cylinder.
If installed far from the cylinder, the speed will become unstable. Use SC-M3/M5, SC3W, SCD-M3/M5, SC3U series speed controllers.

■ Generally, the higher the air pressure and the lower the load factor, the more stable the speed.
Use with a load factor of 50% or less.

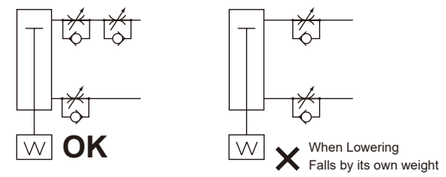
■ Speed control is stable with a meter-out circuit.
When driving a single-rod cylinder at creep speed in the PUSH direction, if the load resistance is small, a flying-out phenomenon may occur at the start of operation. As countermeasures, use circuits ⓑ, ⓒ or ⓓ. In addition, the ⓓ circuit is the most stable.



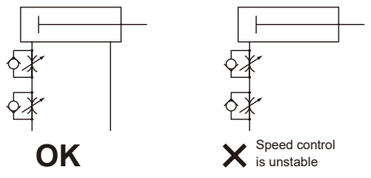
ⓓSpeed adjustment method for PUSH operation of the circuit:
1. Set the speed with the speed controller x.
2. Restrict the speed with the speed controller y until there is no popping out.
3. Reconfirmation of speed

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

(*2) For vertical mounting, it will fall by its own weight in a meter-in circuit, so combine it with a meter-out circuit.



(*3) For series connection of speed controllers, use the circuit shown in the figure below.



(Guideline for lurching occurrence)
Lurching occurs in the following cases:
• Thrust > Resistance
*Resistance: *Resistance: Thrust due to residual pressure on exhaust side (For creep speed+ type, intake pressure = residual pressure) { For horizontal use: Frictional force due to load / For vertical use: Dead weight of the load

■ Do not apply lateral load to the cylinder.
Operation becomes unstable when lateral load is applied.

■ Avoid use in locations with vibration.
Operation becomes unstable due to the influence of vibration.

8. Low friction type SSD-KU

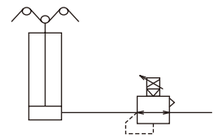
Warning

■ Durability varies depending on operating conditions and model characteristics.
Also, this cylinder is a cylinder with internal leakage. For the amount of leakage, please check the specifications (P. 488).

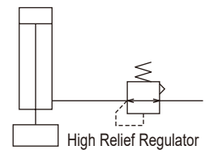
Caution

■ Install a speed controller on the cylinder.
Install a speed controller on the cylinder. Use within the operating piston speed range of each cylinder. When used with a balancer, etc., it may be better not to install a speed controller to improve supply/exhaust efficiency. The following circuits ⓐ to ⓒ are recommended depending on the application.

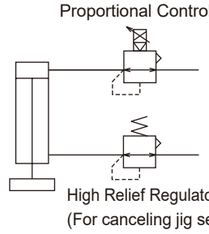
ⓐTension control (winding machines, etc.)



ⓑBalancer (machine tool Z-axis, etc.)



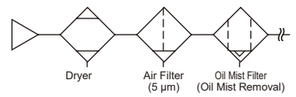
ⓒLoad control (polishing, etc.)



*To improve supply/exhaust characteristics, maximize piping volume as much as possible.

■ Do not lubricate. It will cause characteristics to fluctuate.

■ Poor quality air adversely affects characteristics and durability. Use clean air with the piping below.



■ Install the speed controller near the cylinder.
If installed far from the cylinder, the speed will become unstable.

■ Generally, the higher the air pressure and the lower the load factor, the more stable the speed.
Use with a load factor of 50% or less.

■ Do not disassemble this product. If disassembled, performance may no longer be maintained. Furthermore, only consumable parts are not provided for this product.

■ Avoid use in environments with steam, high humidity, or alkaline atmospheres.

9. Non-rotating type SSD-M

Caution

■ Do not use in a way that applies rotational torque to the piston rod.
The non-rotating bushing will deform and the service life will be significantly reduced.

10. Cutting oil resistant type SSD-G2, G3 / SSD-KG2, KG3

Caution

■ Do not apply eccentric load to the piston rod. This may reduce the life of scrapers and bearings.

■ If there is no splashing of cutting oil or water on the piston rod, use the G or G1 series. Please note that if there is no scattering of cutting oil or water with G2 and G3 series, the lubrication of the piston rod will be cut off and the service life will be reduced.

11. Spatter adhesion prevention type SSD-G4 / SSD-KG4 / SSD-DG4

Warning

■ This cylinder series has improved durability in spatter scattering atmospheres compared to general type cylinders. However, please note that durability may be inferior to general type cylinders when used in other atmospheres.

During Use

1. Common

⚠ Warning

■ Install and remove rod metal using appropriate pliers (C-type retaining ring installation tool).

■ Even when using appropriate pliers (C-type retaining ring installation tool), be careful as the retaining ring may come off the tip of the pliers (C-type retaining ring installation tool) and fly off, potentially causing injury to personnel and damage to surrounding equipment.
Also, when installing, confirm that it is securely in the retaining ring groove before supplying air.

2. Drop prevention type SSD-Q

⚠ Warning

■ During equipment maintenance, for safety, please take separate measures to prevent the load from falling due to its own weight.

■ When stopping with external shock absorbing equipment (shock absorber, etc.), adjust so that there is no bounce. If there is bounce, the sleeve and stopper piston will make impact contact, leading to damage of the lock mechanism. Also, please perform periodic inspections once or twice a year to check for damage to the holding part due to this phenomenon.

⚠ Caution

■ After manual operation of the lock mechanism, return the lock mechanism to its original state. Also, do not perform manual operations other than during adjustment, as it is dangerous.

■ Release the lock when mounting or adjusting the cylinder.
If installation work, etc. is performed while the lock is engaged, the lock part may be damaged.

3. Low speed type SSD-F/SSD-KF

⚠ Caution

■ Use without lubrication.
Lubrication may change characteristics.

■ Adjust alignment, etc., so that no lateral load is applied to the cylinder. Also, adjust and install so that there is no twisting with respect to the sliding guide.
- Fluctuations in load or resistance will make operation unstable.
- Guides with a large difference between static and dynamic friction will have unstable operation.

4. Low friction type SSD-ICU

⚠ Caution

■ Adjust alignment, etc., so that no lateral load is applied to the cylinder. Also, adjust and install so that there is no twisting with respect to the sliding guide.
- Fluctuations in load or resistance will make operation unstable.
- For long strokes, the speed becomes unstable due to the self-weight of the piston rod. Please install and use a guide.
- Guides with a large difference between static and dynamic friction will have unstable operation.

For precautions regarding mounting, installation, adjustment, use, and maintenance, please see "Precautions for Use" in this catalog and the CKD Components Product website (https://www.ckd.co.jp/kiki/en/) -> "Model No." -> Instruction Manual.

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