To Use This Product Safely

Be sure to read this before use. For general cylinder information, see Opening Section P. 41, and for cylinder switches, see P. 808.

Individual Precautions: Guided cylinder STS/STL Series

During Design / Selection

1. Common

⚠ Caution

■ When using a plain bearing type with a long stroke at low speed, stick-slip may occur depending on the load conditions. In this case, use a rolling bearing type.

2. With rubber air cushion STS/STL-$^{M}_{B}$-□C

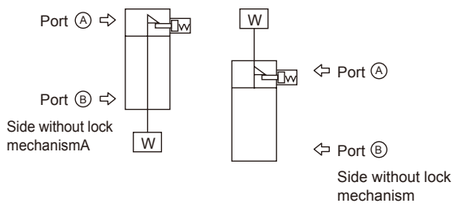
⚠ Caution

■ Due to the structure, if the air supply is cut off, the stroke end position cannot be maintained. Please be careful. 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.

3. Drop prevention type STS/STL-$^{M}_{B}$Q

⚠ Warning

■ In the locked state, if pressure is supplied to port Ⓐ from a state where both side ports are not pressurized, the lock may not be released, or the lock may suddenly be released and the piston rod may fly out, which is very dangerous. When releasing the lock mechanism, always supply pressure to port Ⓑ 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

■ Keep the cylinder load factor at 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 be released, so use a single valve or a manifold with individual exhaust.

■ 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.

4. Low speed type (STS/STL-$^{M}_{B}$F)

⚠ Caution

■ Use without lubrication.
Lubrication may change characteristics.

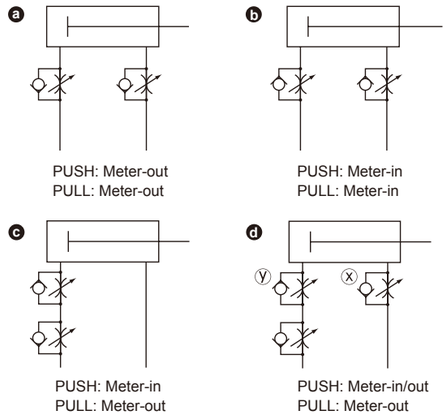
■ Install the speed controller near the cylinder.
If installed far from the cylinder, the speed will become unstable. SC-M3/M5-F, SC3W, SCD-M3/M5-F Series speed controllers are recommended.

■ 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 apply lateral load to the cylinder. Also, install the sliding guide without twisting.
Operation will become unstable if there are fluctuations in load or resistance. Guides with a large difference between static friction and dynamic friction will result in unstable operation.

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

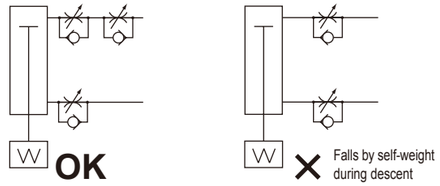
■ Speed control with a meter-out circuit provides stability.
When driving a single-rod cylinder at creep speed in the PUSH direction, if the load resistance is small, a flying-out phenomenon may occur at the start of operation. As countermeasures, use circuits ⓑ, ⓒ, or ⓓ. Circuit ⓓ is the most stable.



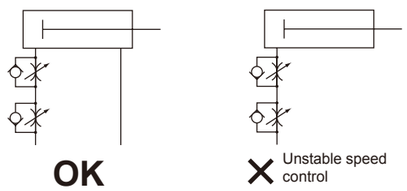
ⓓ Speed adjustment method for PUSH operation of the circuit:
1. Setting the speed with the x-axis speed controller
2. Restrict the speed with the y-axis speed controller until there is no popping out.
3. Reconfirmation of speed

Note1) Comparing ⓑⓒⓓ, the ⓓ circuit is the most stable in operation.

Note2) For vertical mounting, it will fall by its own weight in a meter-in circuit, so combine it with a meter-out circuit.



Note3) 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: 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]

5. Coolant proof STS/STL-$^{M}_{B}$G$^{2}_{3}$

⚠ Caution

■ Do not apply an 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 case 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.

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

6. Spatter adhesion prevention type STS/STL-$^{M}_{B}$G4

⚠ Caution

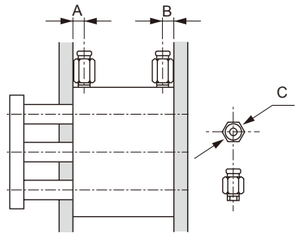
■ This cylinder series has improved durability in a spatter scattering atmosphere compared to general-purpose cylinders. However, please *that durability may be inferior to general type cylinders when used in other atmospheres.

During Use

1. Common

Caution

■ Be sure to use a speed controller when piping. Also, the usable fittings are as follows.



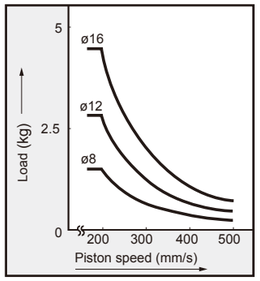
ø80 does not allow side piping such as shown in the figure above.

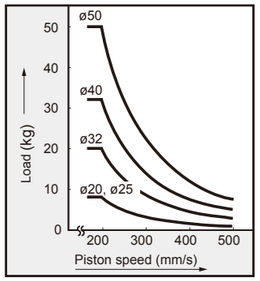
Item / Bore Size (mm)	Port Size	Port position dimension A	Port position dimension B	Usable Fittings	Fitting outer diameter øC
ø8	M5x0.8	11	6.5	SC3W-M5-4 SC3W-M5-6	ø12 or less
ø12		7.5	7.5	GWS4-M5-S GWS4-M5 GWL4-M5	
ø16		7.5	7.5	GWL6-M5 GWS6-M5	
ø20		12	8	SC3W-M5-4, SC3W-M5-6 GWS4-M5-S, GWS4-M5 GWL4-M5	ø15 or less
ø25		12	9	GWL6-M5	
ø32	Rc1/8	14	9	SC3W-6-4 / 6 / 8 GWS4-6, GWS6-6, GWS8-6	ø15 or less
ø40		14.5	10	GWS8-6, GWL4-6	
ø50	Rc1/4	16	11	SC3W-8-6 / 8 / 10 GWS4-8 GWS6-8 GWS10-8 GWS12-8 GWL4 to 12-8	ø21 or less
ø63		17.5	16		
ø80	Rc3/8	25	26	SC3W-10-8/10/12 GWS6-10 GWS8-10 GWS10-10 GWL6 to 12-10	ø21 or less
ø100	Rc3/8	24	25.5 (50)	SC3W-10-8/10/12 GWS6-10 GWS8-10 GWS10-10 GWL6 to 12-10	ø21 or less

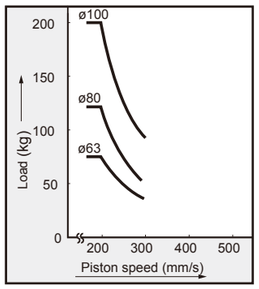
■ To prevent an increase in sliding resistance, do not make dents or scratches on the tube body mounting surface and end plate surface that may impair flatness. The flatness of the mating side included to the end plate should be 0.05 mm or less.
If it is difficult to ensure the above flatness, insert shims (customer prepared), etc. between the end plate and the workpiece to adjust the gap. This may help prevent an increase in sliding resistance.

■ Be sure not to rotate the piston rod, as it may destabilize operation (due to misalignment).

■ Allowable Energy Value
Use within the range to the lower left of the curve. If using in the upper right range, provide a separate external shock absorber.







■ Do not rotate the piston rod except when disassembling the product for maintenance, etc. Misalignment may occur and operation may become unstable, so do not rotate the piston rod.

■ Treat our Shock absorbers as consumable parts. Replace when a decrease in energy absorption capacity is observed or when operation is no longer smooth.

2. With rubber air cushion STS/STL-$^{M}_{B}$-□C

Caution

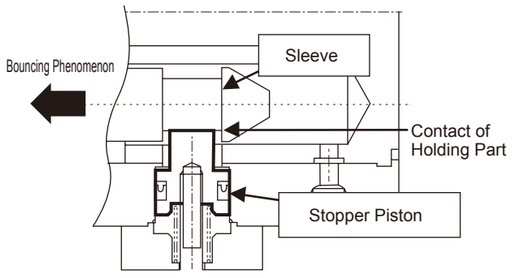
■ Do not rapidly exhaust the air in the cylinder after operating at low speed outside the catalog specification range. (Example Removing piping or couplers, etc.) The rubber air cushion may come off. Please be especially careful as this is more likely to occur when the air pressure is high.

3. Drop prevention type STS/STL-$^{M}_{B}$Q

Warning

■ During equipment maintenance, please take separate measures for safety so that the load does not fall due to its own weight.

■ When stopping with external shock absorbing equipment (shock absorbers, etc.), adjust so that there is no bounce. If it bounces, the sleeve and stopper piston will make impact contact, leading to damage to 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

■ Since the lock mechanism works at the stroke end, if an external stopper is applied mid-stroke, the lock mechanism will not work, and there is a risk of falling. When setting the load, be sure to confirm that the lock mechanism is working before installing.

■ Supply pressure equal to or higher 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, so please be careful. Also, clogging of the silencer included to the EXH. port of the valve will lead to similar results.

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

4. Low speed type (STS/STL-$^{M}_{B}$F)

Caution

■ Make adjustments such as alignment 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.
Operation will become unstable if there are fluctuations in load or resistance. Guides with a large difference between static friction and dynamic friction will result in 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