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. 1026.

Individual Precautions: Tie-rod cylinder SCG Series

During Design / Selection

1. Common

⚠ Caution

■Install a speed controller on the cylinder.
Install a speed controller on the cylinder. Please use within the operating piston speed range of each series.

⚠ Caution

■Rubber cushion type and air cushion type are available as cushion mechanisms built into the cylinder. The purpose of the air cushion is to absorb the kinetic energy held by the piston by utilizing the compressibility of air, and to prevent the piston and cover from hitting impulsively at the stroke end. Therefore, the cushion is not for low-speed operation (deceleration operation) of the piston speed from near the stroke end. The table below shows the kinetic energy that can be absorbed by the cushion. If the kinetic energy exceeds this value or if you want to avoid bouncing due to air compressibility, please consider a separate shock absorber.

Bore Size (mm)	Rubber Cushion	Air Cushion	
	Allowable Absorption Energy J	Effective air cushion Length (mm)	Allowable Absorption Energy J
ø32	0.5	8.6	2.5
ø40	0.9	8.6	3.7
ø50	1.6	13.4	8.0
ø63	1.6	13.4	14.4
ø80	3.3	15.4	25.4
ø100	5.8	15.4	45.6

Kinetic Energy (J) =
$\frac{1}{2}$ × Mass (kg) × $\frac{1}{2}$ [Speed (m/s)]²

(Note) How to calculate kinetic energy

The average speed of the cylinder is obtained 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 entering the cushion is

It can be obtained by the following simplified formula.

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

Vm: Speed just before entering cushion (m/s)

ω : Cylinder load factor (%)

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

2. Drop prevention type SCG-Q

⚠ Warning

■In a locked state, if pressure is supplied to the port Ⓐ from a state where both 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, always supply pressure to the port Ⓑ and release it from a state where no load is applied to the lock mechanism.

Port Ⓐ
Port Ⓑ
Side without lock mechanism
W
Port Ⓐ
Port Ⓑ
Side without lock mechanism
W
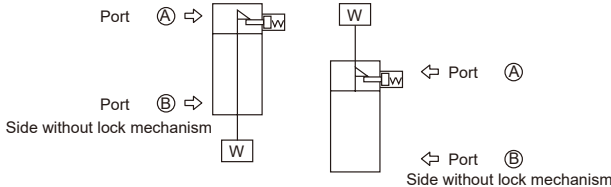
■When using a quick exhaust valve to increase the lowering speed, the cylinder body may start moving before the lock pin operates, and normal release may not be possible. Do not use a quick exhaust valve with a drop prevention type cylinder.

■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, air leaked from the solenoid 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 solenoid 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.
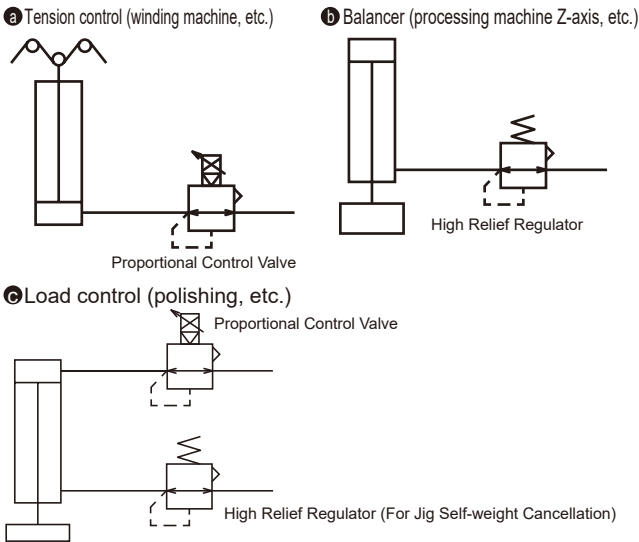
3. Low-friction type SCG-U

⚠ Warning

■Durability varies depending on usage conditions and model characteristics.
This cylinder is a cylinder with internal leakage. For leakage volume, check the specifications (P. 546).

⚠ Caution

■When used with a balancer, etc., it may be better not to install a speed controller to improve supply/exhaust efficiency. Depending on the application, circuits ⓐ to ⓒ below are recommended.

ⓐTension control (winding machine, etc.)
ⓑBalancer (processing machine Z-axis, etc.)
Proportional Control Valve
High Relief Regulator

ⓒLoad control (polishing, etc.)
Proportional Control Valve
High Relief Regulator (For Jig Self-weight Cancellation)

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

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

■Poor quality air will adversely affect characteristics and durability, so please use clean air with the piping below.

Dryer
Air Filter (5 μm)
Oil Mist Filter (Oil Mist Removal)
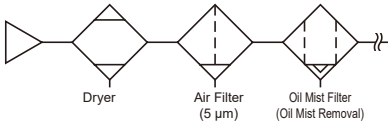
■Install the speed controller near the cylinder.
If installed far from the cylinder, adjustment will be unstable.

■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.

4. Cutting oil resistant type SCG-G2/G3

⚠ Caution

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

■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. In such cases, please use the G series.

5. Spatter adhesion prevention type SCG-G4

⚠ Warning

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

During Use

1. Drop prevention type SCG-Q

⚠ Caution

■ 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.

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

■ Manual operation non-locking type release method
  Screw the release bolt into the stopper piston and pull the bolt with a force of 20N or more by the amount of movement, and the stopper piston will move and the lock will be released. (When mounted horizontally with no load or when the opposite port is pressurized) Also, when you release your hand, the built-in spring returns the stopper piston to its original position, and when it re-enters the piston rod groove, the piston will be locked.

Release bolt
Stopper spring
Stopper Piston
Piston Rod groove
Movement amount
Lock
Lock release
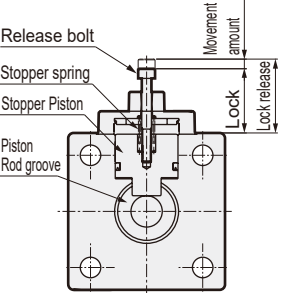
Bore Size (mm)	Lock	Lock release	Movement amount	Release bolt
ø32	19.5	22.5	3	M3×25
ø40	18	21	3	M3×25
ø50	26.5	30.5	4	M4×35
ø63	21.5	25.5	4	M4×35
ø80	19	23	4	M4×35
ø100	21.5	25.5	4	M4×35

■ Manual operation locking type release method
  When the round nut is turned to the left (counterclockwise), the stopper piston moves and the lock is released. Also, if you turn it to the right to the lock position, the stopper piston will return, and when it re-enters the piston rod groove, the piston will be locked.

Round Nut
Movement amount
Lock
Lock release
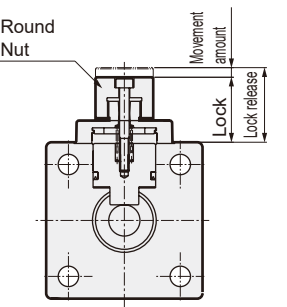
Bore Size (mm)	Lock	Lock release	Movement amount
ø32	20	23	3
ø40	18.5	21.5	3
ø50	27	31	4
ø63	22	26	4
ø80	19.5	23.5	4
ø100	22	26	4

2. Low-friction type SCG-U

⚠ Caution

■ Do not apply lateral load to the cylinder. Also, install the sliding guide so that it does not get twisted.
  ● Operation will become unstable if there are fluctuations in load or resistance.
  ● In the case of a long stroke, 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 friction and dynamic friction will result in unstable operation.

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

■ Avoid use in steam, humid environments, or alkaline atmospheres.

3. Non-rotating type SCG-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.