Pneumatic Equipment

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.

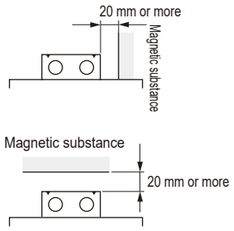
Individual Precautions: Twin Rod Cylinder STR2 series

During Design / Selection

1. Common; With switch

Caution

■ If there is a magnetic material such as an iron plate near the cylinder switch, it will cause the cylinder switch to malfunction. Keep a distance of 20 mm or more from the cylinder surface. (Common to all bore sizes)

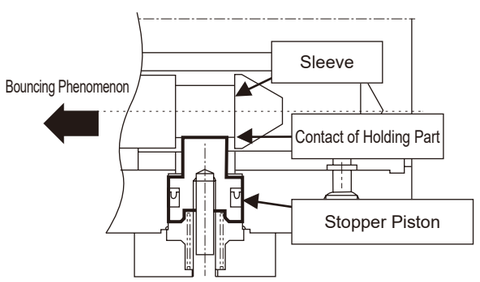


2. Drop prevention type STR2-Q

Warning

■ In the locked state, if pressure is supplied to the port on the side with the lock mechanism 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, be sure to supply pressure to the opposite side 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 may start moving before the lock mechanism operates, and normal release may not be possible.
Do not use quick exhaust valves with fall prevention cylinders. 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.



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

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

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, 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 speed type STR2-F

Caution

■ Use without lubrication.
Lubrication may change characteristics.

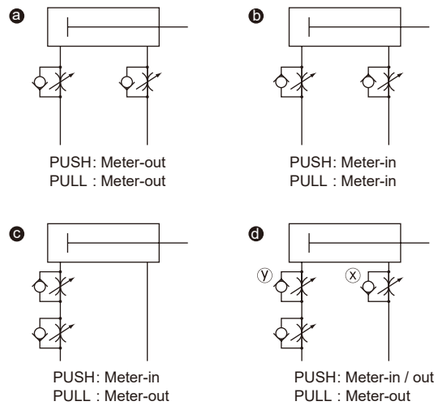
■ Install the speed controller near the cylinder.
If installed far from the cylinder, the speed will become unstable.
Use SC-M3/M5, SC3W, SCD-M3/M5, SC3WU series speed controllers.

■ 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.

■ 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.

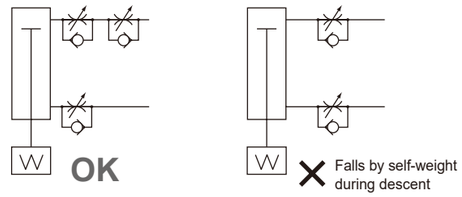
■ Speed control with a meter-out circuit provides stability.
When driving a single-rod cylinder at creep speed in the PUSH direction, if the load resistance is small, a flying-out phenomenon may occur at the start of operation. As countermeasures, use circuits ⓑ, ⓒ or ⓓ.
In addition, the ⓓ circuit is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



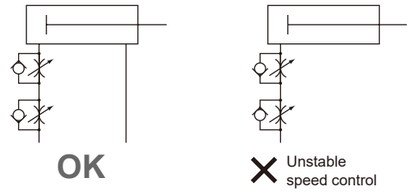
ⓓ Speed adjustment method for PUSH operation of the circuit:
1. Speed setting with x speed controller
2. Throttle with y speed controller until projection stops.
3. Reconfirmation of speed

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

■ 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.

During Use

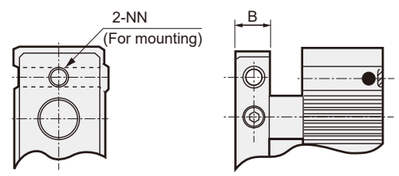
1. Common

Caution

■ The Twin Rod Cylinder has two piping ports for each operating direction. Change the plug position according to the usage conditions. After changing, please confirm that there is no air leakage from the plug part.

■ 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.

■ When using the screw hole NN on the end plate, ensure that the bolt length is equivalent to dimension B. This will cause damage to the end plate.



Bore size (mm)	B dimension
ø6	6
ø10	6
ø16	8
ø20	10
ø25	12
ø32	12

■ When mounting the main body with through bolts, tighten with the tightening torque shown in the table below.

Bore size (mm)	Tightening torque
ø6	0.6 to 1.0 N·m
ø10	1.4 to 2.4 N·m
ø16	
ø20	2.9 to 5.1 N·m
ø25	4.8 to 8.6 N·m
ø32	

■ A rubber cushion is incorporated as a cushion mechanism. The table below shows the kinetic energy that can be absorbed by the rubber cushion. If the energy exceeds this value, consider a separate shock absorber.

Tube I.D. (mm)	Allowable Absorption Energy J	
	PUSH	PULL
ø6	0.008	0.059
ø10	0.061	0.083
ø16	0.181	0.083
ø20	0.303	0.127
ø25	0.68	0.237
ø32	1.3	0.311

■ If the surface with the counterbore (JJ) is used as the mounting surface, the cylinder may tilt due to the step. In such cases, use the port position change or port position 180° change option (o) so that the surface with the counterbore is not the mounting surface.

■ Operating units with excessive inertia will cause damage to the cylinder body and malfunction, so be sure to use within the allowable absorption energy range.

■ Avoid use with the stroke adjustment bolt removed.

■ When using cylinders adjacent to each other, it will cause malfunction of the cylinder switch, so keep the following distance from the cylinder surface.

Adjacent conditions			Switch type	ø6	ø10	ø16	ø20	ø25	ø32
Cylinder 2 pieces in parallel	Horizontal placement	A	K2, K3	43	45	56	66	75	111
			K0, K5	40 *1	47 *1	62	81	85	111
		B	K2, K3	7	1	2	4	3	15
			K0, K5	4 *1	3 *1	8	19	12	15
	Vertical placement Mount switch on the adjacent cylinder side	A	K2, K3	28	27	36	47	47	58
			K0, K5	27 *1	26 *1	36	53	53	58
		B	K2, K3	15	12	15	20	14	20
			K0, K5	14 *1	11 *1	15	26	20	20
	Vertical placement Mount switch on the opposite side of the adjacent cylinder	A	K2, K3	19	16	22	28	34	39
			K0, K5	14 *1	16 *1	22	33	34	39
		B	K2, K3	6	1	1	1	1	1
			K0, K5	1 *1	1 *1	1	6	1	1
Cylinder 3 or more pieces in parallel	Horizontal placement	A	K2, K3	44	45	57	67	77	111
			K0, K5	41 *1	47 *1	64	83	86	111
		B	K2, K3	8	1	3	5	5	15
			K0, K5	5 *1	3 *1	10	21	14	15
	Vertical placement	A	K2, K3	33	30	40	51	49	58
			K0, K5	30 *1	28 *1	42	60	97	58
		B	K2, K3	20	15	19	24	16	20
			K0, K5	17 *1	13 *1	21	33	25	20

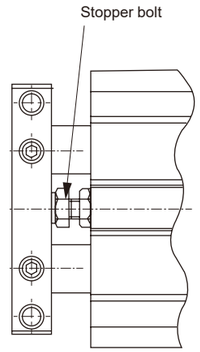
*1: Dimensions of STR2-M. Reed switches cannot be used with STR2-B-6, 10.

2. Drop prevention type STR2-Q

⚠ 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.

■ In the case of head side fall prevention, do not adjust or change the stopper bolt to adjust the retraction side stroke, as this will prevent the lock mechanism from working.



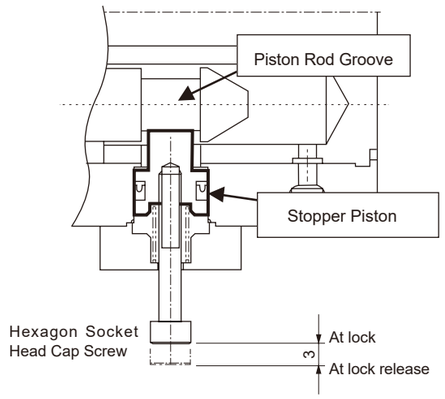
■ If the piping on the side with the lock mechanism is thin and long, or if the speed controller is far from the cylinder port, the exhaust speed may be slow and it may take time for the lock to engage, so please be careful. Also, clogging of the silencer included to the EXH. port of the solenoid valve will lead to similar results.

■ After manually operating 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 installing or adjusting the cylinder. Performing installation work, etc. while the lock is engaged may damage the lock part.

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

■ Release method
- Screw a hexagon socket head cap screw (M3x20) into the stopper piston and pull the bolt with a force of 20N or more for 3 mm to move the stopper piston and release the lock. Also, when released, the built-in spring returns the stopper piston to its original position, and if it enters the piston rod groove, the cylinder will be locked.



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