Pneumatic Equipment

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. 808.

Individual Precautions: Linear Slide Cylinder LCR Series

During Design / Selection

1. Common

Caution

■Select the cylinder according to the "LCR Selection Guide" on P. 114 to 117.

■If the cylinder is used in a place exposed to water droplets or oil droplets, a place where there is a risk of corrosion, or a place with a lot of dust, it may cause damage or malfunction, so protect the product with a cover, etc.

■Precautions for products with switches

- When using a T□V type switch with a stroke adjustment stopper (S3□□, S4□□, S5□□, S6□□) or Shock absorber type stopper (A3□□, A4□□, A5□□, A6□□), the switch on the head side will interfere with the stopper, so mount the switch on the side opposite the stopper.
- For switches with a stroke of 30 or less, one switch is included to each of the two grooves on the main body, so pay attention to the lead wire extraction direction during design.

2. Drop prevention type LCR-Q

Caution

■Do not use 3-position valves.

Avoid using in combination with 3-position valves (especially closed center metal seal type). If pressure is trapped 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.

3. Low speed type LCR-F

Caution

■Use without lubrication.

Lubrication may change characteristics.

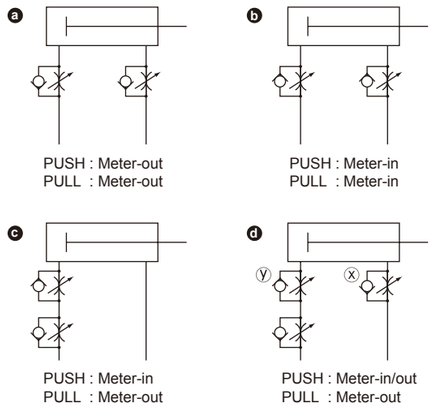
■Install the speed controller near the cylinder.

If installed far from the cylinder, the speed will become unstable. Use SC-M3/M5-F, SC3W, SCD-M3/M5, or 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 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 a countermeasure, use circuits ⓑ, ⓒ, ⓓ.

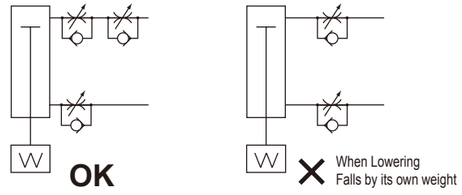
Note that circuit ⓓ is the most stable.

ⓓ Speed adjustment method for PUSH operation of circut :

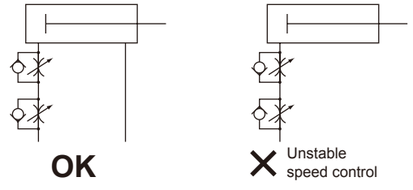
1. Setting speed with the x-axis speed controller
2. Throttle down the y-axis speed controller until lurching is eliminated.
3. Reconfirmation of speed

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

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 the exhaust side (For fine speed type, supply 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 places with vibration.

Operation becomes unstable due to the influence of vibration.

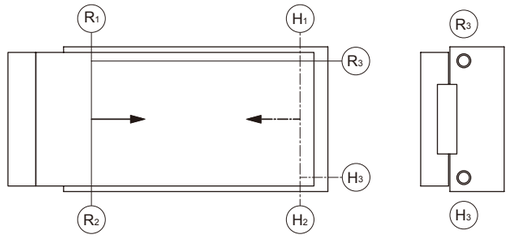
During Use

1. Common; During piping

Caution

■When changing the piping port position, use adhesive for M3 and M5 plugs (hexagon socket head set screws). (Recommended adhesive: Loctite 222/221, ThreeBond 1344, or other low-strength adhesives)

■Piping port position and operating direction



Ⓡ indicates the rod side pressure port, and Ⓗ indicates the head side pressure port. At the time of factory shipment, ports other than Ⓡ1 Ⓗ1 (depending on stopper selection and stopper position Ⓡ2 Ⓗ2) are sealed with plugs.

■Rear piping

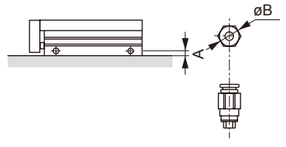
This product, excluding ø6 and drop prevention types, can be used with rear piping (Ⓗ3 ports and in the diagram above Ⓡ3). When using Ⓡ3, Ⓗ3 remove the plug sealing the port and seal the port with the plug from the table below Ⓡ1 Ⓗ1.

Item	Plug
LCR-6	Ⓡ2, Ⓗ2 No port.
LCR-8	M5x5 (Hexagon socket head set screw)
LCR-12	
LCR-16	
LCR-20	R1/8 (Hexagon socket head taper thread plug)
LCR-25	Seal the Ⓡ3, Ⓗ3 ports with the plug that was sealing the Ⓡ1, Ⓗ1 ports.

For ø8 to ø20, it is necessary to prepare two plugs from the table above separately. Plug attachment option (see P. 57) and plug single item model No. (see P. 63) are also available, so please utilize them.

■Precautions for piping fittings

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



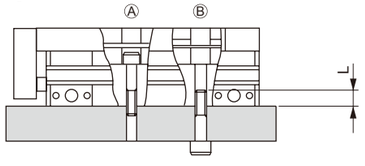
Item Bore Size (mm)	Port Size	Port position dimension A	Usable fittings	Fitting outer diameter B
ø6	M3	4	SC3W-M3-4 SC3U-M3-4 SC3W-M3-3.2 SC3U-M3-3.2 GWS3-M3-S GWS4-M3-S	ø8 or less
ø8	M5	5.5	SC3W-M5-4 SC3W-M5-6 GWS4-M5-S GWS4-M5	ø11 or less
ø12		5.5		
ø16		6.5	SC3W-M5-4 SC3W-M5-6 GWS4-M5-S GWS4-M5 GWL4-M5 GWL6-M5 GWS6-M5	ø13 or less
ø20	Rc1/8	8	SC3W-6-4,6,8 GWS4-6 GWS8-6 GWL6-6 GWS6-6 GWL4-6	ø15 or less
ø25		9		

2. Common; During installation

Caution

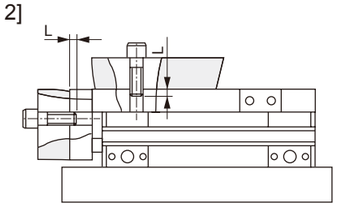
■Please do not make dents or scratches on the mounting surface of the main body (tube) and the table surface that may impair flatness. Also, the flatness of the mating side to be included to the main body and table should be 0.02 mm or less.

■Observe the following values for the bolt screw-in length and tightening torque when mounting the main body. [Figure 1]



Item	A		B		
	Bolt used	Tightening torque (N·m)	Bolt used	Tightening torque (N·m)	Max. screw-in depth L (mm)
LCR-6	M3 x 0.5	0.6 to 1.1	M4 x 0.7	1.4 to 2.4	6
LCR-8	M3 x 0.5	0.6 to 1.1	M4 x 0.7	1.4 to 2.4	6
LCR-12	M4 x 0.7	1.4 to 2.4	M5 x 0.8	2.9 to 5.1	8
LCR-16	M5 x 0.8	2.9 to 5.1	M6 x 1.0	4.8 to 8.6	9
LCR-20	M5 x 0.8	2.9 to 5.1	M6 x 1.0	4.8 to 8.6	9
LCR-25	M6 x 1.0	4.8 to 8.6	M8 x 1.25	12.0 to 21.6	12

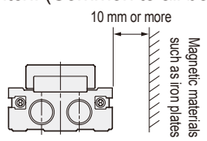
■Observe the following values for the bolt screw-in length and tightening torque when mounting a jig to the slide table and end plate.
[Figure 2]



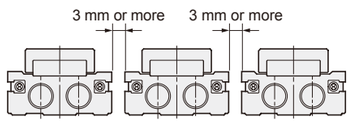
Item	Table		
	Bolt used	Tightening torque (N·m)	Screw-in length L (mm)
LCR-6	M3 x 0.5	0.6	3
LCR-8	M3 x 0.5	0.6	3 to 4.5
LCR-12	M4 x 0.7	1.4	4 to 5.5
LCR-16	M5 x 0.8	2.9	5 to 6
LCR-20	M5 x 0.8	2.9	5 to 6
LCR-25	M6 x 1.0	4.8	6 to 7

Item	End plate		
	Bolt used	Tightening torque (N·m)	Screw-in length L (mm)
LCR-6	M3 x 0.5	0.6	4.5 to 6
LCR-8	M3 x 0.5	0.6	4.5 to 7
LCR-12	M4 x 0.7	1.4	6 to 9
LCR-16	M5 x 0.8	2.9	7.5 to 9
LCR-20	M5 x 0.8	2.9	7.5 to 11
LCR-25	M6 x 1.0	4.8	9 to 11

■If there is a magnetic material such as an iron plate near the cylinder switch, it may malfunction. It can be used safely by keeping it 10 mm or more away from the cylinder surface or by changing the mounting surface of the cylinder switch. (Common to all bore sizes)



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



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

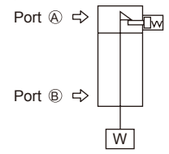
■When using locating holes, use pins with dimensions that do not result in a press fit. Using press-fit dimension pins may cause damage to the linear guide part due to press-fitting load or accuracy deterioration due to distortion.
The recommended tolerance for pins is JIS tolerance m6 or less.

■Apply ø6, 8 : CGL grease (manufactured by IKO Co., Ltd.) or ø12 to 25 : AFF grease (manufactured by THK Co., Ltd.) to the guide rail raceway surface every 6 months or 1 million operating cycles, whichever comes first.

3. Drop prevention type LCR-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.

Caution

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

■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.

■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.

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

■On the side with the lock, be sure to use the cylinder to the 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.

4. Low speed type LCR-F

Caution

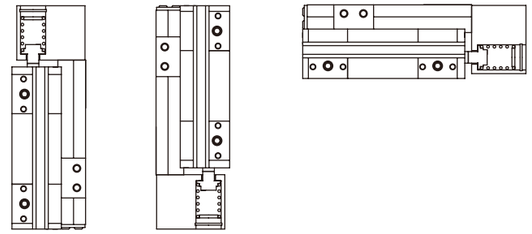
■Adjust alignment etc. so that no lateral load is applied to the cylinder.
Also, adjust and install so that there is no twisting with respect to the sliding guide.
- Operation will become unstable if there are fluctuations in load or resistance.
- Guides with a large difference between static friction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

5. With buffer LCR-B

■Depending on the speed and load, the buffer may activate during operation, causing the switch to malfunction. Adjust the speed according to the load before use.

■Please note that models with buffers cannot be used in a vertically upward orientation.

X OK OK



■Use the buffer with a stroke less than the buffer stroke. This will cause malfunction or damage.

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.