Safety Precautions

Be sure to read this section before use.
Refer to Intro Page 73 for general information of the cylinder, and to Intro Page 80 for general information of the cylinder switch.

Product-specific cautions: High precision guided rodless cylinder SRG3 Series

Mounting, installation and adjustment

1. Common

⚠ CAUTION

■ Pay attention when designing the brake control circuit.

A slight amount of external leakage is inherent to the structure of SRL3 and other slit rodless cylinders. Therefore, brake control using a 3-position valve with all ports closed may fail to keep the stop position of the table. Use the control circuit with both sides pressurized with 3-position P/A/B connection valve. However, note that the table may deviate from origin if air pressure is applied in the de-energized state when starting after a pressure drop.

■ Basic circuit diagram

● Horizontal load

When piping is as shown in Fig. 1, equal pressure is applied to both ends of the piston when stopped to prevent the table from popping out when operation is restarted.

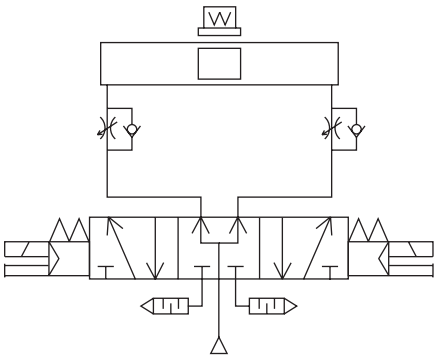


Fig. 1

● Vertical load

● If vertical load works as shown in Figure 2, the table moves in the load direction. Install a regulator with check valve on the top to reduce thrust in the load direction to balance the load.

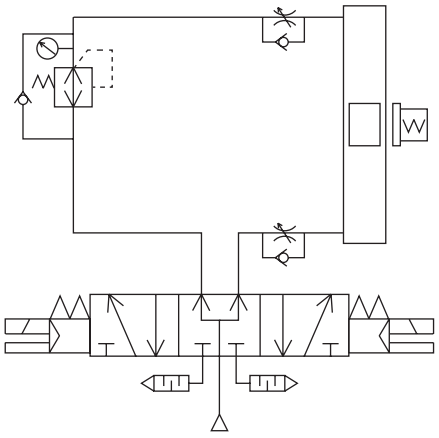


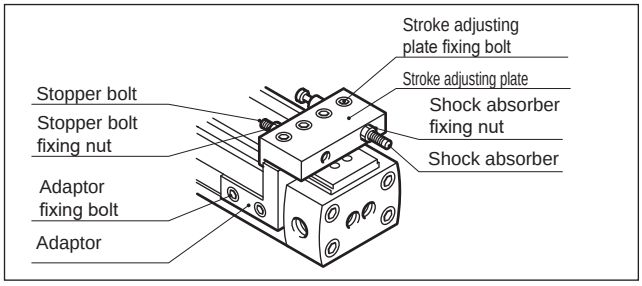
Fig. 2

■ Although the structure of SRL3 and other slit rodless cylinders has a slight amount of external air leakage, it does not affect the speed control performance.

■ Prevent negative pressure from occurring inside the cylinder tube. Using the cylinder as an air balancer or operating the table with external force or inertia force with all ports closed may cause negative pressure inside the cylinder, resulting in air leakage if the sealing belt comes off. Do not use external force or inertia force, otherwise negative pressure will occur inside the cylinder.

⚠ WARNING

■ How to adjust the stroke adjusting unit



(1) Moving the stroke adjusting unit

● Loosen the adaptor fixing bolt and the stroke adjusting plate fixing bolt to move the stroke adjusting unit.

(2) Fixing the stroke adjusting unit

● After moving the stroke adjusting unit to the desired position, tighten the adaptor fixing bolt and the stroke adjusting plate fixing bolt with the value in Table 1 to fix the unit. Note that if tightened with a value less than that in the table below, the stroke adjusting unit may be displaced.

Table 1 Tightening torque of adaptor fixing bolt and stroke adjusting plate fixing bolt

Tightening torque / Model	Adaptor fixing bolt (N·m)	Stroke adjusting plate fixing bolt (N·m)
SRG3-12/16	1.0 to 1.2	0.5 to 0.7
SRG3-20	2.5 to 2.7	
SRG3-25	5.2 to 5.6	2.5 to 2.7

(3) Adjusting the stroke with a stopper bolt

● In the case of ø12 to ø20, adjust the stroke normally by moving the stroke adjusting unit, since there is a danger that fingers may be caught in a narrow space between the table and the stroke adjusting plate. To adjust the stroke, loosen the stopper bolt fixing nut and turn the stopper bolt. After adjustment, tighten the stopper bolt fixing nut with the value in Table 2 to fix the stopper bolt.

Table 2 Tightening torque of stopper bolt fixing nut and shock absorber fixing nut

Tightening torque / Model	Stopper bolt fixing nut (N·m)	Shock absorber fixing nut (N·m)
SRG3-12/16	1.1 to 1.2	1.3 to 1.8
SRG3-20	2.5 to 2.7	2.9 to 3.9
SRG3-25	8.8 to 9.5	4.5 to 6.0

(4) Adjusting the shock absorber

● With standard shock absorber

Change the operational stroke of the shock absorber to adjust its absorbed energy.

To adjust the operational stroke of the shock absorber, loosen the shock absorber fixing nut and turn the shock absorber. After adjustment, tighten the shock absorber fixing nut with the value in Table 2 to fix the shock absorber.

Because the gap between the shock absorber and the stopper bolt is narrow, it is recommended to remove the stroke adjusting plate for adjustment.

(5) Precautions for use

● A shock absorber can absorb the rated energy at the rated stroke. However, the initial shock absorber installation position is adjusted to have a stroke allowance at the cylinder's stroke end. Therefore, the absorbed energy will be less than the allowable absorbed energy of a discrete shock absorber. If the rated absorbed energy is required, adjust the shock absorber so that the full stroke can be used. At the time, adjust so that the table stops with the stopper bolt. Even at the cylinder stroke end, if the cylinder's thrust is continuously applied, the shock absorber may be damaged.

Fig. 1

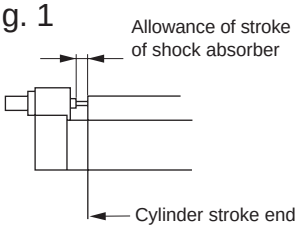
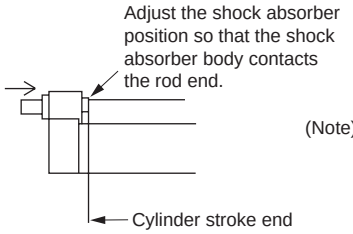


Fig. 2



(Note) This explanation applies to the shock absorber supplied with the full stroke adjustable.

● The absorbed energy changes depending on the colliding speed. Keep it within 1/2 of the max. energy absorption in Table 3 at 1000 mm/s colliding speed.

Table 3 Specifications of full stroke adjustable with shock absorber (initial set point)

Type	Absorbed energy (J)	Effective stroke (mm)
For SRG3-12/16	2.4	5.5
For SRG3-20	5.7	7
For SRG3-25	10	8

■ Do not perform electric welding after installing the rodless cylinder.

Otherwise electric current passes into the cylinder and causes sparks between the dust-proof belt and cylinder tube, which will damage the dust-proof belt.

■ The cylinder body may be damaged or may malfunction if a unit with excessive inertia, etc., is moved. Use within the allowable range.

■ Do not apply strong impact or excessive moment to the table.

■ Carefully match the centers when connecting a load with an external guide mechanism.

● Displacement of the shaft center increases as the stroke becomes longer. Consider the connection method (floating) so that the displacement can be absorbed.

■ Keep moment, including inertia force caused by load transfer or stop, within the allowable load. Damage will occur if this value is exceeded.

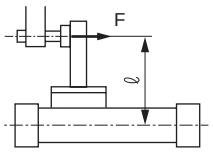
(When the overhang load is large)

● When the overhang load is large and the cylinder is stopped at both ends by the piston, load inertia causes bending moment even if the energy is within the allowable absorbed energy of the internal cushion.

If the kinetic energy is large and an external cushion is used, adjust so that the cylinder contacts with the center of gravity of workpiece or the closest point to it.

(When an external stopper is used)

● When using an external stopper, make a selection considering bending moment due to the cylinder thrust.



$M1 = F \cdot \ell$

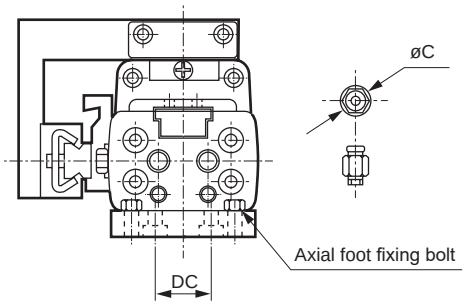
F: Cylinder thrust
ℓ: Length from the center of the cylinder to the stopper

■ Using common port piping

● Piping fittings compatible with the common ports (options R and T) are limited. Select an appropriate one from Table 4.

Table 4

Mounting / Bore size (mm)	Applicable fitting O.D. øC 00	LB	LB1
ø12 or equiv.	11 or less	Common port piping is not available	11 or less
ø16 or equiv.	12 or less		12 or less
ø20 or equiv.	16 or less		16 or less
ø25 or equiv.	26 or less		26 or less

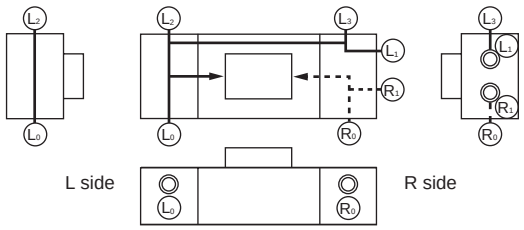


● In the case of the axial foot (LB1) mounting with option R or T, the piping fitting interferes with the axial foot fixing bolt. Fix the cylinder body (by tightening the axial foot fixing bolt) before attaching the piping fitting. (Attaching the piping fitting first will cause interference and prevent tightening of the axial foot fixing bolt.)

■ Piping port position and operating direction

Bore size ø12 to ø20 or equiv.

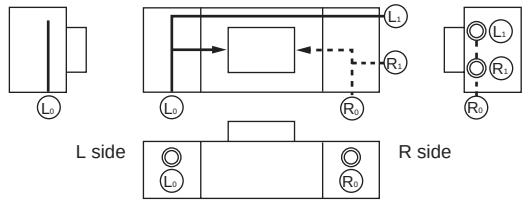
● Option code (blank, R, B, T)



Ⓡ indicates the pressurized ports on R side and Ⓛ indicates the pressurized ports on L side. When the product is shipped from the factory, ports other than one each of Ⓡ0 and Ⓛ0 are sealed with plugs. Remove the plugs when piping to the plugged ports.
Option (D) is not available.

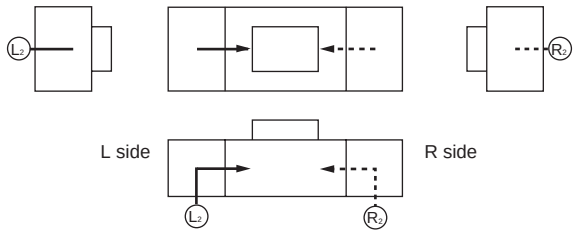
Bore size ø25

● Option code (blank, R, B, T)



Ⓡ indicates the pressurized ports on R side and Ⓛ indicates the pressurized ports on L side. When the product is shipped from the factory, ports other than one each of Ⓡ0 and Ⓛ0 are sealed with plugs. Remove the plugs when piping to the plugged ports. Bottom piping is not possible. If bottom piping is necessary, select the option (D).

● Option (D) (bottom piping)



Ⓡ indicates the pressurized ports on R side and Ⓛ indicates the pressurized ports on L side. There are no ports for piping other than Ⓡ2 and Ⓛ2.

■ Do not damage surface flatness by denting or scratching the body (tube) mounting surface or the end plate surface.

⚠ CAUTION

■ Pay attention when designing the brake control circuit.

A slight amount of external leakage is inherent to the structure of SRL3 and other slit rodless cylinders. Therefore, brake control using a 3-position valve with all ports closed may fail to keep the stop position of the table. Use the control circuit with both sides pressurized with 3-position P/A/B connection valve.
However, note that the table may deviate from origin if air pressure is applied in the de-energized state when starting after a pressure drop.

■ Basic circuit diagram

● Horizontal load

When piping is as shown in Fig. 1, equal pressure is applied to both ends of the piston when stopped to prevent the table from popping out when operation is started.

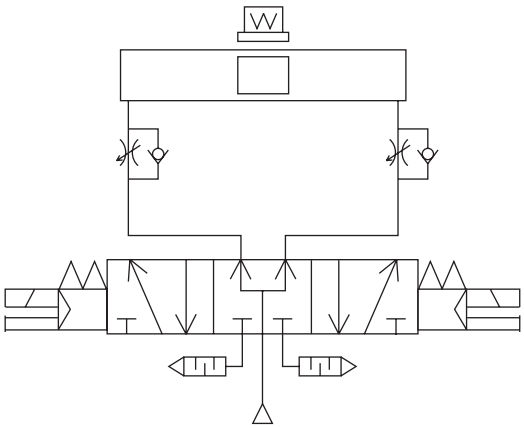


Fig. 1

● Vertical load

When vertical load works as shown in Figure 2, the table moves in the load direction. Install a regulator with check valve on the top to reduce thrust in the load direction to balance the load.

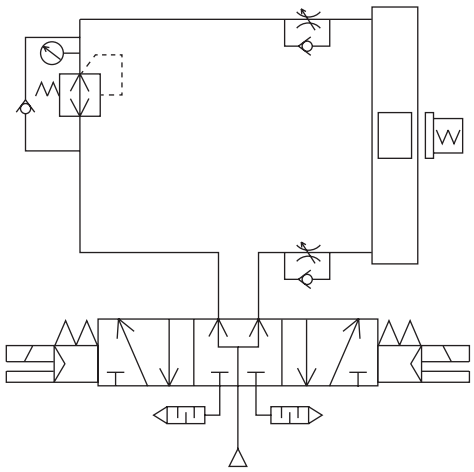


Fig. 2

■ Do not use the cylinder in places where it is directly exposed to coolant, oil mist, etc.

Be sure to provide a protective cover, etc., if the cylinder must be installed in such a place.

■ Do not use this product where foreign matter such as cutting chips, dust, or spatter, etc., will contact or enter the cylinders.

Provide a protective cover, etc., if the cylinder must be installed in such a place. Be sure to consult with CKD for use in these environments.

■ CKD's shock absorber is a repair part.

Replace when the energy absorption performance has degraded or the operation is not smooth.