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. 1512.

Individual Precautions: Rodless Cylinders SRL3 Series

Design / Selection

1. Common

⚠ CAUTION

■ Pay attention when designing the brake control circuit.

Slit type rodless cylinders represented by SRL3 have slight external air leakage structurally, so intermediate stop control by an all-port block 3-position valve will cause a failure to maintain the table stop position. Therefore, please use a both-side pressurization control circuit using a PAB connection 3-position valve. However, please note that if air is pressurized in a de-energized state when restarting after a pressure drop, the table may move and deviate from the origin. Do not use intermediate stop by control with ABR connection because air on both sides escapes, there is a danger of popping out when restarting, and speed control becomes difficult.

■ Basic Circuit Diagram

● Horizontal load

Piping as shown in Figure 1 will apply equal pressure to both sides of the piston when stopped, preventing the table from flying out during restart.

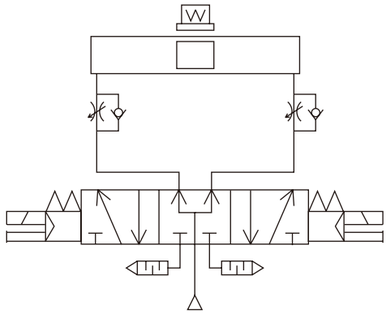


Fig. 1

● In case of vertical load

● If a vertical load is applied as shown in Fig. 2, the table will move in the Load Direction. Therefore, install a pressure reducing valve with check valve on the upper side, reduce the thrust in the Load Direction, and balance the load.

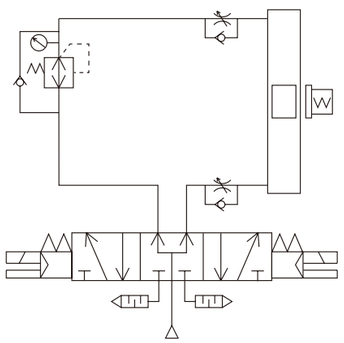


Fig. 2

■ 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. If used as an air balancer or in an all-port blocked state, if the table is driven by external force, inertia force, etc., negative pressure may be generated in the cylinder, causing the seal belt to detach and air leakage to occur. Be careful not to create negative pressure in the cylinder by driving it with external force, inertial force, etc.

2. Fall Prevention Type SRL3-Q

⚠ 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.

■ To operate the cylinder at 500 mm/s and over, reduce the speed when entering the position locking mechanism to 500 mm/s or less. As a deceleration method, consider installing an external shock suppressor, installing a deceleration circuit, etc.

During Use

1. Common

⚠ Warning

■ Shock Absorber Adjustment

Since the gap between the shock suppressor and the stopper bolt is narrow, it is recommended to remove the adapter (stroke adjustment plate) for adjustment.

■ Precautions for use of stroke adjustment unit

Be sure to adjust so that the table stops at the stopper bolt. Settings where cylinder thrust continues to be applied to the shock suppressor even at the cylinder stroke end may cause the shock suppressor to break.

Table 1
Full stroke adjustment shock suppressor specifications (Initial setting value)

Model	Absorption Energy (J)	Effective Stroke (mm)
For SRL3-12/16	2.4	5.5
For SRL3-20	5.7	7
For SRL3-25	10	9
For SRL3-32	18	13
For SRL3-40	50	16.5
For SRL3-50/63	86	21
For SRL3-80/100	143	25

⚠ CAUTION

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

Current flows through the cylinder and a spark occurs between the dustproof belt and the cylinder tube, damaging the dustproof belt.

■ The Cylinder Body may be damaged or may malfunction if a unit with excessive inertia, etc., is actuated. 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. Carefully decide the connection method (floating) so that the displacement can be absorbed.

■ Keep the moment, including inertia force caused by load transfer or stop, within the allowable load. Exceeding this value will cause damage.

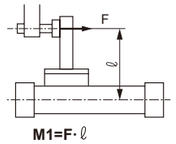
(When overhang is large)

● 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, try to hit the center of gravity of the workpiece as much as possible.

(When using external stopper)

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

● Moment that operates when the cylinder stops with an external stopper



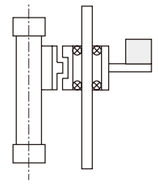
F : Cylinder Thrust
ℓ : From cylinder center Distanace to stopper

M1=F·ℓ

(When using external guide)

● If the centers are not coincident when an external guide is attached, movement will not be smooth and resistance due to interference will operate as moment. Design the connection part so that it can accept non-coincidence of the centers.

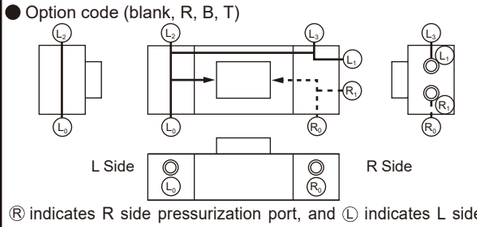
● Example of guide use



■ Piping port position and operating direction

Equivalent to Bore Size ø12 to ø20

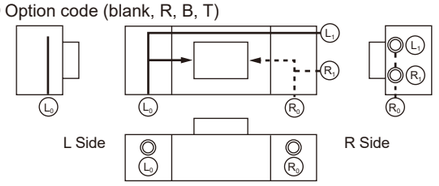
● Option code (blank, R, B, T)



Ⓡ indicates R side pressurization port, and Ⓛ indicates L side pressurization port. At the time of factory shipment, Ⓡ Ⓛ ports other than 1 location each are sealed with plugs. Piping to other ports is possible by removing the plugs. Option codes (D, S) cannot be manufactured.

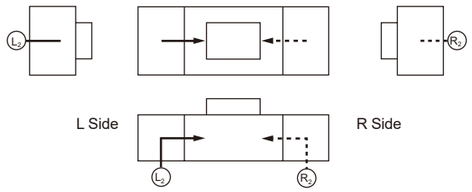
Equivalent to Bore Size ø25 to ø63

● Option code (blank, R, B, T)



Ⓡ indicates R side pressurization port, and Ⓛ indicates L side pressurization port. At the time of factory shipment, Ⓡ Ⓛ ports other than 1 location each are sealed with plugs. Piping to other ports is possible by removing the plugs. However, bottom piping is not possible. If bottom piping is required, please select option (D, S).

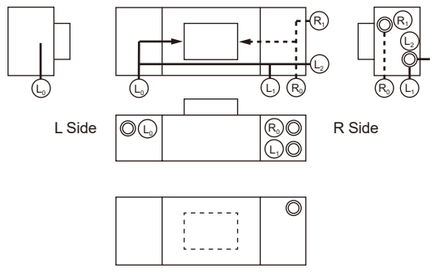
● Option code (D, S) (bottom piping)



Ⓡ indicates R side pressurization port, and Ⓛ indicates L side pressurization port. At the time of factory shipment, Ⓡ Ⓛ ports other than 1 location each are sealed with plugs. Piping to other ports is possible by removing the plugs.

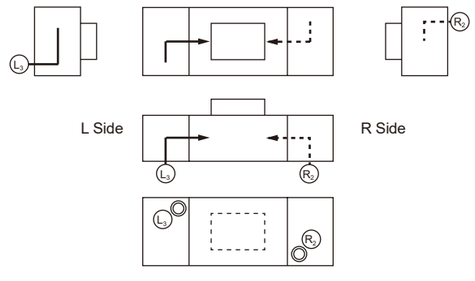
Equivalent to Bore Size ø80, ø100

● Option code (blank, R, B, T)



Ⓡ indicates R side pressurization port, and Ⓛ indicates L side pressurization port. At the time of factory shipment, ⓇⓁ ports other than each 1 location are sealed with plugs. Piping to other ports is possible by removing the plug.

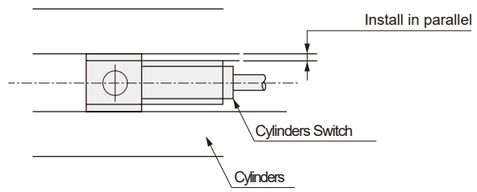
● Option code (D, S) (bottom piping)



Since there are no ports other than Ⓡ Ⓛ, piping is not possible.

■Treat our shock suppressors as consumable parts. Replace it if a decrease in energy absorption capacity is observed or if operation is no longer smooth.

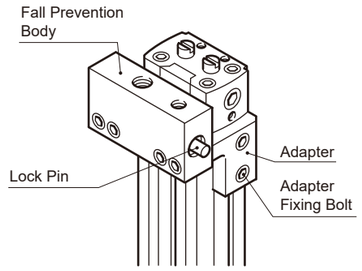
■Install the switch in parallel with the mounting groove and do not apply force to the lead wire.



2. Fall Prevention Type SRL3-Q

⚠Warning

■How to adjust the stroke adjustment unit

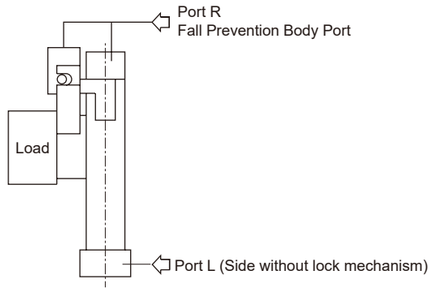


- Loosen the adaptor fixing bolt to move the position locking mechanism. In this case, please use with shock absorber (A, A1). Also, if the stroke is finely adjusted with a shock suppressor, the fall prevention position will be misaligned and it will not be possible to lock securely, so perform fine adjustment with the adapter fixing bolt.
- After moving it to the desired position, tighten the adaptor fixing bolt with the value in the table below. If tightened below the values in the table, the fall prevention main body may shift, so please be sure to observe this.
- When setting the load, be sure to confirm that the lock mechanism is working before installing.

Model	Adapter Fixing Bolt Tightening Torque (N·m)
SRL3-Q-12/16	1 to 1.2
SRL3-Q-20	2.5 to 2.8
SRL3-Q-25	5.2 to 5.6
SRL3-Q-32	22 to 24
SRL3-Q-40	44 to 48
SRL3-Q-50/63	77 to 83
SRL3-Q-80/100	100 to 110

■About Piping

- Piping to the position locking mechanism is necessary.

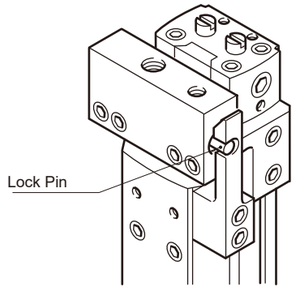


- Divide the piping to R side of the rodless cylinder using a tee fitting, etc., and with the same kind of pipe, connect the piping to the position locking mechanism.
- When the piping to the position locking mechanism is long and thin, or when the speed controller is far away from the cylinder port, note that it takes time to engage the lock. Also, clogging of the silencer attached to the valve's EXH. port will lead to similar results.

■Supply pressure equal to or higher than the Min Operating Pressure to the position locking mechanism port.

■Manual release

- Push in the lock pin of position locking mechanism using a stick. In this case, be sure to supply pressure to port L and release the lock after ensuring that no load is applied to the lock mechanism. If both ports R and L are exhausted and pressure is supplied to port R while the piston is locked, the lock will be released and the table may fly out, which is very dangerous.



■Valves

- Keeping the cylinder with pressure applied to the lock mechanism may cause the lock pin to come off, which is very dangerous. Do not use 3-position closed center and 3-position P/A/B connection valves.
- If back pressure is applied to the locking mechanism, the lock may be released. Use a discrete valve, or use an individual exhaust manifold.
- For usage where the drop speed is increased by the Quick Exhaust Valves, the lock may not release normally because the Cylinder Body starts operating before the lock pin. Do not use a quick exhaust valve with a drop prevention type cylinder.

■For safety purposes, prevent the load from falling under its own weight during maintenance.

■In the case of the cylinder with air cushion, if the air cushion needle at the lock mechanism side is tightened excessively, the piston bounds at the stroke end, the lock lever contacts the lock pin violently and the lock mechanism may be damaged. Also, if the air cushion needle is opened too much, the piston will bounce back at the stroke end, similarly leading to damage. Adjust the needle so that the air cushion does not bounce. When stopping with external cushioning equipment (shock absorber, etc.), adjust similarly so that there is no bounce. Also, please perform periodic inspections once or twice a year to check for damage to the holding part due to this phenomenon.

⚠CAUTION

■After the lock mechanism is manually operated, make sure to confirm manual operation and return the mechanism to the original state before use. 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.

■Do not use multiple cylinders synchronized. Do not use two or more fall prevention cylinders 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.

■Apply grease regularly to the sliding part of the lock lever.

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.