Discontinue

CKD

SM-10423-A

INSTRUCTION MANUAL

SUPER RODLESS CYLINDER WITH BRAKE

SRB2

- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

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For Safety Use

To use this product safely, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (to the level pursuant to JIS B 8370 Pneumatic System Rules).

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.

Our customers use this product for a very wide range of applications, and we cannot keep track of all of them. Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, examine whether the product meets your application, requirements, and how to use it.

This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents, read this instruction manual carefully for proper operation.

Observe the cautions on handling described in this manual, as well as the following instructions:

⚠ Precautions

- Before performing an overhaul inspection on the actuator, deactivate residual pressure completely.
- While the actuator is operating, do not step into or place hands in the driving mechanism.
- To prevent an electric shock, do not touch the electric wiring connections (exposed live parts) of the actuator equipped with a solenoid valve or switch.
  Perform an overhaul inspection with the power off. Also, do not touch these live parts with wet hands.

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SRB2
Super Rodless Cylinder With Brake
Manual No. SM-10423-A

NOTE : Letters & figures enclosed within Gothic style bracket (examples such as [C2-4PP07] · [V2-503-B] etc.) are editorial symbols being unrelated with contents of the book.

Jun.9.1994
Revision : Jul.27.2000

1. PRODUCT

1.1 Specifications

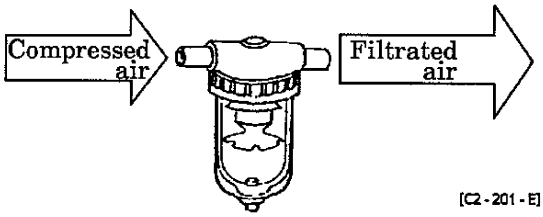
Item \ Model code		SRB2
Media		Compressed Air
Max. working pressure	MPa	0.7
Min. working pressure	MPa	for cylinder Equiv. to ϕ25 & 40 ..... 0.2 Equiv. to ϕ63 ..... 0.15 for brake 0.29
Proof pressure	MPa	1.05
Ambient tempreature range	°C	5 to 60 (Not to be frozen)
Lubrication		Not required (Use Turbine oil Class 1, ISO, VG32 if and when lubrication is needed)
Working piston speed	mm/s	50 to 500
Positioning accuracy	mm	±1 (No load, at 300mm/s)
Brake holding power	N	Equiv. to ϕ25 ··· 313 Equiv. to ϕ40 ··· 800 Equiv. to ϕ63 ··· 1989
Model Nos. of applicable switches		M2, M2W, M3, M3W, M0, M5 T2YF, T2YM, T2YD, T3YF, T3YM

Note : Cylinder switches are available for cylinders of this type.

2. CAUTION

2.1 Fluid

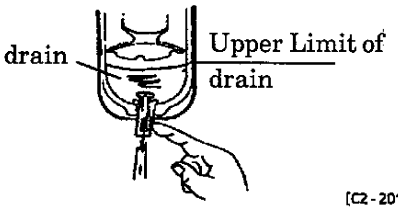
1) Use the compressed air, filtrated and dehumidified. Carefully select a filter of an adequate filtration rate (5μm or lower preferred), flow rate and its mounting location (as closest to directional control valve as possible).



[C2-201-E]

2) Be sure to drain out the accumulation in filter periodically.

3) Note that the intrusion of carbide of compressor oil (such as carbon or tarry substance) into the circuit causes malfunction of solenoid valve and cylinder. Be sure to carry out thorough inspection and maintenance of compressor.



[C2-201-F]

4) The cylinder of this type does not require lubrication. It is recommended, however, to use Turbine oil Grade 1, ISO VG32 as lubricant, if lubrication is preferred.

5) The cylinder of this type is inoperable with low pressure range due to the external fluid leakage.

3. OPERATION

3.1 Operation

1) Range of working pressure
Operate the system within following range of air pressure.

Tube bore (mm)	Pressure range for brake MPa	Pressure range for cylinder MPa
Equiv. to ϕ25 & 40	0.29 to 0.7	0.2 to 0.7
Equiv. to ϕ63		0.15 to 0.7

2) Cushion factor is adjusted at factory prior to shipment.
Adjust it, however, with cushion needle in case of re-adjusting it in compliance with load at site.
Tightening the needle increases cushion effect. In the event that the kinetic energy is exceeding the value in the following table due to heavier load, faster speed, etc, consider installation of a certain additional relieving system.

$$\text{Kinetic energy (J)} = \frac{1}{2} \times \text{load mass (kg)} \times \{\text{Speed (m/s)}\}^2$$

CUSHION CHARACTERISTICS

Tube bore (mm)	Absorbable energy (J)		
	Effective cushion length (mm)	With cushion	Without cushion
Equiv. to ϕ25	22.5	1.37	0.015
Equiv. to ϕ40	24.3	4.19	0.049
Equiv. to ϕ63	33.3	17.06	0.135

3) Install a set of piston speed controller as per illustrated fundamental circuit on page 5.

3.2 How to release manual operation of brake

1) Release it by screwing-in the hex.socket head bolts after removing caps on both ends of brake unit.

It is advisable to use a piece of flat washer with a bolt to prevent giving a scratch mark on the side.

2) Cautions

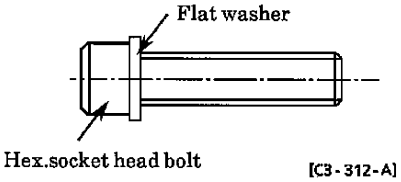
① In virtical mounting, beware of table sliding down upon releasing manual operation due to weight of load as the braking power no longer exists.

Should it be the case, give such preventive caution before releasing the manual operation as follows;

- Let the load move to the lowest end of stroke.
- Apply a stopper to load.
- Charge air pressure to rodless cylinder to keep a balance with the load.

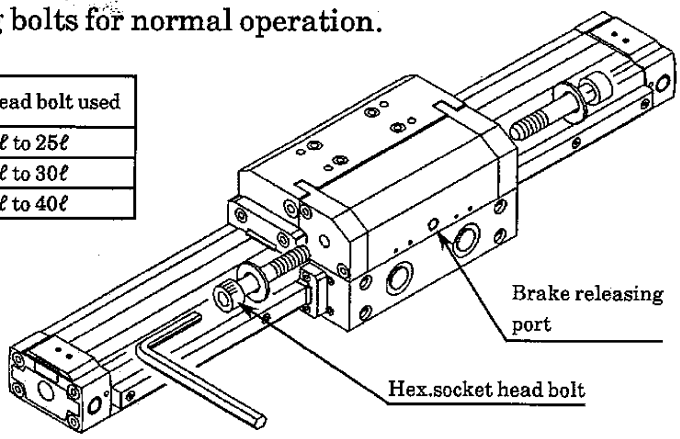
② Remove the releasing bolts for normal operation.

Tube bore	Hex. socket head bolt used
ϕ25 equiv	M5×20ℓ to 25ℓ
ϕ40 equiv	M5×25ℓ to 30ℓ
ϕ63 equiv	M8×35ℓ to 40ℓ



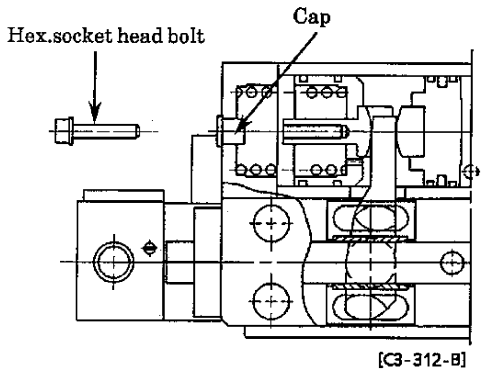
[C3-312-A]

Brake actuating condition

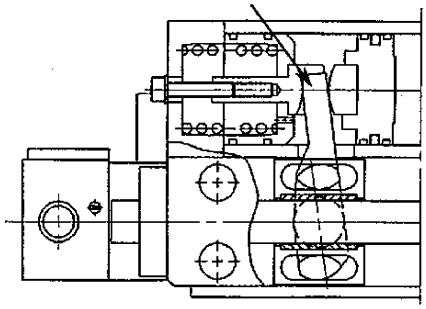


Brake released condition

Brake arm is set free, accordingly brake is set free, as the piston (2) is drawn back by screwed bolt.

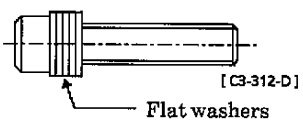


[C3-312-B]



[C3-312-C]

When there are only longer bolts available than specified in the table above which leaves excessive length to draw piston (2) back appropriately, make use of a couple pieces of flat washer to make the effective length of bolt short enough.



[C3-312-D]

4. INSTALLATION

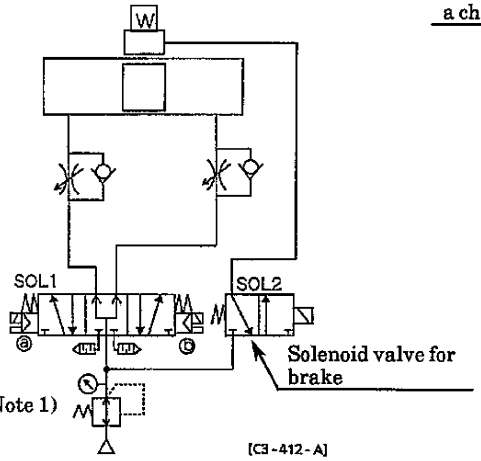
4.1 Fundamental Circuit

1) To retain an accurate operation, comply the following fundamentals and design such circuit as illustrated below.
   ① Supply the pressure to both side of piston when piston is stopped.
   ② To make thrust balanced (including the load), install a regulator with a check valve within the circuit which provides larger thrust.
   ③ Install the solenoid valve for brake as close to the brake port as possible.
2) For air circuit, make it with 3-position PAB port connection valve as posted below.

For holizontal moving load

Use the circuit per Fig.1. In this case, no pressure regulator is required because rodless cylinder has the same sectional area at both ends of the piston.

Fig 1

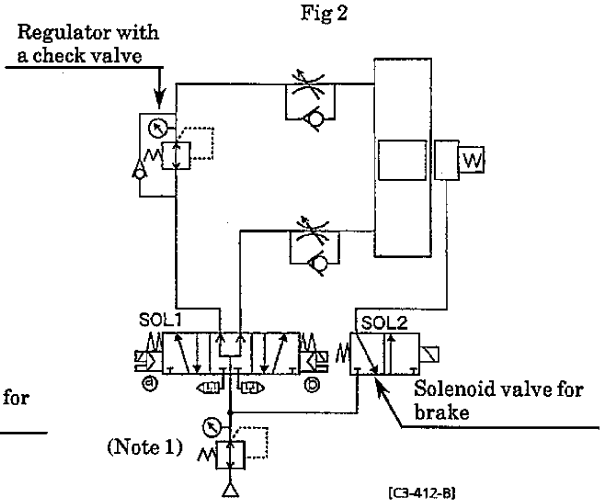


a	SOL-1	b	SOL-2	Actuating
OFF		OFF	OFF	Halt
ON		OFF	ON	Retreat
OFF		ON	ON	Advance

For vertical moving load

Should it be the case of such vertical moving load as illustrated in Fig.2, keep balance with the load by installing pressure regulator with check valve to eliminate table sliding down when brake isreleased.

Fig 2



a	SOL-1	b	SOL-2	Actuating
OFF		OFF	OFF	Halt
ON		OFF	ON	Descent
OFF		ON	ON	Upturn

★Pressure within the regulator $= \left(\frac{\pi D^2 P - 4W}{\pi D^2} \right)$

D : Cylinder bore [mm]
P : Working pressure [MPa]
W: Load [N]

(Note 1.) Install a regulator independently for exclusive use to stabilize the motion when pressure fluctuation is foreseen by some other pneumatic equipment.

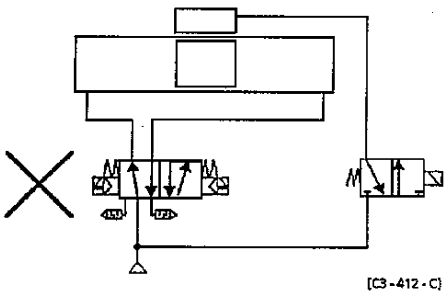
3) How to keep propulsion balance

Make use of regulator with a check valve as illustrated in "Paragraph 4-1. Basic circuit diagram". Adjust the pressure to remove sticking motion while visually inspecting it. It is, of course, able to calculate it by formulae.

4) Caution

Comply with either Fig. 1 or Fig. 2 posted on previous page, even for the purpose of drop prevention or emergency stop.

2-position valve is not suitable for this purpose because the pressure for rodless cylinder itself, even while propulsion to it is suspended, also charges to brake line.



4.2 Electric control schematics

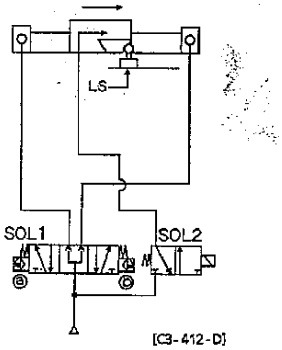
1) When sequencer (PC) is in use

Positioning accuracy is deteriorated due to scanning time to use sequencer (PC) within control schematics for brake control solenoid.

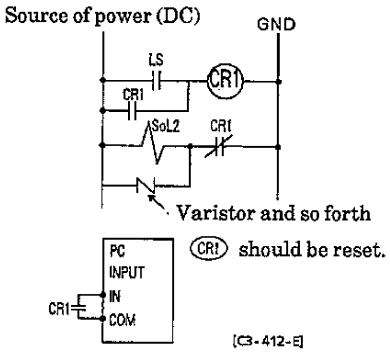
[Example]:

Scanning time	10msec	positioning error becomes within ±1.5mm due to only scanning time.
Cylinder speed	300mm/s	
In this case,		

For an intermediate stopping, to have the positioning accuracy stabilization, provide such a direct control system to solenoid valve for brake, as with a relay.



[C3-412-D]

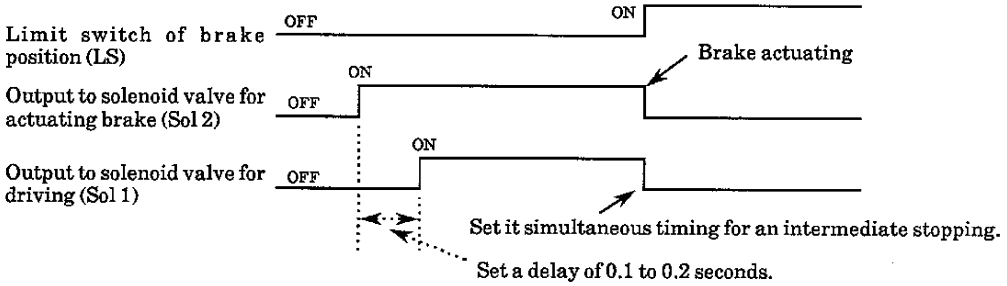


[C3-412-E]

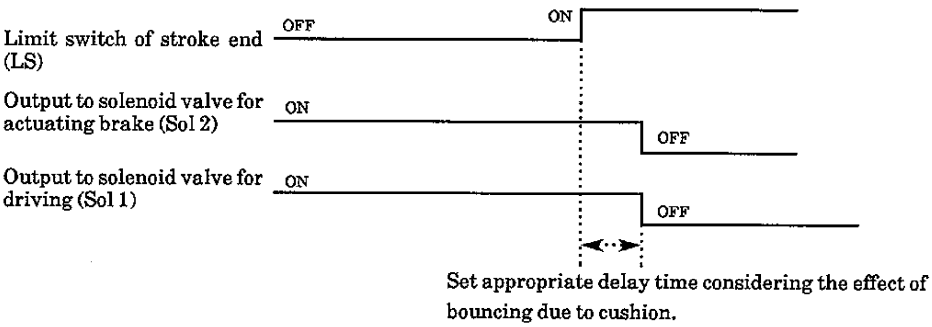
2) Output timing to solenoid valve for brake.

Refer to the following timing chart regarding output timing to both solenoid valve for brake and solenoid valve for driving.

① Starting and intermediate stopping

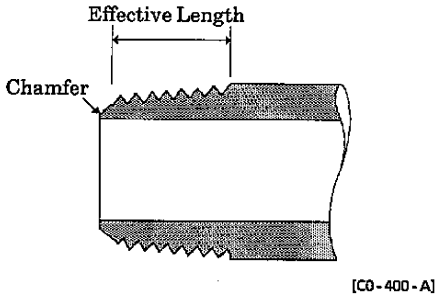


② Stopping at the stroke end

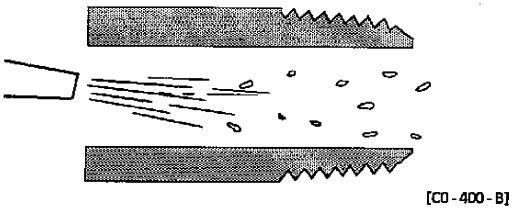


4.3 Piping

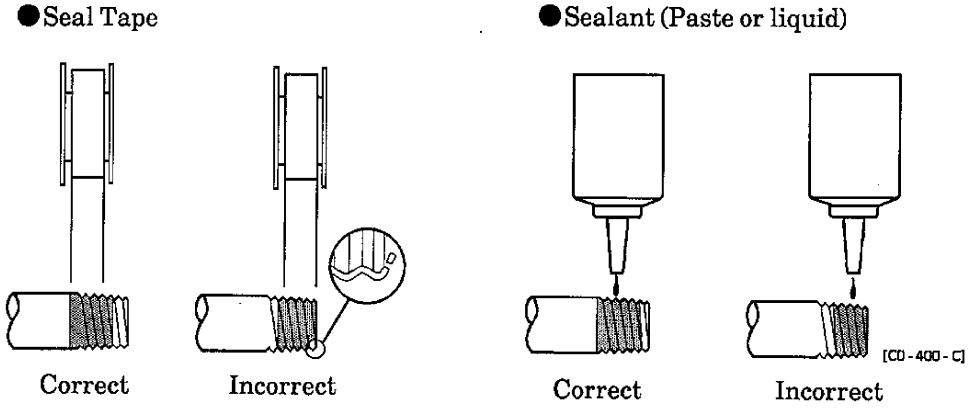
1) For piping beyond the filter, use pipes that hardly get corroded such as galvanized pipes, nylon tubes, rubber tubes, etc.
2) See to it that the pipe connecting cylinder and solenoid valve has effective sectional area needed for the cylinder to drive at specified speed.
3) Install filter preferably adjacent upper-stream to solenoid valve for eliminating rust, foreign substance and drain in the pipe.
4) Strictly observe the effective thread length of gas pipe and give a chamfer of approx. 1/2 pitch from the threaded end.



5) Flush air into the pipe to blow out foreign substances and chips before piping.



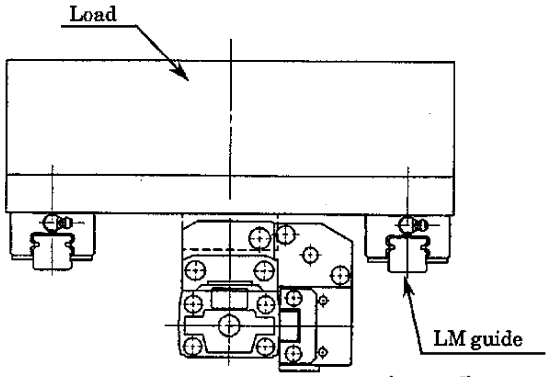
6) Refrain applying sealant or sealing tape approx. two pitches of thread off the tip of pipe to avoid residual substances from falling into piping system.



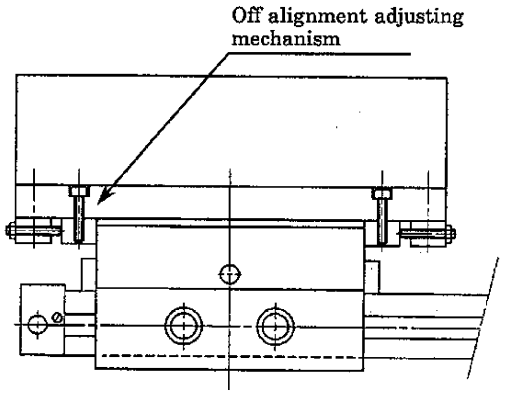
4.4 Installation

1) The range of servicable ambient temperature is 5 to 60°C.
2) Carefully avoid anything from bouncing the cylinder as it may distort the tube resulting its malfunction.
3) Carefully beware that the given pressure will not be held by cylinder even when cylinder port is closed during the cycle of air supply. due to some unavoidable air leakage
4) Carefully avoid electric arc welding to rodless cylinder after completion of mounting it. Dust preventive belt may be damaged due to the spark generated between dust preventive belt and cylinder tube because of current running through cylinder.
5) Refer to the Technical manual (CT-N-335) as for the mass of tolerable load.
6) Mounting the load

   Use SRB2 principally with an external linear guide such as LM guide. As for mounting, adopt such off alignment adjusting mechanism with external guide for easy adjusting and smooth operation. (Refer to the following schematics.)



[C3-412-F]

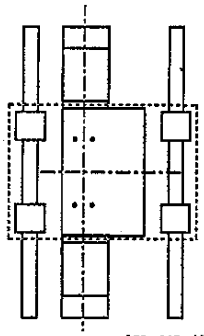
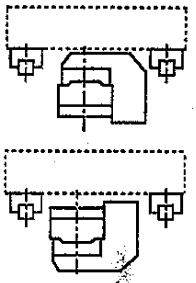
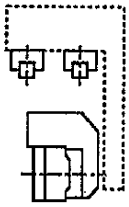
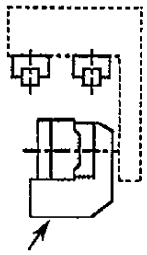


[C3-412-G]

7) Mounting configuration

Configuration is posted below. It is impractical to mount it so as the braking device coming to the bottom side.

Mounting plate

Vertical loading	Horizontal loading		
	①	②	③
 [C3-412-H]	 [C3-412-I]	 [C3-412-J]	 Braking device to the bottom [C3-412-K]
OK	OK	OK	✕ Impractical

5. MAINTENANCE

5.1 Periodic Inspection

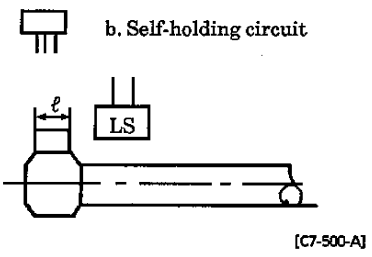
1) In order to upkeep the cylinder in optimum condition, carry out periodic inspection once or twice a year.

2) Inspection items

ⓐ Check the loosen bolts and nuts for mounting the load and body.
ⓑ Check if the cylinder operates smoothly.
ⓒ Check any change of the piston speed and cycle time.
ⓓ Check for external leakage.
ⓔ Check for remarkable change of table play.
ⓕ Check for the stroke abnormality.
ⓖ Loosen screws for mounting switch or position discrepancy.
ⓗ Check for any crack or flaw at joint of switch and switch lead cord.
ⓘ Check for any magnetizable foreign particle at the location of switch mounting.
ⓙ Check for the loosen bolts of mounting brake mechanism.
ⓚ Varification of brake actuation and release motion

See "Trouble shooting", 5.2, should there be any trouble found, also additionally tighten bolts, nuts, etc. if there are any slackened ones.

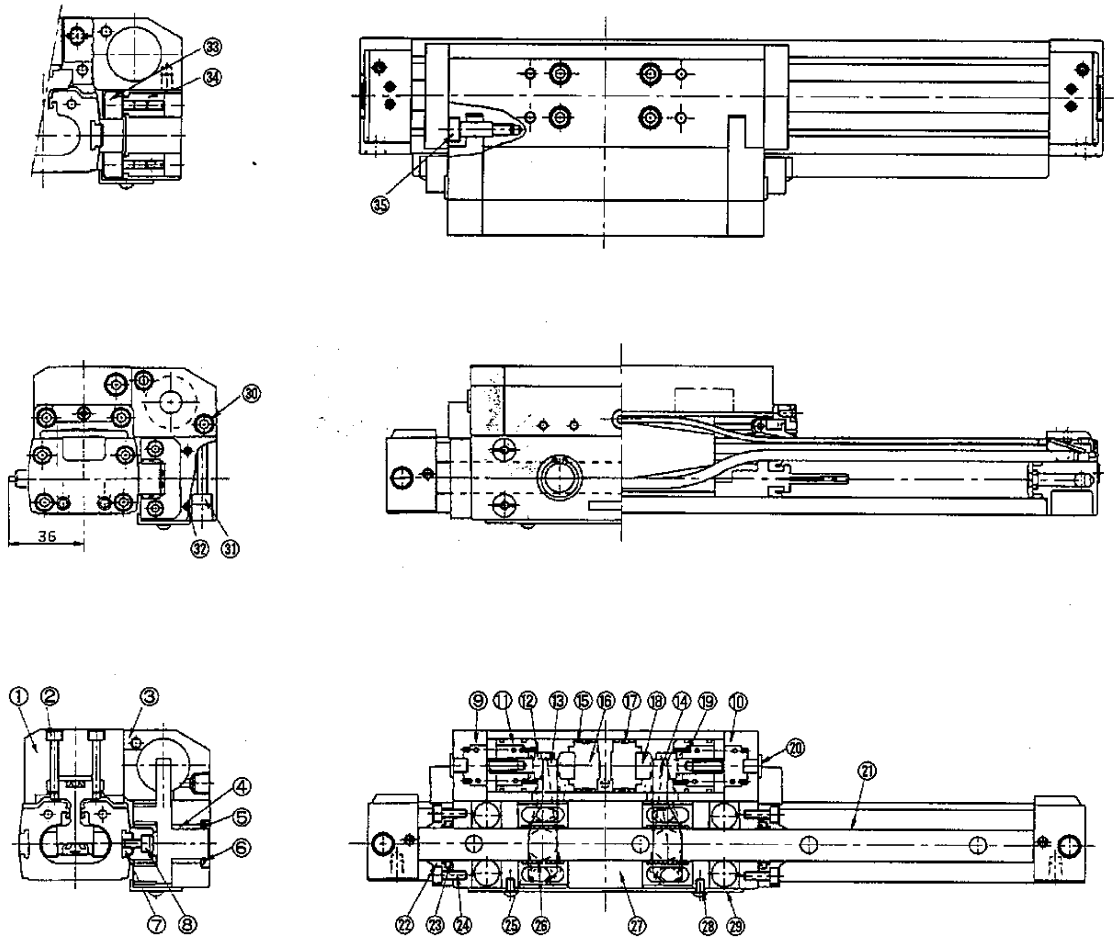
5.2 Trouble Shooting

Trouble	Cause	Correction
Brake does not release.	Insufficient pressure to the brake mechanism	Secure ample pressure.
	No signal to brake solenoid valve (In case NO type - Electric signal is there.)	Reaffirm the circuit to receive a signal. (Reaffirm the circuit to shut off a signal.)
	Solenoid valve for brake does not function	Check wiring and repair as required. Repair or replace solenoid valve as is required.
	Damage to packing for brake piston	Replace the brake unit.
Table does not stop.	Electric signal is there. (In case NO type - No signal to brake solenoid)	Reaffirm the circuit to shut off a signal. (Reaffirm the circuit to receive a signal.)
	Solenoid valve for brake does not function	Check the circuit and repair or replace solenoid valve as is required.
	Damage to packing for brake piston	Replace the brake unit.
	Left manual release of brake	Remove the manually open status.
	Skips off the dog for brake a- Excessive cylinder speed b- Circuit is not self-holding circuit  a. Excessive speed	a- Slow down the speed or increase the dog length (ℓ). b- Revise the circuit to that of self holding.
	Cylinder switch does not function	Correct or remove the cause of malfunction.
Inaccurate positioning	Effective sectional area of solenoid valve for brake is not large enough.	Replace the solenoid valve with the one of larger effective sectional area.
	Either too thine or too long tubing of connecting solenoid valve for brake and brake port	Either replace tubing with the one of larger diameter or shorten it if possible. As an alternative, connect the solenoid valve directly
	Too low response of solenoid valve for brake	Replace the solenoid valve with the one of high response.
	Too low response of signal sensor switch to solenoid valve for brake	Replace the sensor switch with the one of high response.
	Relays within signal circuit of brake control are actuated sequentially.	Revise the signal circuit. (Carefully review the response time, particularly when using sequencer.)
	Slackening of mounting a dog for brake signal.	Correct and remove the play.
	Remarkable wear and tear on the shape of the dog	Replace with new dog if wear and tear is excessive.
	a- Slant angle should be maintained less than 30° when using roller plunger type limit switch. b- More length of dog than over run length is required when making an interlocking by means of dog.	a- The larger angle cause load variation and results inaccurate positioning. (The slant angle can be up to 60° when using roller lever.) b- When relay is used for self holding circuit, dog length is required to provide an appropriate time length of relay actuating.

Trouble	Cause	Correction
Inaccurate positioning	Fluctuation of cylinder speed a- Misalignment of the center lines between cylinder and load guide b- The momentum inertia of load is excessive in comparison with thrust to cylinder. (Particularly when the positioning pitch is too small.) c. See if the stopping position is within the cushion chamber or just after piston comes out of cushion chamber.	a- Prevent off alignment using floating mounting etc. b- Alter cylinder with larger bore. c. Install a check valve to cushion in the event that stopping piston just when getting out of cushion chamber.
	Table is apt to pop out a- Incorrect setting of pressure balancing regulator b- Delayed timing of stop release	a- Reset the pressure regulator. b- Shorten the timing of stop release. (See if supply line is chalked, also.)
	Fluctuation of load a- Feeding load change along curvature variation of copying profile (Steady change) b- Remarkable change of load due to perpendicular load (Step change)	a- Reduce load ratio by altering cylinder with larger bore. b- Revise the circuit by building plural number of regulators for pressure balancing in the event that the range of load variation is relatively small or load changes stepping trend.
Does not operate	No pressure or inadequate pressure	Provide an adequate pressure source.
	No signal to direction control valve	Correct the control circuit
	Misalignment of center lines at mounting	Correct the installation state.
	Damage to piston packing	Replace piston packing.
	Damaged seal belt	Replace piston packing.
Does not function smoothly	Misalignment of center lines at mounting	Correct the installation state.
	Exertion of moment	Install a guide. Revise the installation state .
	Excessive load	Increase the pressure itself Use the tube of larger ID.
	Speed control valve is built in the way of "Meter in" circuit	Change the direction of the speed control valve.
Breakage and/or deformation	Impact force due to high speed operation	Turn the speed down. Reduce the load Install a mechanism with more secured cushion effect (e.g. external cushion mechanism).
	Moment is exceeding tolerable value.	Install a guide. Reverse the installation state and/or change the supporting system.
Switch does not function	Position discrepancy of switch	Re-set the position of switch within the zone of HD as explained in Article 7, 7-1, 1), page 15.
	Switch is electrically damaged	Re-build the circuit to eliminate excessive current and/or voltage. (Replace the switch) See if there is any sharp bending of lead cord and occurring internal short circuit (Replace the switch)
	Switch is mechanically damaged	Replace switch. Remove any external obstacles.
	Abnormal distribution of magnetic flux in a magnet to actuate the switch.	Clean and remove the magnetizing foreign particles around switch base.

5.3 Maintenance

1) Internal structure and expendable parts



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No.	Parts	Material	Qty	Remark
1	Table	Aluminum alloy	1	Almite treatment
2	Hex.socket head bolt	Alloy steel	4	Black oxide finish
3	Body	Aluminum alloy	1	Hardened almite
4	Oilless metal	Oil impregnated bearing metal	2	
5	Washer	Stainless steel	2	
6	C shape snap ring for axe	Steel	2	Parkalizing finish
7	Backup nut	Alloy steel		Black oxide finish
8	Hex.socket head bolt	Alloy steel		Black oxide finish
9	Plate (L)	Aluminum alloy	1	Almite treatment
10	Plate (R)	Aluminum alloy	1	Almite treatment
11	Piston (2)	Aluminum alloy	2	
12	Piston cap (2)	Steel	2	Black oxide finish
13	Bake arm (L)	Alloy steel	1	Black oxide finish
14	Bake arm (R)	Alloy steel	1	Black oxide finish
15	Wear ring	Acetal resin	8	
16	Piston (1)	Aluminum alloy	1	
17	Packing	Nitrile rubber	2	
18	Piston cap (1)	Steel	2	Black oxide finish
19	Coil spring	Steel	2	Black oxide finish
20	Cap	Nylon	2	
21	Rail	Steel	1	Chrome plate, industrial standard
22	Side guide	Acetal resin	2	
23	Scraper	Ulethane rubber	2	
24	Hex.socket head bolt	Alloy steel	4	Black oxide finish
25	Shoe holder	Steel	4	Black oxide finish
26	Shoe	Special	4	
27	Brake block	Aluminum alloy	1	Almite treatment
28	Hex.socket head bolt	Alloy steel	2	Black oxide finish
29	Bottom plate	Aluminum alloy	1	Almite treatment
30	Hex.socket head bolt	Alloy steel	4	Black oxide finish
31	Hex.socket head bolt	Alloy steel	4	Black oxide finish
32	Hex.socket head bolt	Alloy steel	4	Black oxide finish
33	Cam follower		4	
34	Eccentric roller holder	Steel	4	Black oxide finish
35	Shoulder bolt	Alloy steel	2	Black oxide finish

3) Expendable parts of Rodless cylinder body are as follows.

Expendable parts list

Tube bore (mm)	ϕ25 Equiv.	ϕ40 Equiv.	ϕ63 Equiv.
Kit No. / Parts name	SRB2-25K-☐	SRB2-40K-☐	SRB2-63K-☐
Seal belt	F4-221959-☐	F4-221961-☐	F4-221963-☐
Dust prevention belt	F4-221964-☐	F4-221966-☐	F4-221968-☐
Cushion packing	F4-670392	F4-670394	F4-670395
Piston packing	F3-222049	F3-222051	F3-222053
Cylinder gasket	P-22A	P-38	P-58

※ : Designate the kit No. when ordering parts.
Designate the stroke in the ☐ marked block.

Refer to the "Operational manual of Super rodless cylinder SRL2, SM-186782" to replace the expendable parts as above.

2) How to mount or dismount the brake unit

(1) Dismounting the brake unit

① Remove hex, socket head bolts (4 ea.) which fix eccentric roller holder.

② Loosen the pressure of cam follower by rotating eccentric roller holder with minus tip of screw driver. (4 places)

③ Manually release the brake or turn it in the release condition by means of air pressure.

④ Remove shoulder bolts (2 ea.)

⑤ Slide out the brake unit off the rail.

(2) Mounting the brake is accomplished following to the reversed procedures of dismounting as above.

◈① Set brake in release condition then slide it in the brake unit over the rail.

Note : When it is hard to slide in, adjust the position of cam follower by rotating the eccentric roller holder with a minus tip of screw driver.

◈② Mount shoulder bolts.

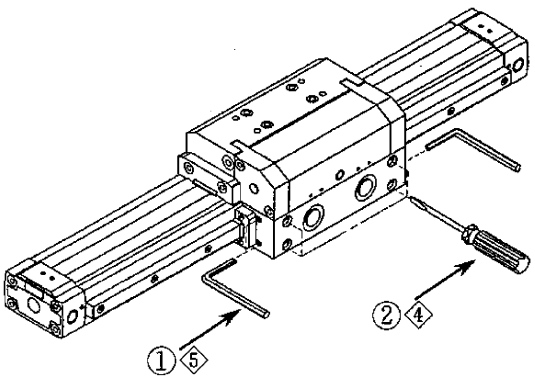
◈③ Upon varifying smoothness of table motion, release manual operation (or discharge the air) to make brake serviceable.

◈④ Make cam follower touch rail by turning eccentric roller holder with minus tip of screw driver.

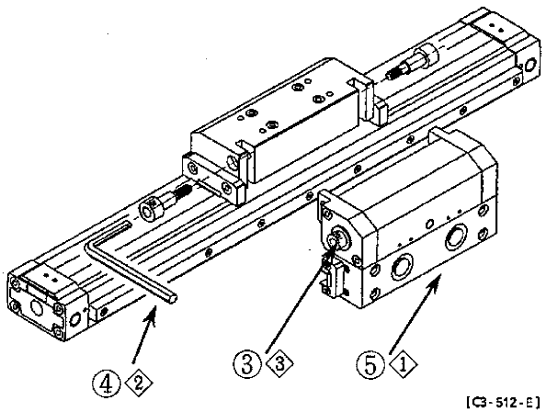
Note : Be sure to do this in the condition of brake serviceable. Beware of that biased touch of brake shoe may take place during brake actuation, if the cam follower is placed on the rail while it is in brake release condition.

◈⑤ Fix the eccentric roller holder by tightening the hex. socket head screws.

(Different numeric such as ① to ⑤ or ◈① to ◈⑤ are provided for easy reference to the below posted illustrations.)



[C3-512-D]



[C3-512-E]

Discontinue

(3) Tightening torque for each type of screw is as follows.

N · cm

Model	②Shoulder bolt	④ Eccentric roller holder	⑤Hex.socket head screw
SRB2-25	490	2.9	69
SRB2-40	784	2.9	69
SRB2-63	2352	3.9	147

6. HOW TO ORDER

• Without Switch

SRB2 — LB — 25 B — 200

• With Switch

SRB2 — OO — 25 B — 200 — MOH — D — Y

ⓐ ⓑ ⓒ ⓓ ⓔ ⓕ ⓖ

ⓐ Mounting type		ⓑ Tube bore (mm)		ⓒ Cushion		ⓓ Stroke (mm)	
OO	Basic type	25	φ25 Equiv.	B	Cushion on both ends	Standard stroke	Max. stroke
LB	Foot type, along cylinder axis	40	φ40 Equiv.	R	Cushion on R end	200, 300	Max. stroke up to 1700mm on order.
		63	φ63 Equiv.	L	Cushion on L end	400, 500	
				N	No cushion	600, 700	
						800, 900	
						1000	

Right and Left ends are as viewing cylinder facing to port side.

ⓔ Model coding of switch						ⓕ Number of switch	
Lead wire straight type	Lead wire L type	Application			Lamp	R	1 ea., R end
						L	1 ea., L end
M0H※	M0V※	for Relay and PC	Solid state type	2-wire	Monochrome	D	2 ea.
M5H※	M5V※	for Relay, PC, IC circuit or Series connection			without lamp	T	3 ea.
						4	4 ea.
M2H※	M2V※	for PC	Reed switch type		Monochrome	5	5 ea.
—	M2WV※				2-color		
M3H※	M3V※	for Relay, PC, IC circuit or Compact solenoid valve		3-wire	Monochrome		
—	M3WV※				2-color		
T2YH※	T2YFV※	for PC		4-wire			
T3YH※	T3YFV※	for Relay and PC		3-wire			
T2YMH※	T2YMV※	for PC					
T3YMH※	T3YMV※	for Relay and PC		2-wire			
T2YD※	—	for PC					
T2YDT※	—						

• Numeric figure is used to specify more than 4 each.

※ mark denotes the length of lead wire.

※ Length of lead wire	
No code	1m (Standard)
3	3m (Option)
5	5m (Option)

ⓖ Option & accessories	
No code	Port location F, Cushion needle location F (standard)
B	Port location F, Cushion needle location B
D	Port location D, Cushion needle location F
R	Port location R, Cushion needle location F (φ 25, Neither L nor B available)
T	Port location R, Cushion needle location B
S	Port location D, Cushion needle location D (φ 25, Unavailable)
Y	Floating joint

Note : Refer to the External dimension drawing as for designation code of port or cushion needle position.

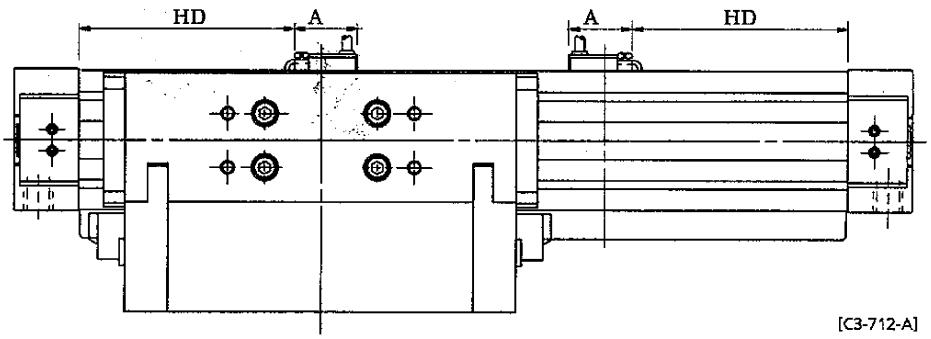
※ Refer to page 16 as for expendable parts.

7. OPERATIONAL CAUTION OF CYLINDER WITH SWITCH

7.1 Common Caution for both cylinders mounted with either Non contact switch or Contact point switch

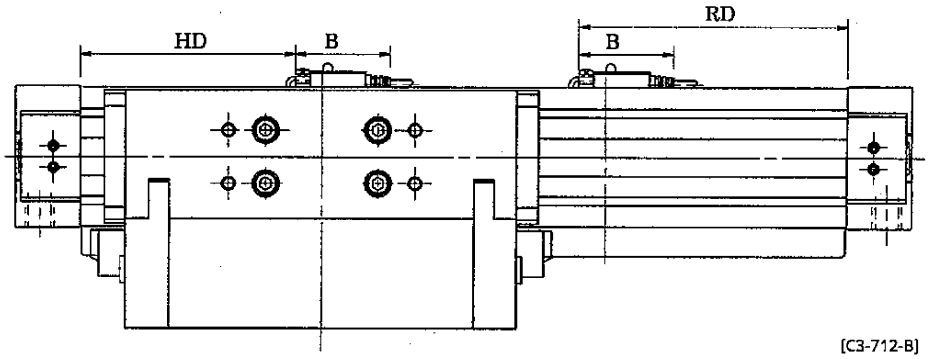
1) Although the cylinder switches are positioned, prior to delivery, at the location specified in the following table (the mostly sensitive position), it is recommendable to confirm it prior to start using the cylinder. It is, of course, mandatory to confirm it when cylinder and switches are independently purchased or an additional switch is to be mounted.

● Lead wire L type



[C3-712-A]

● Lead wire straight type



[C3-712-B]

Marking / Model	Type M switch				Type T switch			
	HD	RD	A	B	HD	RD	A	B
SRB2-※※-25	79	101	23.5	35.5	75	105	34	37
SRB2-※※-40	100	122			96	126		
SRB2-※※-63	139	161			135	165		

2) How to relocate switches

After loosening mounting screw (machine screw), slide the switch together with a bracket along cylinder tube to the appropriate position, then tighten the screw.

3) As for replacing switch, take out switch from bracket by loosening mounting screw (Machine screws). Leave, at this time, bracket on cylinder. Mount a new switch onto the bracket and tighten screws after finding an appropriate location over the cylinder. (Apply torque of 49 to 68 N · cm for tightening screws.)

4) Determining mounting position of the switch at an intermediate part of the stroke.

(1) Comply with the following principle to find out the location of mounting switch at an intermediate part of the stroke.

① Models M0, M2, M3 and M5

Tentatively lock the piston at the desired point to stop. Slide the switch forward and backward over the position of piston to find out where the switch turns On on each direction. Tighten the mounting screw while holding the switch at the center of these two points as it is the most sensitive point of the switch.

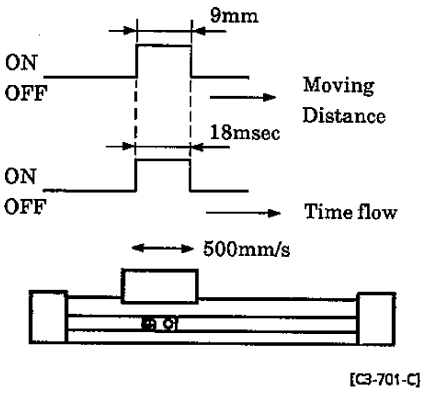
② Models M2W or M3W, T2Y※, T3Y※ two-color indicating type proximity switches.

Slide the switch over the piston to find out where a green lamp is lit. Tighten the mounting screw while holding the switch at the point as it is the most sensitive point of switch.

- Two-color indicating proximity switch turns red lamp On while it is within the range of responding stroke where as turning green lamp On at the most sensitive point (thus, it is easily locate the mostly adequate position to set the switch).

There is no harm to the switch to let the switch function within the range of red lamp zone.

(2) In case an intermediate sensing is required, cylinder speed is usually high. Therefore, such particular consideration as described below may be necessary because there are going to be such problems never be expected during sensing the speed at stroke end sometimes take place.



[C3-701-C]

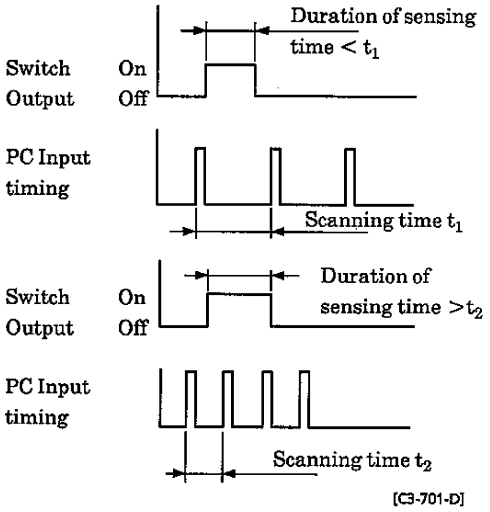
Does control circuit affirmatively respond? (such as Relay circuit, Programmable controller circuit · program).

Cylinder responding time itself is such high speed as 1 msec. But there are going to be only limited responding time allowance calculated out of the following formula.

$$\text{Sensing time allowance (sec)} = \frac{\text{Range of responding distance (mm)}}{\text{Cylinder speed (mm/s)}}$$

Example : Of 9mm responding distance with cylinder speed 500mm/s, there are only 18msec. sensing time allowance. (Par timing chart on previous page.)

- Response has to be carried out taking signal affirmatively during the duration of within this limited responding time allowance. Build a self-holding circuit in the system, if it is necessary.
- For input of programmable controller particularly, time length including program scanning time has to be shorter than this limited responding time allowance.



- The following is the Table of switch responding range.

Item / Model	Operation range			
	Solid state type switch			Reed switch type switch
	M2V, M2H M3V, M3H	M2WV 3MWV	T2Y※V, T2Y※H T3Y※V, T3Y※H	M0V, MCH M0V, M0H
SRB2-25	9.5 to 15.5	9 to 14	3 to 10	8.5 to 13.5
SRB2-40	11.5 to 17.5	10 to 16.5	4 to 11	10 to 16
SRB2-63	16 to 24	14 to 21	7 to 14	14 to 21.6

- Refer to "Operation Manual, SM-186782, Super rodless cylinder, SRL2".as for operational cautions of Cylinder switch.