Rodless cylinder with brake SRT series

Discontinue

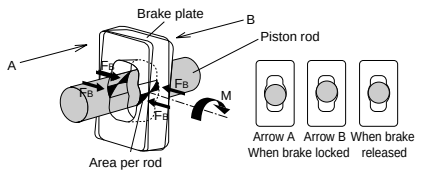
●: Standard, ◎: Option, : Not available

Variation	Model No.	Bore size (mm)	Stroke length (mm)											Max. stroke length (mm)	Mounting style		Cushion				Option		Switch	Page
			200	300	400	500	600	700			800	900	1000		Basic type	Axial foot type	Both sides cushion	R side cushion	L side cushion	No cushion	Floating joint	C mount bracket		
															00	LB	B	R	L	N	Y	C		
Double acting	SRT	12, 16, 20	●	●	●	●	●	●			●	●	●	1000	●	●	●	●	●	●	◎	◎	◎	1632
		25, 32, 40	●	●	●	●	●	●			●	●	●	1500	●	●	●	●	●	●	◎	◎	◎	1632
		50, 63	●	●	●	●	●	●			●	●	●	2000	●	●	●	●	●	●	◎	◎	◎	1632

Product introduction

• New brake mechanism used

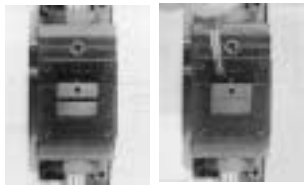
New slant plate method used brake mechanism provides high durability and powerful holding force (equivalent to cylinder thrust at 0.6MPa).



Applying torque M to the brake plate generates axial force F_B that holds the piston rod. This secures high durability and powerful holding force.

• Easy brake release

For brake release, just return the tilt of brake plate to the original position by a minus headed screw driver etc.



• Piping hour reduced

When supplying air to brake section, movable piping (cable bearer etc.) is not required, but just piping to the edge of flange.

• Simple structure

Very few number of brake section components, and simple structure.

• Switch can be installed.

Other cylinder switches such as proximity and reed types etc. are available.

M * V

M * H

- Proximity -2 wire
  M2V, M2H
- Proximity -3 wire
  M3V, M3H
- Reed -2 wire
  M0V, M0H, M5V, M5H
- 2 color proximity indicator light -2 wire
  M2WV
- 2 color proximity indicator light -3 wire
  M3WV

• Space saving

Low compact brake mechanism realizes space saving.

Safety Precautions

Always read before starting use

Refer to Intro 45 for general details on the cylinder, and to Intro 52 for details on the cylinder switch.

Rodless cylinder with brake SRT Series

WARNING Design & Selection

1 Structure so that nothing directly touches the driven object or movable sections of the cylinder with brakes.

Provide a protective cover so that no human-body directly touches the unit. If parts contact is possible, provide safety measures by placing a sensor to stop the cylinder or sound a warning to report danger.

2 Use a balance circuit considering cylinder protrusion.

When activating brakes at the specified position in the stroke, as with braking, or if pneumatic pressure is applied to only 1 side of the cylinder, the piston protrudes at high speed when brakes are released. This involves risk to personnel and equipment. Use a balance circuit, such as the recommended pneumatic pressure circuit, to prevent protrusion.

This brake cylinder has oilless specifications. Do not lubricate this cylinder. Otherwise, braking faults may occur.

Use pneumatics for the brake section when using the low hydraulic type middle bore size brake cylinder.

3 Holding force (maximum static load) refers to performance to hold a static load without vibration or impact when brakes are activated in a no-load state.

Take care when constantly using near the upper limit of the holding force.

4 During braking, kinetic energy is large and the braking distance is long. Thus, avoid using when brakes may be applied at the stroke limit.

Even if a cushion is provided, the back pressure is released and the cushions may not function.

If kinetic energy is large, overrun distance increases and stopping accuracy drops.

5 Do not apply loads with impact, strong vibration, or torque while brakes are activated.

If a load with impact, strong vibration, or torque is applied externally, holding force drops.

6 Consider stopping accuracy and overrun distance when braking.

A mechanical lock is applied, so the cylinder does not stop instantly when the stop signal is issued, but stops with a time-wise delay. The stroke at which the cylinder slides due to this delay is the overrun distance. The maximum and minimum width of overrun distance is stopping accuracy.

- To achieve the required stop position, move the limit switch forward by the overrun distance.
- The limit switch must have a detection length (dog length) equivalent to the overrun distance + α.
- When using the CKD cylinder switch, the working range is 7 to 16 mm, depending on the switch. If overrun distance exceeds this, provide self-holding of the contact at the switch load.

7 To improve stopping accuracy, minimize the time from stop signal output to brake stoppage.

Use a high-response DC control electricity circuit or solenoid valve, and set the solenoid valve as close to the cylinder as possible.

8 Stopping accuracy is affected by changes in piston speed.

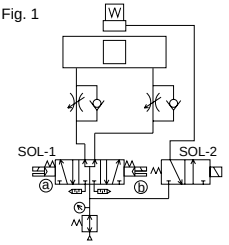
If piston speed changes due to load fluctuation or disturbance during cylinder reciprocation, stop position dispersion increases. Take measures to keep piston speed constant just before the stop position. Speed changes are large during the acceleration range, compared to during the cushion stroke and when starting operation, so dispersion in the stop position increases.

9 Precautions for basic circuit

• For horizontal load

Pipe as in Fig. 1. When using the rodless cylinder, the section area on both sides of the piston is equal, so the regulator for balancing is not required.

Fig. 1

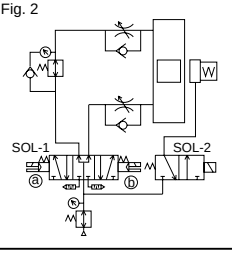


Status	ⓐ SOL-1	ⓑ SOL-2
Stop	OFF	OFF	OFF
Retract	ON	OFF	ON
Advance	OFF	ON	ON

• For vertical load

If the load is facing downward as in Fig. 2, the table moves in the direction of the load when brakes are released. Install a regulator with a check valve to reduce thrust in the load direction and balance the load.

Fig. 2



Status	ⓐ SOL-1	ⓑ SOL-2
Stop	OFF	OFF	OFF
Lower	ON	OFF	ON
Rise	OFF	ON	ON

(Note 1) If pressure may fluctuate due to other pneumatic components, install a dedicated regulator to stabilize operation.

⚠ WARNING Design & Selection

10 Release brakes faster than cylinder operation. If the cylinder operates first, brakes may not be released.

11 If back pressure is applied to the locking mechanism, the lock may be released. Use a discrete valve, or use an individual exhaust type manifold.

12 Use a 3-position PAB connection (bi-directional pressurization) valve for the cylinder drive to prevent the piston from protruding when starting.

13 Use a regulator with a check valve on the side with large thrust to balance thrust, including load.

⚠ CAUTION Design & Selection

1 The cylinder cannot be used where welding spatter, etc., may come in contact

2 With the slit rodless cylinder, such as the SRL2, air leaks externally at a level that does not affect speed control.

3 Precautions in stopping accuracy

• Stop pitch and load ratio

Stopping accuracy differs with stop pitch and load ratio. The load ratio below is recommended for achieving specified stopping accuracy.

Stop pitch	Load ratio
50mm or less	20% of thrust
50mm to 100mm	40% of thrust
100mm over	60% of thrust

• Selection of valve for brake

Stopping accuracy and overrun distance change with the responsiveness of the valve for braking. Use the valve listed in the Device Selection Guide. Couple the valve directly to the brake port to improve stopping accuracy.

• Using a PLC

If a PLC is used as the electric control unit for the valve for brakes, stopping accuracy drops due to scan time (computing time). When using a PLC, do not assemble the valve for the brake into the PLC circuit.

4 Do not make major changes in load weight when stopped with brakes, or the stopping position may change.

5 When the cable bearer slides, the protective tape may generate friction powder. Consider this when using in an environment having dust.

Discontinue

Pneumatic Components

Safety Precautions

Always read before starting use

Refer to Intro 45 for general details on the cylinder, and to Intro 52 for details on the cylinder switch.

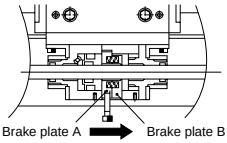
Rodless cylinder with brake SRT Series

WARNING Installation & Adjustment

1 If brakes are released when air is pressurized on only 1 side of the cylinder, the piston may protrude at high speed, causing a hazard.
Observe the points below when releasing brakes for adjustment, etc.

- Check that no one is in the movable range of the load and that no problem arises if the load moves when brakes are released.
- Take the following measures to prevent the load from dropping when brakes are released:
  · Set the load at the lowering end
  · Pressurize both sides
  · Set a support column
- Confirm that air is not pressured on only one side of the cylinder when releasing brakes.

2 Manually releasing brakes



- When the cover is removed and a hexagon socket head cap screw, etc., is screwed into brake plate A and tilted in the direction of the arrow, brake plates A and B become parallel and the piston rod is freed.
  If both brake plates are not tilted over completely, only one side will be released.
- When there is no air pressure, such as with vertical installation, braking force is lost when brakes are manually released. This may cause the table to move (lower) due to the weight of the load, etc.
  For safety, take the following measures before manually releasing the lock:
  · Move the load to the lowest end.
  · Provide a stopper on the load.
  · Supply air pressure to the rodless cylinder and balance the load.
- During normal operation, remove the manual release bolt.

3 Brakes are released manually or by pressurizing the brake release port. If brakes are left released in this state while a load is installed, the load may drop. return to the initial state after manually releasing brakes or stop the air supply to the brake release port, and confirm that brakes work before installing a load.

4 Do not apply brake holding force to the cylinder exceeding that indicated in the catalog.

5 If there is any play, such as looseness, in the brake signal dog, stopping accuracy is affected. Securely fix to eliminate play, etc.

6 If cylinder speed is fast, the detection dog must be long enough to match relay response time. If the dog is short, the stop signal is not output and operation does not stop.

⚠ CAUTION — Installation & Adjustment

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

2 When connecting to a load with external guide mechanism, align the center carefully.

- The longer the stroke, the greater the shaft center may deviate. Carefully consider connection (floating) so deviation is absorbed.

3 Adjust cylinder air balance.

With brakes released, place a load on the cylinder and balance the load by adjusting air pressure applied to the cylinder rod and head. Faults such as cylinder protrusion during brake release or improper brake release are prevented by accurately balancing the load.

4 Check the installation position of detectors such as the cylinder switch.

When using braking, consider overrun distance for the required stopping position, and adjust the position of detectors such as the cylinder switch.

5 Load fluctuation during the cylinder reciprocation stroke leads to changes in the piston speed, which in turn increases dispersion in the stop position. Place and adjust so the load does not change just before stopping in the cylinder reciprocation stroke.

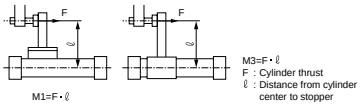
6 Speed changes are large during the acceleration range compared to during the cushion stroke and when starting operation, so dispersion in the stop position increases. Accuracy in specifications may therefore not be attained in step operation with a short stroke from the starting position to the next position.

7 If the cable bearer slides, protective tape may generate friction powder. Consider this when using in an environment vulnerable to dust.

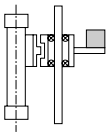
8 Check that moment, including inertia generated when moving or stopping the load, does not exceed the allowable load, or damage may result.

- If overhang is large and the cylinder is stopped at both ends with the piston, the bending moment functions due to load inertia even within internal cushion energy absorption. If kinetic energy is large and an external cushion, etc., is used, try contact with the workpiece center of gravity when possible.
- When selecting an external stopper, consider the bending moment generated by cylinder thrust.

- Moment that functions when stopping with external stopper



- When an external guide is installed, if the centers are not aligned, movement is not smooth and resistance caused by twisting functions as moment. Configure connection so misalignment is absorbed.
- Example of using guide



9 Using the SRT Series

- Avoid electrical welding after installing the rodless cylinder. If the current flows into the cylinder and generates sparks between the dust-proof belt and cylinder tube, the dust-proof belt may be damaged.
- If a unit with excessive inertia, etc., is moved, the cylinder may be damaged or faulty operation occur. Use within the allowable range.
- Do not scratch or dent the cylinder, or these may cause operation faults.
- If negative pressure is generated in the cylinder due to external force or inertia force, etc., the seal belt may disengage and caused air to leak externally or operation faults to occur.

Discontinue

Pneumatic Components

Safety Precautions

Always read before starting use

Refer to Intro 45 for general details on the cylinder, and to Intro 52 for details on the cylinder switch.

Rodless cylinder with brake SRT Series

WARNING During use & maintenance

1 **The brake section can be removed from the cylinder body. Do not disassemble or inspect brakes or hazards may result when brakes are used again.**

2 **The required grease is applied to brakes. Avoid applying extra grease and do not wipe grease off. Do not wipe off greases on the brake shaft, neither.**

3 **The braking mechanism cannot be replaced.**

4 **To prevent faults, use a dust cover during operation except when manually releasing brakes.**

CAUTION During use & maintenance

1 **If the air supply pipe is thin or long, stopping accuracy drops.**

2 **Frictional resistance increases and causes the piston speed to change when the cylinder has been stopped for a long time, such as when using first thing in the morning or afternoon. This may impair stoppage accuracy. Conduct break-in operation to obtain stable stopping accuracy.**

Discontinue
Rodless cylinder with brake
SRT Series

• Bore size : 12, 16, 20, 25 mm
32, 40, 50, 63 mm bore

CAD DATA AVAILABLE.

Specifications

Descriptions		SRT							
Bore size	mm	12 dia.	16 dia.	20 dia.	25 dia.	32 dia.	40 dia.	50 dia.	63 dia.
Actuation		Double acting							
Working fluid		Compressed air							
Max. working pressure	MPa	0.7							
Min. working pressure	Cylinder section MPa	0.2			0.15			0.1	
	Brake section MPa	0.3 (Note)							
Withstanding pressure	MPa	1.05							
Ambient temperature	°C	5 to 60							
Port size	Cylinder section	M5		Rc1/8		Rc1/4		Rc3/8	
	Brake section	M5		Rc1/8					
Stroke length tolerance	mm	+2.0 (to 1000), $+^{2.5}_{0}$ (to 2000)							
Working piston speed	mm/s	50 to 1000							
Cushion		Air cushion							
Lubrication		Not required (when lubrication, use turbine oil Class 1 ISO VG32. Continue to lubricate once lubricated.)							
Stoppage accuracy	mm	±1.5 (300mm/s at no load)							
Holding force	N	66	118	184	288	483	754	1178	1870

Note: Min. working pressure of brake section is the value of well balanced load.

Allowable energy absorption

Bore size (mm)	Cushioned		No cushion	With shock absorber (Initial set value)	
	Allowable energy absorption (J)	Cushion stroke length (mm)	Allowable energy absorption (J)	Absorbed energy (J)	Effective stroke length (mm)
12 dia.	0.03	14.5	0.003	2.4	5.5
16 dia.	0.22	19.2	0.007	2.4	5.5
20 dia.	0.59	22.2	0.010	5.7	7
25 dia.	1.40	20.9	0.015	10	9
32 dia.	2.57	23.5	0.030	18	13
40 dia.	4.27	23.9	0.050	50	16.5
50 dia.	9.13	24.9	0.072	86	21
63 dia.	17.4	29.6	0.138	86	21

Stroke length

Bore size (mm)	Standard stroke length (mm)	Max. stroke length (mm)	Min. stroke length (mm)
12 dia.	200, 300, 400 500, 600, 700 800, 900, 1000	1000 (12, 16, 20 dia.) 1500 (25, 32, 40 dia.) 2000 (50, 63 dia.)	200
16 dia.			
20 dia.			
25 dia.			
32 dia.			
40 dia.			
50 dia.			
63 dia.			

• Custom stroke length is available per 1 mm increment.
Note: Stroke length is limited according to load. Refer to page 1641.

Switch specifications

• One color/bi-color indicator/strong magnetic field

Descriptions	Proximity 2 wire		Proximity 3 wire		Proximity 2 wire
	M2V, M2H	M2WV (2 color indicator)	M3V, M3H	M3WV (2 color indicator)	T2YD
Applications	Programmable controller		Programmable controller, relay, IC circuit, small solenoid valve		Programmable controller
Power voltage	-		DC4.5 to 28V	DC10 to 28V	-
Load voltage	DC10 to 30V		DC30V or less	DC30V or less	DC24V ±10%
Load current	5 to 30mA		200mA or less	150mA or less	5 to 20mA
Light	LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)	Red/green LED (ON lighting)

Descriptions	Reed 2 wire			
	MOV, MOH		M5V, M5H	
Applications	Programmable controller, relay		Programmable controller, relay, IC circuit (without indicator light), serial connection	
Power voltage	-		-	
Light	DC12/24V	AC110V	DC5/12/24V or less	AC110V or less
Load voltage	5 to 50mA	7 to 20mA	50mA or less	20mA or less
Load current	LED (ON lighting)		Without indicator light	

Note 1: When load current range is within 7 to 20mA, M0 * switch can be used with AC24V, and AC48V.
Note 2: Please refer to Ending 1 about other switch specifications.

• With preventive maintenance output

Descriptions		Proximity 3 wire	Proximity 4 wire	Proximity 3 wire	Proximity 4 wire
		T2YFH/V	T3YFH/V	T2YFH/V	T3YFH/V
Applications		Programmable controller	Programmable controller, relay	Programmable controller	Programmable controller, relay
Light	Installation position adjustment	Red/green LED (ON lighting)			
	Preventive maintenance output	-		Yellow LED (ON lighting)	
Output	Current voltage	-	DC10 to 28V	-	DC10 to 28V
	Load voltage	DC10 to 30V	DC30V or less	DC10 to 30V	DC30V or less
	Load current	DC5 to 20mA	DC50mA or less	DC5 to 20mA	DC50mA or less
Preventive maintenance2	Load voltage	DC30V or less			
	Load current	DC20mA or less	DC50mA or less	DC5 to 20mA	DC50mA or less

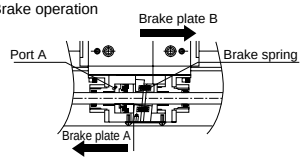
Cylinder mass

Unit: kg

Bore size (mm)	Mass when 0 mm stroke			Additional mass per St =100mm
	Basic type (00)	Foot type (LB)	Mass per switch (Including bracket)	
12 dia.	0.83	0.25	0.02	0.18
16 dia.	0.95	0.33		0.21
20 dia.	1.17	0.54		0.26
25 dia.	2.24	1.1		0.45
32 dia.	3.8	3.9		0.57
40 dia.	5.0	5.1		0.74
50 dia.	7.5	7.6		0.99
63 dia.	12.5	12.8		1.52

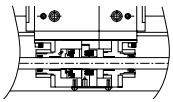
Operational principle

Brake operation



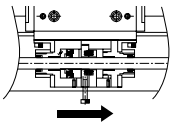
When air is exhausted air from port [A], the brake plate [A], [B] is pushed by the spring force, then the brake plate [A], [B] tilts to the arrow direction with using each fulcrum. This boosts the brake force by cylinder thrust, then the position of piston rod is held.

Brake release



When air is supplied from port [A], the brake plate [A], [B] is pushed by the release piston, then the brake plate [A], [B] tilts at right angle to the piston rod. A clearance is created between them, and the rod can be moved freely.

Manual brake release



Remove the cover, screw a hexagon socket head cap screw etc. into the brake plate [A], then tilt the plate to the arrow direction. This makes brake plate [A] and [B] in parallel, then releases the piston rod as freely moved. (Brake is also released when the brake plate is returned to the original slant by a minus headed screw driver etc.)

Discontinue

How to order

Without switch

SRT - 00 - 32 B - 200 ——— Y

With switch

SRT - 00 - 32 B - 200 - M0H - R - Y

Ⓐ Mounting style

Ⓑ Bore size

Ⓒ Cushion

Ⓓ Stroke length
Note 1

Ⓔ Switch model No.
Note 2, Note 3

Ⓕ Switch quantity

Ⓖ Option
Note 4

Symbol	Descriptions
Ⓐ Mounting style	
00	Basic type
LB	Axial foot type
Ⓑ Bore size (mm)	
12	12 mm bore
16	16 mm bore
20	20 mm bore
25	25 mm bore
32	32 mm bore
40	40 mm bore
50	50 mm bore
63	63 mm bore
Ⓒ Cushion	
B	Both sides cushion
R	R side cushion
L	L side cushion
N	No cushion
Ⓓ Stroke length (mm)	
200, 300, 400, 500, 600, 700, 800, 900, 1000	

Ⓔ Switch model No.

Lead wire Straight type	Lead wire Radial type	Contact	Display	Lead wire
M0H *	M0V *	Reed	1 color indicator	2 wire
M5H *	M5V *			
M2H *	M2V *	Proximity	1 color indicator	2 wire
-	M2WV *		2 color indicator	
M3H*	M3V*		1 color indicator	3 wire
-	M3WV*		2 color indicator	
T2YFH*	T2YFV*		With preventive maintenance output	3 wire
T3YFH*	T3YFV*			4 wire
T2YMH*	T2YMV*			3 wire
T3YMH *	T3YMV *			4 wire
T2YD *	-		Strong magnetic field proof switch	2 wire
T2YDT *	-			

*Lead wire length	
Blank	1m (standard)
3	3m (option)
5	5m (option)
Ⓕ Switch quantity	
R	One on R side
L	One on L side
D	Two
T	Three
4	4 (when more than 4 switches, indicate switch quantity.)
Ⓖ Option	
Y	Floating joint
C	C mount bracket

⚠Cautions for model No. selection

Note 1: Stroke length is limited according to load. Please refer to Page 1641 about technical data.
Note 2: Available other than listed Ⓔ switch model No. (Custom order)
Please refer to Ending 1 about details.
Note 3: Not available in the environment where welding spatter is applied to cylinders.
When using T2YD and T2YDT, pay attentions.
Note 4: When "C", M type switch with radial lead wire and T types switches are not available.

<Example of model number>

SRT-00-32B-200-M0H-R-Y

Model: Rodless cylinder with brake
Ⓐ Mounting style : Basic type
Ⓑ Bore size : 32 mm
Ⓒ Cushion : Both sides cushion
Ⓓ Stroke length : 200 mm
Ⓔ Switch model No. : Reed switch M0H
Ⓕ Switch quantity : One on R side
Ⓖ Option : Floating joint

How to order switch

• Switch main body + mounting bracket (Note 1)

SRL2 – M0H * (E)

Switch model No.
(Previous page (E))

• Switch only

SW – M0H * (E)

Switch model No.
(Previous page (E))

• Mounting bracket (Note 2)

• M type switch

SRL2 - M

• T type switch

SRL2 - T

• Lead wire holder (Note 3)

SRL2 – MH

* Lead wire length	
Blank	1m (standard)
3	3m (option)
5	5m (option)

(Note 1) Switch main body + mounting bracket doesn't include any lead wire holder. When lead wire holder is necessary, place an order separately.
(Note 2) For M and T type switches, these brackets are different.
(Note 3) For lead wire holder, 10 pieces/set.

How to order discrete C mount bracket

SRL2 – Bore size - C

(C mount bracket, 4 mounting bolts)

How to order floating joint set

SRL2 – Bore size - Y

(Mount, mount base, pin, plain washer, pan head machine screw with spring washer, 4 mounting bolts)

How to order mounting bracket

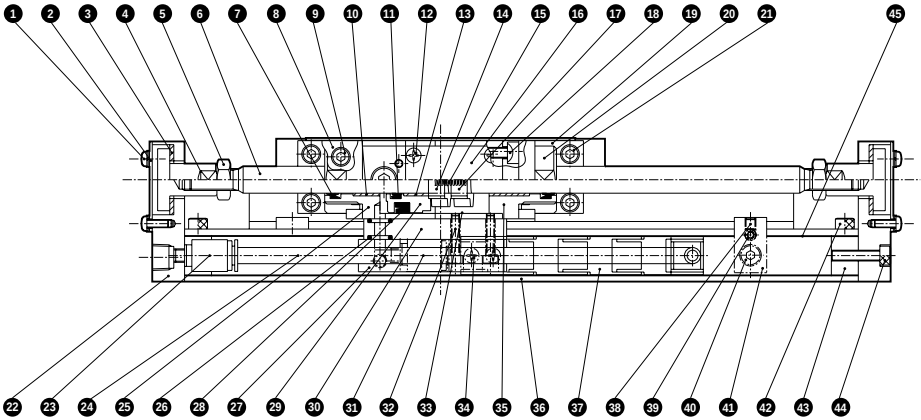
SRT – Mounting style (LB) - Bore size

(Two brackets, 4 mounting bolts)

Note: Switch bracket, C mount bracket, floating joint is common to SRL2.

Discontinue

Internal structure drawing and parts list (12 to 25 mm bore)

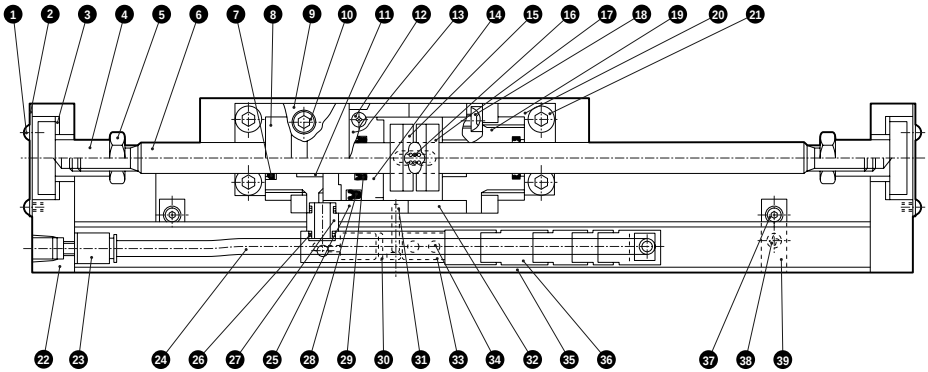


Parts list

No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Pan head machine screw	Steel	Galvanizing	23	Push in joint		
2	Joint part cover	Aluminum alloy	Black alumite	24	Tube	Urethane rubber	
3	Slide plate	Dry bearing		25	Main body A	Aluminum alloy	
4	Floating joint	Steel	Phosphoric acid mangan	26	Gasket	Nitrile rubber	
5	Nut	Carbon steel	Galvanizing	27	Adaptor	Aluminum alloy	Black alumite
6	Brake shaft	Steel	Plated shaft	28	Release piston packing seal	Nitrile rubber	
7	Rod packing seal	Nitrile rubber		29	Release piston	Aluminum alloy	Colorless alumite
8	Brake mounting base	Aluminum alloy		30	Spacer	Aluminum alloy	Colorless alumite
9	Cap bolt with hexagon head hole	Steel	Blackening	31	Push in joint		
10	Bearing bush	Dry bearing		32	Cap bolt with hexagon head hole	Steel	Blackening
11	Release rod packing seal	Nitrile rubber		33	Main body B	Aluminum alloy	
12	Pan head machine screw	Steel	Galvanizing	34	Pan head machine screw	Steel	Galvanizing
13	Release rod bushing	Dry bearing		35	Brake end cover	Aluminum alloy	
14	Brake plate A	Cast iron	Phosphoric acid mangan	36	Cable holder	Aluminum alloy	Colorless alumite
15	Brake spring	Steel	Blackening	37	Cable bearer	Special plastic	
16	Cover	Aluminum alloy		38	Hexagon socket head set screw	Steel	Blackening
17	Brake plate B	Cast iron	Phosphoric acid mangan	39	Hexagon socket head set screw	Steel	Blackening
18	Button bolt with hexagon head hole	Steel	Blackening	40	Button bolt with hexagon head hole	Steel	Blackening
19	Brake foot bracket	Steel	Galvanizing	41	Cable holder receiving plate	Steel	Galvanizing
20	Lock nut	Steel	Galvanizing	42	Cap bolt with hexagon head hole (Note 1)	Steel	Blackening
21	Cap bolt with hexagon head hole	Steel	Blackening	43	Cable holder holding block	Aluminum alloy	Alumite
22	Edge flange	Aluminum alloy	Black alumite	44	Cap bolt with hexagon head hole	Steel	Blackening
				45	Protection tape	Silicon glass cross	

Note 1: ㊷ Cap bolt with hexagon head hole is not available for 12, 16, 20 mm bore.

Internal structure and parts list (32 to 63 mm bore)



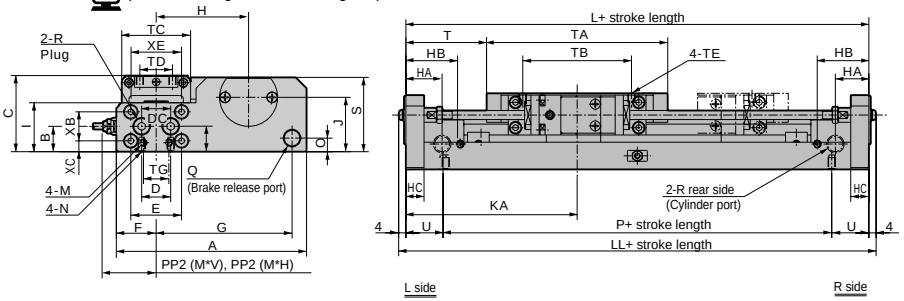
Parts list

No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Pan head machine screw	Steel	Galvanizing	21	Cap bolt with hexagon head hole	Steel	Blackening
2	Joint part cover	Aluminum alloy	Black alumite	22	Edge flange	Aluminum alloy	Black alumite
3	Slide plate	Dry bearing		23	Push in joint	———	
4	Floating joint	Steel	Phosphoric acid mangan	24	Tube	Urethane rubber	
5	Nut	Steel	Galvanizing	25	Main body A	Aluminum alloy	Colorless alumite
6	Brake shaft	Steel	Plated shaft	26	Gasket	Nitrile rubber	
7	Rod packing seal	Nitrile rubber		27	Spacer	Aluminum alloy	
8	Lock nut	Steel	Galvanizing	28	Release piston packing seal	Nitrile rubber	
9	Brake mounting base	Aluminum alloy	Colorless alumite	29	Release rod packing seal	Nitrile rubber	
10	Cap bolt with hexagon head hole	Steel	Blackening	30	Push in joint	———	
11	Bearing bush	Dry bearing		31	Cap bolt with hexagon head hole	Steel	Blackening
12	Pan head machine screw	Steel	Galvanizing	32	Main body B	Aluminum alloy	Colorless alumite
13	Cover	Aluminum alloy	Colorless alumite	33	Adaptor	Aluminum alloy	Black alumite
14	Release piston	Cast iron		34	Pan head machine screw	Steel	Galvanizing
15	Brake plate A	Cast iron	Phosphoric acid mangan	35	Cable holder	Aluminum alloy	Colorless alumite
16	Brake spring	Steel	Blackening	36	Cable bearer	Special plastic	
17	Brake plate B	Cast iron	Phosphoric acid mangan	37	Button bolt with hexagon head hole	Steel	Blackening
18	Button bolt with hexagon head hole	Steel	Blackening	38	Cable holder receiving plate	Steel	Galvanizing
19	Brake end cover	Aluminum alloy	Colorless alumite	39	Pan head machine screw	Steel	Galvanizing
20	Brake foot bracket	Steel	Galvanizing				

Discontinue

Dimensions (12 to 25 mm bore)

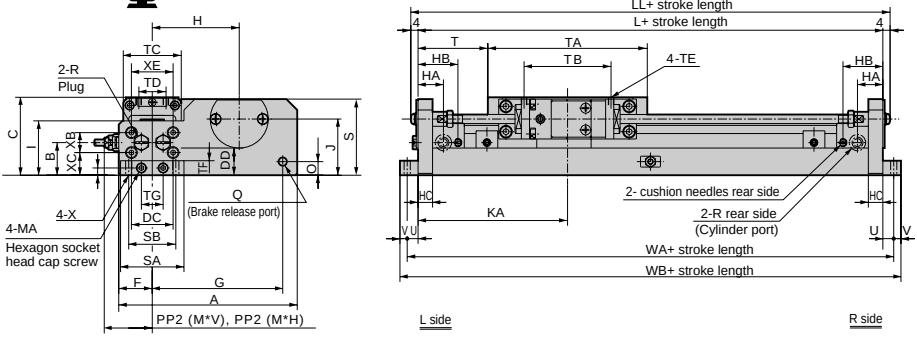
• SRT-12 to 25 CAD (File name: Page 1644 or Ending 152)



Symbol / Bore size (mm)	A	B	C	D	DC	E	F	G	H	HA	HB	HC	I	J	KA	L	LL	M	N
12 dia.	94.5	16.5	39	16	11	19.5	16.5	70	46	14	22	8	27	27.5	76	152	160	M3 depth 5	M3 depth 5
16 dia.	98.5	18	43	20	12	23	18.5	72	48	14	22	8	30	31	82.5	165	173	M3 depth 5	M3 depth 5
20 dia.	105	14	42	16	16	28	22	75	51	18.5	28.5	10	27	30	94.5	189	197	M4 depth 6.5	M4 depth 6.5
25 dia.	114.5	17	53	20	26	38	26.5	80	55	19.5	32	12	37	37.5	107	214	222	M6 depth 9	-

Symbol / Bore size (mm)	O	P	Q	R	S	T	TA	TB	TC	TD	TE	TG	U	XB	XC	XE	PP2 (with switch)			
																	M * V	M * H	T * V	T * H
12 dia.	7.5	144	M5	M5	38.5	35.5	81	42	29	13	M3 depth 5	8	4	10	11.5	19.5	24.5	26	31	28
16 dia.	7.5	157	M5	M5	42	38.5	88	48	32	15	M3 depth 5	12	4	11	12.5	23	26.5	28	33	30
20 dia.	7.5	148	Rc1/8	Rc1/8	41	44.5	100	60	38	18	M4 depth 6	14	20.5	16	6	28	29.5	31	36	33
25 dia.	9	162	Rc1/8	Rc1/8	52	46	122	70	48	20	M5 depth 8	-	26	23	5.5	40	34.5	36	41	38

• SRT-LB-12 to 25 CAD (File name: Page 1644 or Ending 152)

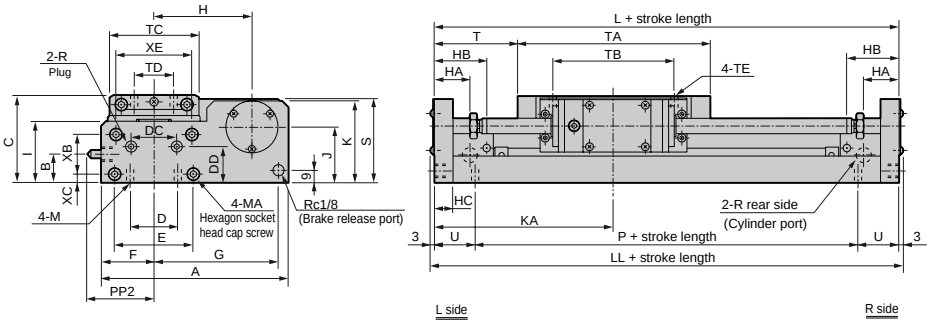


Symbol / Bore size (mm)	A	B	C	DC	DD	E	F	G	H	HA	HB	HC	I	J	KA	L	LL	O	Q	R	S	T	TA
12 dia.	94.5	16.5	39	11	16.5	19.5	16.5	70	46	14	22	8	27	27.5	76	152	160	7.5	M5	M5	38.5	35.5	81
16 dia.	98.5	18	43	12	18	23	18.5	72	48	14	22	8	30	31	82.5	165	173	7.5	M5	M5	42	38.5	88
20 dia.	105	14	42	16	14	28	22	75	51	18.5	28.5	10	27	30	94.5	189	197	7.5	Rc1/8	Rc1/8	41	44.5	100
25 dia.	114.5	17	53	26	19	38	26.5	80	55	19.5	32	12	37	37.5	107	214	222	9	Rc1/8	Rc1/8	52	46	122

Symbol / Bore size (mm)	TB	TC	TD	TE	TG	XB	XC	XE	PP2 (with switch)				Installation method								
									M * V	M * V	T * V	T * H	SA	SB	TF	U	V	MA	X	WA	WB
12 dia.	42	29	13	M3 depth 5	8	10	11.5	19.5	24.5	26	31	28	32	24	8	6	4	M3 X 10	3.4	164	172
16 dia.	48	32	15	M3 depth 5	12	11	12.5	23	26.5	28	33	30	35	26	8	6	4	M3 X 10	3.4	177	185
20 dia.	60	38	18	M4 depth 6	14	16	6	28	29.5	31	36	33	43	33	10	6	6	M4 X 12	4.5	201	213
25 dia.	70	48	20	M5 depth 8	-	23	5.5	40	34.5	36	41	38	52	20	12	9	11	M5 X 65	7	232	254

Dimensions (32 to 63mm bore)

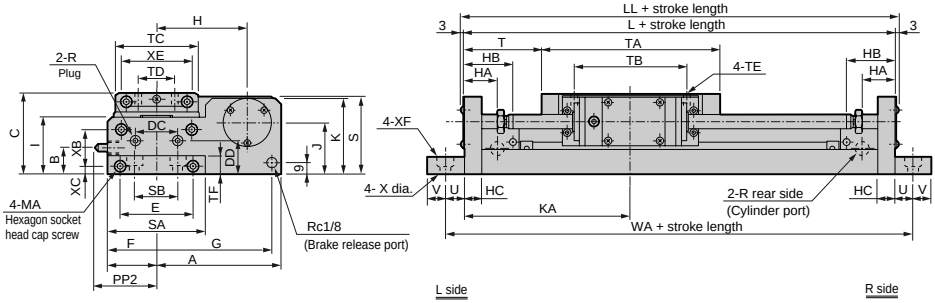
• SRT-32 to 63 CAD (File name: Page 1644 or Ending 152)



Symbol / Bore size (mm)	A	B	C	D	DC	DD	E	F	G	H	HA	HB	HC	I	J	K	KA	L	LL	M
32 dia.	129	18.5	57	32	27	21	48	33	86	66	24	37.5	14	39	39	56	127	254	260	M6 depth 9
40 dia.	144	22	67	36	35	28	60	40	93	74	29	42	16	47	44	65	138	276	282	M8 depth 12
50 dia.	177	28	82	45	35	35	74	48	101	89	33	51	18	57	52	77	147	294	300	M8 depth 12
63 dia.	209	35	95	50	39	42	96	59	112	105	35	52	20	68	58	93	168	336	342	M10 depth 15

Symbol / Bore size (mm)	MA	P	R	S	T	TA	TB	TC	TD	TE	U	XB	XC	XE	PP2 (with switch) M*V	PP2 (with switch) M*H	PP2 (with switch) T*V	PP2 (with switch) T*H
32 dia.	M5	196	Rc1/4	56	60	134	80	56	20	M6 depth 9	29	25	6	47	41.5	43	48	45
40 dia.	M6	210	Rc1/4	65	64	148	90	68	30	M6 depth 11	33	30	7	58	48.5	50	55	52
50 dia.	M8	212	Rc3/8	77	71	152	100	80	30	M8 depth 13	41	36	10	70	56.5	58	68	60
63 dia.	M8	258	Rc3/8	93	84	168	110	102	40	M8 depth 13	39	42	14	90	67.5	69	74	71

• SRT-LB-32 to 63 CAD (File name: Page 1644 or Ending 152)



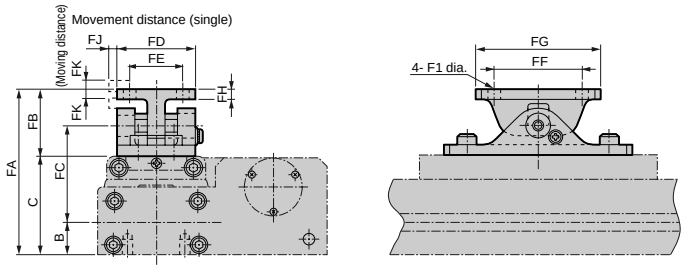
Symbol / Bore size (mm)	A	B	C	DC	DD	E	F	G	H	HA	HB	HC	I	J	K	KA	L	LL	R	S	T	TA
32 dia.	129	18.5	57	27	21	48	33	86	66	24	37.5	14	39	39	56	127	254	260	Rc1/4	56	60	134
40 dia.	144	22	67	35	28	60	40	93	74	29	42	16	47	44	65	138	276	282	Rc1/4	65	64	148
50 dia.	177	28	82	35	35	74	48	101	89	33	51	18	57	52	77	147	294	300	Rc3/8	77	71	152
63 dia.	209	35	95	39	42	96	59	112	105	35	52	20	68	58	93	168	336	342	Rc3/8	93	84	168

Symbol / Bore size (mm)	TB	TC	TD	TE	XB	XC	XE	PP2 (with switch) M*V	PP2 (with switch) M*H	PP2 (with switch) T*V	PP2 (with switch) T*H	Installation method SA	SB	TF	U	V	WA	X	XF	MA
32 dia.	80	56	20	M6 depth 9	25	6	47	41.5	43	48	45	64	32	12	9	11	272	7	-	M5
40 dia.	90	68	30	M6 depth 11	30	7	58	48.5	50	55	52	80	36	15	11	9	298	9	14 spot face depth 8.6	M6
50 dia.	100	80	30	M8 depth 13	36	10	70	56.5	58	68	60	94	45	20	11	9	316	9	14 spot face depth 8.6	M8
63 dia.	110	102	40	M8 depth 13	42	14	90	67.5	69	74	71	116	50	25	13	12	362	11	17.5 spot face depth 10.8	M8

Discontinue

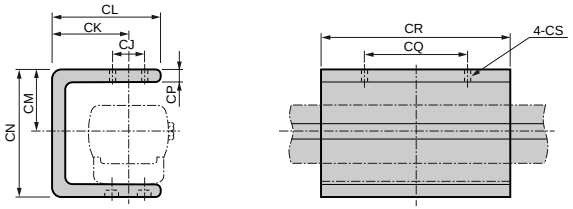
Dimensions: Option

• Floating joint CAD (File name: Page 1644 or Ending 152)



Symbol / Bore size (mm)	FA	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	B	C
12 dia.	54	21	31.5	24	16	30	40	3	3.4	3	3	10.5	33
16 dia.	58	21	34	24	16	30	40	3	3.4	3	3	12	37
20 dia.	67	25	39	30	20	40	56	4	4.5	3	3	14	42
25 dia.	78	25	47	30	20	40	56	4	6	3	3	17	53
32 dia.	95	38	55.5	45	30	50	70	6	7	5	5	18.5	57
40 dia.	105	38	62	45	30	50	70	6	7	5	5	22	67
50 dia.	126	44	73	60	40	70	90	8	9	5	5	28	82
63 dia.	139	44	79	60	40	70	90	8	9	5	5	35	95

• C mount bracket CAD (File name: Page 1644 or Ending 152)



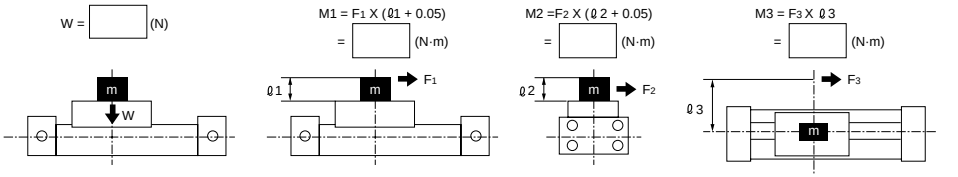
Symbol / Bore size (mm)	CJ	CK	CL	CM	CN	CP	CQ	CR	CS
12 dia.	13	27	40	22.5	50	5	42	81	M3
16 dia.	15	35.5	50	29	60	6	48	88	M3
20 dia.	18	32.5	50	26	60	6	60	100	M4
25 dia.	20	45	69	28	71	5	70	116	M5
32 dia.	20	54	81.5	33.5	80	7	80	128	M6
40 dia.	30	63	95.5	38	91.5	8	90	138	M6
50 dia.	30	74	113	48	112.5	10	100	142	M8
63 dia.	40	88	138	58	131	13	110	158	M8

Rodless cylinder with brake (SRT) selection guide

<STEP1>

1 Find the static moment.

• How to find moment



Note: Including 0.05 (m) above distance from temporary piston center to table surface

2 Find a rough value of coefficient G according to <Table 1>.

<Table 1>

$$Va\ (\text{average speed}) = \frac{\text{Moving distance}}{\text{Moving time}}\ (\text{m/s})$$

Va (average speed) (m/s)	Vm (speed at stroke end) (m/s)	Coefficient G
to 0.3	to 0.65	9
to 0.6	to 1.00	15
to 0.9	to 1.30	23
to 1.2	to 2.00	40

Coefficient G = ☐

Select bore size roughly.

M1 X G = ☐ (N·m) → (dia.)
M2 = ☐ (N·m) → (dia.)
M3 X G = ☐ (N·m) → (dia.)
W = ☐ (N) → (dia.)
$E_0 = \frac{1}{2} \times m \times Vm_2 = \left(M \fallingdotseq \frac{W}{9.8}\right)$ ☐ (J) → (dia.)

Select maximum bore size temporally.

☐ dia.

<Table 2> Allowable value Refer to the value in ( ) for type with C mount bracket.

Descriptions / Bore size (mm)	Wmax (N)	M1max (N·m)	M2max (N·m)	M3max (N·m)
12 dia.	30(15)	1.5(1)	0.6(0.3)	0.6(0.6)
16 dia.	140(70)	5(3.5)	1(0.5)	1(1)
20 dia.	200(100)	10(7)	1.5(0.7)	3(3)
25 dia.	360(180)	17(12)	5(2.5)	10(10)
32 dia.	620(310)	36(25)	10(5)	21(21)
40 dia.	970(485)	77(54)	23(11.5)	26(26)
50 dia.	1470(735)	154(108)	32(16)	42(42)
63 dia.	2320(1160)	275(193)	52(26)	76(76)

Note) C mount can be installed onto the side where the brake not provided. (Cannot be installed to brake side.)

<Table 3> allowable energy absorption (E_0)

Bore size (mm)	Integrated air cushion (J)	Shock absorber (J)	Shock absorber model No.
12 dia.	0.03	2.4	NCK-0.3-C
16 dia.	0.22	2.4	NCK-0.3-C
20 dia.	0.59	5.7	NCK-0.7-C
25 dia.	1.40	10.0	NCK-1.2
32 dia.	2.57	18.0	NCK-2.6
40 dia.	4.27	50.0	NCK-7
50 dia.	9.13	86.0	NCK-12
63 dia.	17.4	86.0	NCK-12

Note) For SRT, no shock absorber is installed.
As an external damper, please use the shock absorber above.

3 Find composite moment at stroke end (M_T).

(Confirm if the bore size temporally selected at **2** meets the following formula.)

$$M_T = \frac{M1 \times G}{M1max} + \frac{M2}{M2max} + \frac{M3 \times G}{M3max} + \frac{W}{Wmax} < 1$$

M_T : Composite moment (should be smaller than 1.)
G : Coefficient G
Wmax : Max. allowable value of W (from Table 2.)
M1max : M1 maximum allowable value (from Table 2)
M2max : M2 maximum allowable value (from Table 2)
M3max : M3 maximum allowable value (from Table 2)

Discontinue

<STEP2>

Then, increase the accuracy of load factor, effective thrust, speed at stroke end, and composite moment value.

• Find load factor.

$$\alpha = \frac{F_0}{F} \times 100\ [\%]$$

α : Load factor
F_0 : Required force to move work piece (N).
F : Cylinder effective thrust (N) (Fig.1 to 3)

At horizontal operation	When vertical operation
$F_0 = F_W + F_1 + F_2 + F_3 + F_L$	$F_0 = W + F_1 + F_2 + F_3 + F_L$
F_W : W X 0.2 (N)	F_1: M_1 X 10 Note (N)
F_2 : M2 X 30 Note (N)	F_3: M_3 X 10 Note (N)
F_L : Other resistance (guide resistance etc.) (N) W: Load (N)	

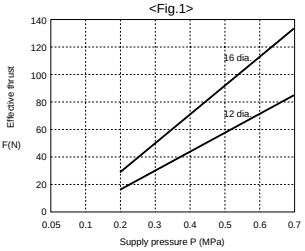
Note: When moment is applied, coefficient compensating increase of generated frictional force

<Table 4> Reference of load factor

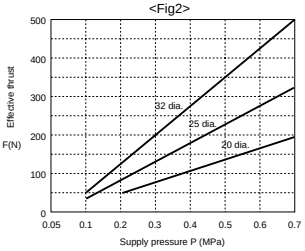
Working pressure (MPa)	Load factor (%)
0.2 to 0.3	$\alpha \leqq 40$
0.3 to 0.6	$\alpha \leqq 50$
0.6 to 0.7	$\alpha \leqq 60$

• Graph of effective thrust

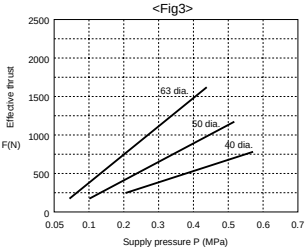
<Fig.1>



<Fig2>



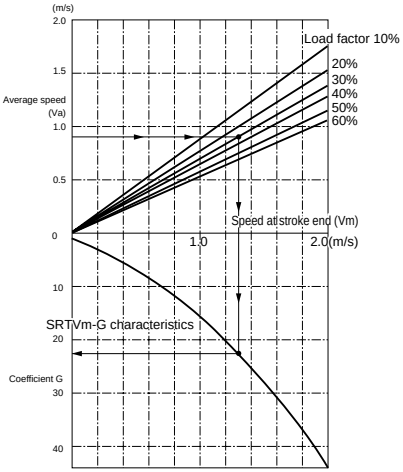
<Fig3>



<STEP3>

Find speed at stroke end (Vm) according to coefficient G, average speed (Va), and load factor found at STEP 2

• Graph of speed - coefficient G <Fig.3>



• Arrow (→) in figure shows
- Average speed [Va]: 0.9m/s
- Load factor: 30%

- Speed at stroke end: 1.3m/s
- Coefficient G: Example finding 22.5

<STEP4>

• Check composite moment (MT) according to coefficient G, and coefficient of speed at stroke end (Vm) found at STEP 3.

M1 X G = F1 X (ℓ 1 + a) X G = ☐ (N·m)

M2 = F2 X (ℓ 2 + a) = ☐ (N·m)

M3 X G = F3 X ℓ 3 X G = ☐ (N·m)

W = ☐ (N)

$$MT = \frac{M1 \times G}{M1max} + \frac{M2}{M2max} + \frac{M3 \times G}{M3max} + \frac{W}{Wmax}$$

MT ≦ 1

↓

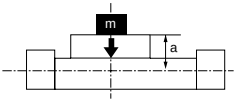
Determining bore size (Refer to <Table 2> at *STEP 1)

↓

Confirming cushion faculty

<Table 5> Value of a

Bore size	a(m)
12 dia.	0.023
16 dia.	0.025
20 dia.	0.028
25 dia.	0.036
32 dia.	0.039
40 dia.	0.045
50 dia.	0.054
63 dia.	0.060



<STEP5>

• Confirming cushion faculty

$$E = \frac{1}{2} \times m \times Vm^2$$

E : Kinetic energy at stroke end (J)
m : Load mass (kg)
Vm : Piston speed rush into cushion (m/s)

<Table 3> allowable energy absorption (E0)

Bore size (mm)	Integrated air cushion (J)	Shock absorber (J)	Shock absorber model No.
12 dia.	0.03	2.4	NCK-0.3-C
16 dia.	0.22	2.4	NCK-0.3-C
20 dia.	0.59	5.7	NCK-0.7-C
25 dia.	1.40	10.0	NCK-1.2
32 dia.	2.57	18.0	NCK-2.6
40 dia.	4.27	50.0	NCK-7
50 dia.	9.13	86.0	NCK-12
63 dia.	17.4	86.0	NCK-12

Note) For SRT, no shock absorber is installed.
As an external damper, please use the shock absorber above.

<STEP6>

• Bore size determined by cushion faculty is assumed as A dia. (Bore size determined at STEP5)

• Bore size determined according to load conditions is assumed as B dia. (bore size determined according to STEP 4)

A dia. ≧ B dia. → Select A dia.

or

→ B dia. using with an external damper together.

(Note) Refer to <Table 3> of <STEP5>.

A dia. < B dia. → Select B dia.