SRT3

Rodless cylinder with brake

ø12/ø16/ø20/ø25
ø32/ø40/ø50/ø63

Overview

A reliable, compact brake unit is integrated into the ø12 to ø63 rodless cylinder (SRL3) series.

Features

Easy brake release
Simply return the brake plate to the original angle with a flathead screwdriver to release the brake.

No more complicated piping
Simply pipe to the end flange to supply pneumatic pressure to the brake. No movable piping (e.g., cableveyor) is necessary.

Simple structure
This simple structure has very few components in the brake section.

Space saving
The brake unit is short, compact and space-saving.

Repeat stopping accuracy
±1.5 mm
(with no load 300 mm/s)
Brake is highly durable and lasts longer.

CONTENTS

The cylinder switches T2YH, T2YV, T3YH, and T3YV are scheduled for end of production at the end of December 2023.

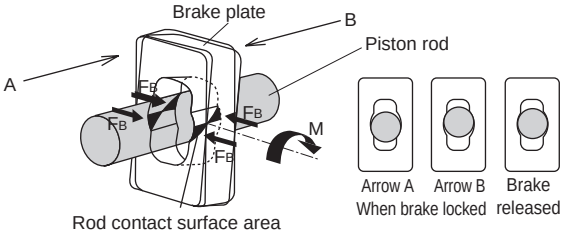
Rodless cylinder with brake
SRT3 Series

Variation	Model No.	Bore size (mm)	Stroke (mm)							
			200	300	400	500	600	700	800	
Double acting	SRT3	ø12 equivalent/ø16 equivalent/ ø20 equivalent	●	●	●	●	●	●	●	
		ø25 equivalent/ø32 equivalent/ ø40 equivalent	●	●	●	●	●	●	●	
		ø50 equivalent/ ø63 equivalent	●	●	●	●	●	●	●	

Product introduction

● New brake mechanism equipped

Newly adopted swash-plate brake mechanism provides high durability and powerful holding force (equivalent to cylinder thrust at 0.6 MPa).



Applying torque M to the brake plate generates axial force F_B for rod holding. This mechanism can ensure high durability and powerful holding force.

● Easy brake release

Simply return the brake plate to the original angle with a flathead screwdriver to release the brake.

● No more complicated piping work

Simply pipe to the end flange to supply pneumatic pressure to the brake. No movable piping (e.g., cableveyor) is necessary.

● Simple structure

This simple structure has very few components in the brake section.

● Space saving

The brake unit is short, compact and space-saving.

●: Standard, ◎: Option, : Not available

	900	1000	Min. stroke (mm)	Max. stroke (mm)	Custom stroke (per mm)	Mounting: Basic 00	Mounting: Axial foot LB	Cushion: Both sides cushioned B	Cushion: R side cushioned R	Cushion: L side cushioned L	Cushion: Without cushion N	Option: Floating fitting Y	Switch	Page
	●	●	1	1000	1	●	●	●	●	●	●	◎	◎	1706
	●	●		1500		●	●	●	●	●	●	◎	◎	
	●	●		2000		●	●	●	●	●	●	◎	◎	

*1: ◎ in the type without switch. Not available for the type with switch.

● Switches mountable

Various cylinder switches including proximity and reed switches can be mounted.

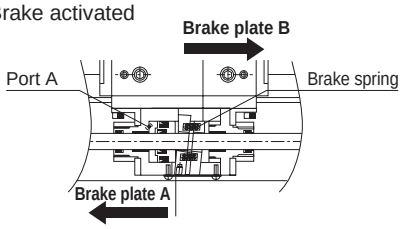
M*V

M*H

- ● Proximity - 2-wire
  M2V/H
- ● Proximity - 3-wire
  M3V/H
- ● Reed - 2-wire
  M0V/H, M5V/H
- ● 2-color LED proximity - 2-wire
  M2WV, T2WV/H, T2YV/H
- ● 2-color LED proximity - 3-wire
  M3WV, T3WV/H, T3YV/H
- ● Strong magnetic field
  T2YD, T2YDT

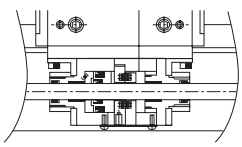
Operational principle

Brake activated



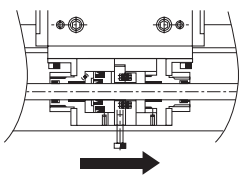
When air is exhausted from port Ⓐ, the brake plates Ⓐ and Ⓑ are pushed and tilted in the direction of the arrow, with Ⓐ and Ⓑ serves as a fulcrum of each other. This mechanism and the cylinder thrust amplify the brake force to securely hold the piston rod.

Brake released

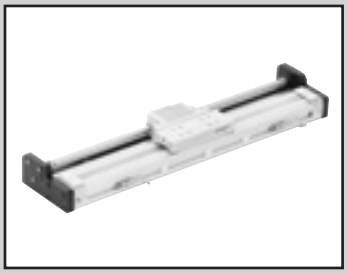


When air is supplied from port Ⓐ, the brake plates Ⓐ and Ⓑ are pushed by the release piston. The brake plates Ⓐ and Ⓑ become perpendicular to the piston rod, causing a clearance between each other, and the piston rod is released.

Brake released manually



Remove the cover, screw the hexagon socket head cap screw into the brake plate Ⓐ and turn it in the direction of the arrow. The brake plates Ⓐ and Ⓑ become horizontal and the piston rod is released. (Alternatively, return the brake plate to the original angle with a flathead screwdriver to release the brake.)



Rodless cylinder with brake

SRT3 Series

● Bore size: ø12, ø16, ø20, ø25, ø32
ø40, ø50, ø63 or equiv.

RoHS CAD

Specifications

Item			SRT3							
Bore size		mm	ø12	ø16	ø20	ø25	ø32	ø40	ø50	ø63
Actuation			Double acting							
Working fluid			Compressed air							
Max. working pressure		MPa	0.7 (≈100 psi, 7 bar)							
Min. working pressure	Cylinder	MPa	0.2 (≈29 psi, 2 bar)			0.15 (≈22 psi, 1.5 bar)			0.1 (≈15 psi, 1 bar)	
	Brake section	MPa	0.3 (≈44 psi, 3 bar) (Note)							
Proof pressure		MPa	1.05 (≈150 psi, 10.5 bar)							
Ambient temperature		°C	5 (41°F) to 60 (140°F)							
Port size	Cylinder		M5		Rc1/8		Rc1/4		Rc3/8	
	Brake section		M5		Rc1/8					
Stroke tolerance		mm	$^{+2.0}_{0}$(up to 1000), $^{+2.5}_{0}$(up to 2000)							
Working piston speed		mm/s	50 to 1000							
Cushion			Air cushion							
Lubrication			Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)							
Holding force		N	66	118	184	288	483	754	1178	1870

Note: The min. working pressure of the brake is a value when a good load balance is achieved.

Allowable absorbed energy

Bore size (mm)	Cushioned		Without cushion
	Max absorbed energy (J)	Cushion stroke (mm)	Max absorbed energy (J)
ø12 or equiv.	0.03	14.5	0.003
ø16 or equiv.	0.22	19.2	0.007
ø20 or equiv.	0.59	22.2	0.010
ø25 or equiv.	1.40	20.9	0.015
ø32 or equiv.	2.57	23.5	0.030
ø40 or equiv.	4.27	23.9	0.050
ø50 or equiv.	9.13	24.9	0.072
ø63 or equiv.	17.4	29.6	0.138

Stroke

Bore size (mm)	Standard stroke (mm)	Max. stroke (mm)	Min. stroke (mm)
ø12 or equiv.	200/300 400/500 600/700 800/900 1000	1000	1
ø16 or equiv.			
ø20 or equiv.			
ø25 or equiv.		1500	
ø32 or equiv.			
ø40 or equiv.			
ø50 or equiv.		2000	
ø63 or equiv.			

* The custom stroke is available in 1 mm increments.

Number of installed M-switches and min. stroke (mm)

Switch quantity	1		2		3		4		5		6		7		8		9	
Switch model No. / Bore size (mm)	M*V	M*H	M*V	M*H	M*V	M*H	M*V	M*H	M*V	M*H	M*V	M*H	M*V	M*H	M*V	M*H	M*V	M*H
ø12 or equiv.	10	10	30	45	60	90	90	135	120	180	150	225	180	270	210	315	240	360
ø16 or equiv.	10	10	30	45	60	90	90	135	120	180	150	225	180	270	210	315	240	360
ø20 or equiv.	10	10	30	45	60	90	90	135	120	180	150	225	180	270	210	315	240	360
ø25 or equiv.	10	10	30	45	60	90	90	135	120	180	150	225	180	270	210	315	240	360
ø32 or equiv.	10	10	30	45	60	90	90	135	120	180	150	225	180	270	210	315	240	360
ø40 or equiv.	10	10	30	45	60	90	90	135	120	180	150	225	180	270	210	315	240	360
ø50 or equiv.	15	15	30	45	60	90	90	135	120	180	150	225	180	270	210	315	240	360
ø63 or equiv.	15	15	30	45	60	90	90	135	120	180	150	225	180	270	210	315	240	360

Number of installed T-switches and min. stroke (mm)

Switch quantity	1		2		3		4		5		6		7		8		9	
Switch model No. / Bore size (mm)	T*V	T*H	T*V	T*H	T*V	T*H	T*V	T*H	T*V	T*H	T*V	T*H	T*V	T*H	T*V	T*H	T*V	T*H
ø12 or equiv.	5	5	45	50	90	100	135	150	180	200	225	250	270	300	315	350	360	400
ø16 or equiv.	5	5	45	50	90	100	135	150	180	200	225	250	270	300	315	350	360	400
ø20 or equiv.	5	5	45	50	90	100	135	150	180	200	225	250	270	300	315	350	360	400
ø25 or equiv.	10	10	45	50	90	100	135	150	180	200	225	250	270	300	315	350	360	400
ø32 or equiv.	10	10	45	50	90	100	135	150	180	200	225	250	270	300	315	350	360	400
ø40 or equiv.	10	10	45	50	90	100	135	150	180	200	225	250	270	300	315	350	360	400
ø50 or equiv.	10	10	45	50	90	100	135	150	180	200	225	250	270	300	315	350	360	400
ø63 or equiv.	10	10	45	50	90	100	135	150	180	200	225	250	270	300	315	350	360	400

Switch specifications (M-switch)

● 1-color/2-color LED

Item	2-wire proximity		3-wire proximity		
	M2V,M2H	M2WV (2-color LED)	M3H/M3V	M3PH/M3PV (made to order)	M3WV
Applications	Dedicated for programmable controller		For programmable controller, relay, IC circuit, compact solenoid valve		
Output method	-		NPN output	PNP output	NPN output
Power supply voltage	-		4.5 to 28 VDC		10 to 28 VDC
Load voltage	10 to 30 VDC		30 VDC or less		
Load current	5 to 30 mA		100 mA or less	100 mA or less	100 mA or less
Indicator	LED (Lit when ON)	Red/green LED (Lit when ON)	LED (Lit when ON)	Yellow LED (Lit when ON)	Red/green LED (Lit when ON)
Leakage current	1 mA or less		10 μA or less	0.05 mA or less	10 μA or less
Weight g	1 m:22 3 m:57 5 m:93				

Item	2-wire reed			
	M0V, M0H		M5V, M5H	
Applications	Programmable controller, relay		For programmable controller, relay, IC circuit (without indicator lamp), serial connection	
Power supply voltage	-		-	
Load voltage	12/24 VDC	110 VAC	5/12/24 VDC	110 VAC or less
Load current	5 to 50 mA	7 to 20 mA	50 mA or less	20 mA or less
Indicator	LED (Lit when ON)		No indicator lamp	
Leakage current	0 mA			
Weight g	1 m:22 3 m:57 5 m:93			

*1: Refer to Ending Page 1 for detailed switch specifications and dimensions.

Switch specifications (T-switch)

● 2-color LED

Item	2-wire proximity		3-wire proximity	
	T2YH/T2YV	T2WH/T2WV	T3YH/T3YV	T3WH/T3WV
Applications	Dedicated for programmable controller		For programmable controller, relay	
Output method	-		NPN output	NPN output
Power supply voltage	-		10 to 28 VDC	
Load voltage	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 20 mA (*3)		50 mA or less	
Indicator	Red/green LED (Lit when ON)	Red/green LED (Lit when ON)	Red/green LED (Lit when ON)	Red/green LED (Lit when ON)
Leakage current	1 mA or less		10 μA or less	
Weight g	1 m:33 3 m:87 5 m:142	1 m:18 3 m:49 5 m:80	1 m:33 3 m:87 5 m:142	1 m:18 3 m:49 5 m:80

● For AC magnetic field

Item	Proximity switch
	T2YD,T2YDT (*4)
Applications	Dedicated for programmable controller
Indicator	Red/green LED (Lit when ON)
Load voltage	24 VDC ±10%
Load current	5 to 20 mA
Internal voltage drop	6V or less
Leakage current	1.0 mA or less
Weight g	1 m:61 3 m:166 5 m:272

*1: Refer to Ending Page 1 for detailed switch specifications and dimensions.
*2: Switches other than the above models, such as switches with connectors, are also available. Refer to Ending Page 1.
*3: The max. load current is 20 mA at 25°C. The current is lower than 20 mA if the operating ambient temperature around the switch is higher than 25°C.
(5 to 10 mA at 60°C)
*4: AC magnetic field proof switch (T2YD/T2YDT) cannot be used in DC magnetic field.

Cylinder weight

Unit: kg

Bore size (mm)	Weight for 0 mm stroke			Mounting bracket weight		Additional weight per St = 100 mm
	Basic (00)	Foot (LB)	Switch weight	T type	M type	
ø12 or equiv.	0.83	0.84	Refer to the weight in the switch specifications.	0.005	0.001	0.18
ø16 or equiv.	0.95	0.96				0.21
ø20 or equiv.	1.17	1.19				0.26
ø25 or equiv.	2.24	2.34				0.43
ø32 or equiv.	3.8	3.9				0.54
ø40 or equiv.	5.0	5.1				0.71
ø50 or equiv.	7.4	7.5				0.96
ø63 or equiv.	12.4	12.7				1.46

How to order

No switch (built-in magnet for switch)

SRT3 - 00 - 32 B - 200 ——— Y

With switch (built-in magnet for switch)

SRT3 - 00 - 32 B - 200 - M0H - R - Y

Ⓐ Mounting *1

Ⓑ Bore size

Ⓒ Cushion

Ⓓ Stroke

Ⓔ Switch model No. *3, *4

Ⓕ Switch quantity

Ⓖ Option

Code	Description
Ⓐ Mounting	
00	Basic
LB	Axial foot
Ⓑ Bore size (mm)	
12	ø12 or equiv.
16	ø16 or equiv.
20	ø20 or equiv.
25	ø25 or equiv.
32	ø32 or equiv.
40	ø40 or equiv.
50	ø50 or equiv.
63	ø63 or equiv.
Ⓒ Cushion	
B	Both sides cushioned
R	R side cushioned
L	L side cushioned
N	Without cushion

Ⓓ Stroke (mm)

Bore size	Stroke (*2)	Custom stroke
ø12 to ø20	**1 to 1000**	**In 1 mm increments**
ø25 to ø40	**1 to 1500**	
ø50, ø63	**1 to 2000**	

Ⓔ Switch model No.

Axial lead wire	Radial lead wire	Contact	Voltage AC	Voltage DC	Indicator	Lead wire
M0H*	**M0V***	Reed	●	●	1-color LED	2-wire
M5H*	**M5V***	Reed	●	●	No indicator lamp	2-wire
M2H*	**M2V***	Proximity		●	1-color LED	
-	**M2WV***	Proximity		●	2-color LED	2-wire
M3H*	**M3V***	Proximity		●	1-color LED	
-	**M3WV***	Proximity		●	2-color LED	3-wire
M3PH*	**M3PV***	Proximity		●	1-color LED (custom)	3-wire
T2WH*	**T2WV***	Proximity		●	2-color LED	2-wire
T2YH*	**T2YV***	Proximity		●		
T3WH*	**T3WV***	Proximity		●		3-wire
T3YH*	**T3YV***	Proximity		●		
T2YD*	**-**	Proximity		●	2-color LED AC magnetic field	2-wire
T2YDT*	**-**	Proximity		●		

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

Ⓕ Switch quantity	
R	1 on R side
L	1 on L side
D	2
T	3
4	4 (when there are more than 4 switches, indicate switch quantity.)

Ⓖ Option	
Y	Floating fitting

⚠ Precautions for model No. selection

*1 : Mounting bracket will be shipped assembled with the product.
*2 : Refer to page 1706 for the min. stroke with switch.
*3 : Switches other than Ⓔ Switch model No. are also available. (Made to order) Refer to Ending Page 1 for details.
*4 : Avoid environments where the cylinder is exposed to welding spatters. Be careful with T2YD and T2YDT in use.

[Example of model No.]

SRT3-00-32B-200-M0H-R-Y

Model: Rodless cylinder with brake

Ⓐ Mounting : Basic
Ⓑ Bore size : ø32 mm
Ⓒ Cushion : Both sides cushioned
Ⓓ Stroke : 200 mm
Ⓔ Switch model No. : Reed M0H switch
Ⓕ Switch quantity : 1 on R side
Ⓖ Option : Floating fitting

How to order switch

○ Switch body + mounting bracket set (*1)

SRL3 - M0H

Switch model No.
(Item Ⓔ on page 1708)

○ Switch body only

SW - M0H

Switch model No.
(Item Ⓔ on page 1708)

○ Mounting bracket set (*2)

· M-switch

SRL3 - M

· T-switch

SRL3 - T

○ Lead wire holder (*3)

SRL3 - MH

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

(*1) "Switch body + mounting bracket set" does not include lead wire holders. Order lead wire holders separately if necessary.
(*2) The mounting bracket is different between the M-switch and T-switch.
(*3) The quantity of lead wire holders per set is 10.

How to order repair parts

SRL3 - 40 K - 200

Bore size
(Item Ⓑ on page 1708)

Stroke
(Item Ⓓ on page 1708)

Note: The switch mounting bracket, floating fitting and repair parts are common with those of SRL3.

How to order floating fitting set

SRL3 - 40 - Y

Bore size
(Item Ⓑ on page 1708)

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

How to order mounting bracket

SRT3 - LB - 40

(Bracket x2, mounting bolt x4)

Bore size
(Item Ⓑ on page 1708)

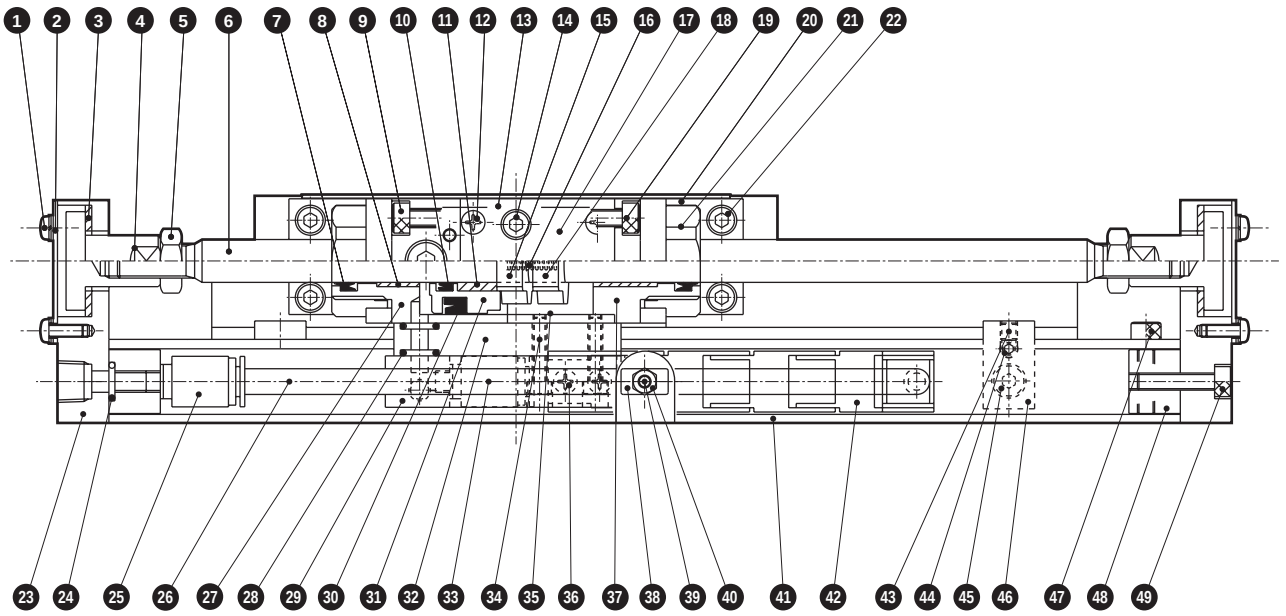
Theoretical thrust table

(Unit: N)

Bore size (mm)	Operating direction	Working pressure MPa							
		0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7
ø12	Push/Pull	-	-	27.7	41.5	55.3	69.1	83.0	96.8
ø16	Push/Pull	-	-	43.2	64.8	86.4	$1.08x10^2$	$1.30x10^2$	$1.51x10^2$
ø20	Push/Pull	-	-	62.9	94.4	$1.26x10^2$	$1.57x10^2$	$1.89x10^2$	$2.20x10^2$
ø25	Push/Pull	-	81.4	$1.08x10^2$	$1.63x10^2$	$2.17x10^2$	$2.71x10^2$	$3.25x10^2$	$3.80x10^2$
ø32	Push/Pull	-	$1.22x10^2$	$1.63x10^2$	$2.44x10^2$	$3.26x10^2$	$4.07x10^2$	$4.88x10^2$	$5.70x10^2$
ø40	Push/Pull	-	$1.90x10^2$	$2.53x10^2$	$3.80x10^2$	$5.06x10^2$	$6.33x10^2$	$7.60x10^2$	$8.86x10^2$
ø50	Push/Pull	$1.99x10^2$	$2.98x10^2$	$3.98x10^2$	$5.96x10^2$	$7.95x10^2$	$9.94x10^2$	$1.19x10^3$	$1.39x10^3$
ø63	Push/Pull	$3.14x10^2$	$4.70x10^2$	$6.27x10^2$	$9.41x10^2$	$1.25x10^3$	$1.57x10^3$	$1.88x10^3$	$2.20x10^3$

Internal structure and parts list (ø12 to ø63)

The internal structure of cylinder is SRL3. Refer to pages 1579 and 1580.



Brake section cannot be disassembled

Parts list

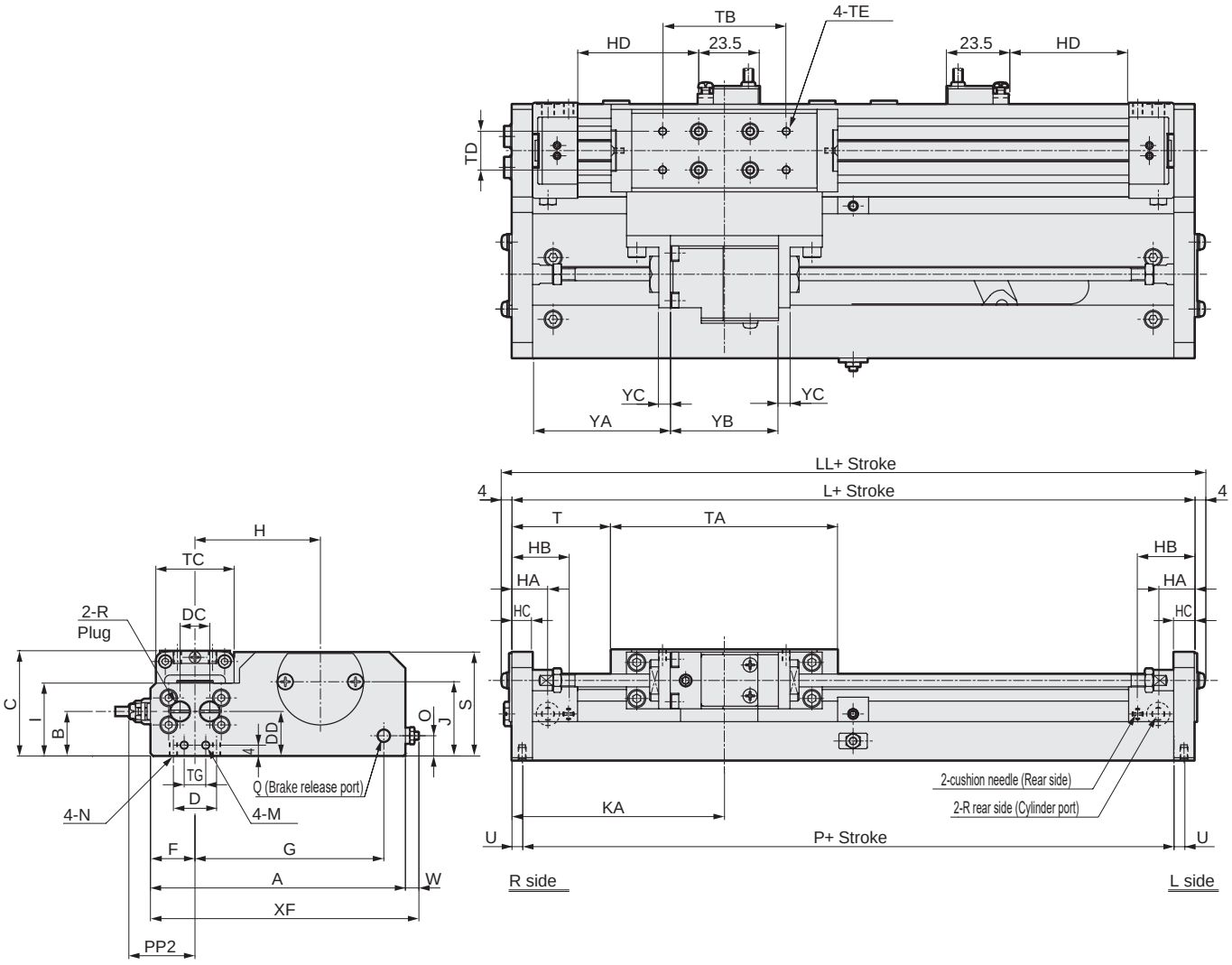
No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	Pan head machine screw	Steel	Zinc chromate	27	Body A	Aluminum alloy	Alumite
2	Fitting cover	Aluminum alloy	Alumite	28	Gasket	Nitrile rubber	
3	Slide plate	Dry bearing		29	Adaptor	Aluminum alloy	Alumite
4	Floating fitting	Steel	Manganese phosphate treatment	30	Piston packing	Nitrile rubber	
5	Hexagon nut, three types	Steel	Zinc chromate	31	Release piston	Aluminum alloy	Alumite
6	Brake shaft	Steel	Industrial chrome plating	32	Spacer	Aluminum alloy	Alumite
7	Rod packing	Nitrile rubber		33	Push-in fitting		
8	Bearing bush	Dry bearing		34	Hexagon socket head cap screw	Steel	Black finish
9	Hexagon socket head cap screw	Steel	Black finish	35	Body B	Aluminum alloy	Alumite
10	Rod packing	Nitrile rubber		36	Pan head machine screw	Steel	Zinc chromate
11	Bearing bush	Copper-based		37	Brake end cover	Aluminum alloy	Alumite
12	Pan head machine screw	Steel	Zinc chromate	38	Square nut	Steel	Zinc chromate
13	Brake mounting base	Aluminum alloy	Alumite	39	Pan head machine screw	Steel	Zinc chromate
14	Hexagon socket head cap screw	Steel	Black finish	40	Hexagon nut, three types	Steel	Zinc chromate
15	Brake plate A	Special steel	Zinc chromate	41	Cable holder	Aluminum alloy	Alumite
16	Brake spring	Steel	Black finish	42	Cableveyor	Special resin	
17	Cover	Aluminum alloy	Alumite	43	ø12 to ø40: Hexagon socket set screw	Steel	Black finish
18	Brake plate B	Special steel	Zinc chromate		ø50, ø63: -	-	-
19	Hexagon socket head cap screw	Steel	Black finish	44	ø12 to ø40: Hexagon socket set screw ø50, ø63: Hexagon socket button head bolt	Steel	Black finish
20	Brake mounting foot	Steel	Zinc chromate				
21	Fixing nut	Steel	Zinc chromate	45	Hexagon socket button head bolt	Steel	Black finish
22	Hexagon socket head cap screw	Steel	Black finish	46	Rail stop plate	Steel	Zinc chromate
23	End flange	Aluminum alloy	Alumite	47	Hexagon socket head cap screw	Steel	Black finish
24	Gasket	Nitrile rubber		48	Cable holder stopper	Aluminum alloy	Alumite
25	Push-in fitting			49	Hexagon socket head cap screw	Steel	Black finish
26	Tube	Polyamide					

MEMO

Dimensions (bore size: ø12, ø16, mounting: 00)

CAD

● With cylinder switch SRT3-00-**-***-M*V* (L-shaped lead wire)



RD: Max. sensitivity installation position HD: Max. sensitivity installation position

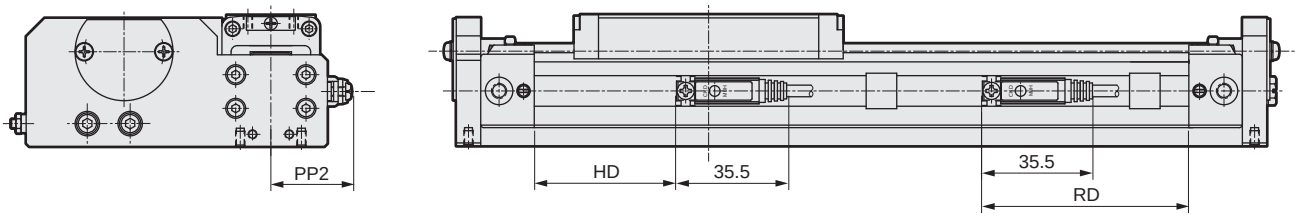
Code / Bore size (mm)	A	B	C	D	DC	DD	F	G	H	HA	HB	HC	I	J	KA	L	LL	M	N	O	P	Q	R	S
ø12 or equiv.	94.5	16.5	39	16	11	16.5	16.5	70	46	14	22	8	27	27.5	76	152	160	M3 depth 5	M3 depth 6	8	144	M5	M5	39
ø16 or equiv.	98.5	18	43	20	12	18	18.5	72	48	14	22	8	30	31	82.5	165	173	M3 depth 5	M3 depth 6	8	157	M5	M5	42

Code / Bore size (mm)	T	TA	TB	TC	TD	TE	TG	U	W	XF	YA	YB	YC
ø12 or equiv.	35.5	81	42	29	13	M3 depth 5	8	4	5	99.5	47	42	8
ø16 or equiv.	38.5	88	48	32	15	M3 depth 5	12	4	5	99.5	53.5	42	8

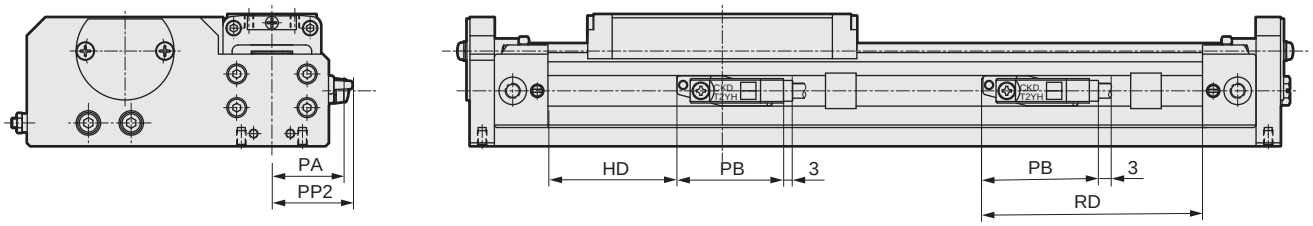
Code	With switch																
Bore size (mm)	HD			RD			PA	PB			PP2						
	M*	T*Y*	T*W	M*	T*Y*	T*W		T*Y*	T2YD	T*W*	M*V	M*H	T*YV	T*YH	T2YD	T*WV	T*WH
ø12 or equiv.	40.5	36	32	60.5	65	69	24.3	35	34	33.5	24.5	23	26	23	28.4	20.7	17.2
ø16 or equiv.	47	42	38	67	72	76	26.3	35	34	33.5	26.5	25	28	25	30.4	22.7	19.2

Dimensions (bore size: ø12, ø16, mounting: 00)

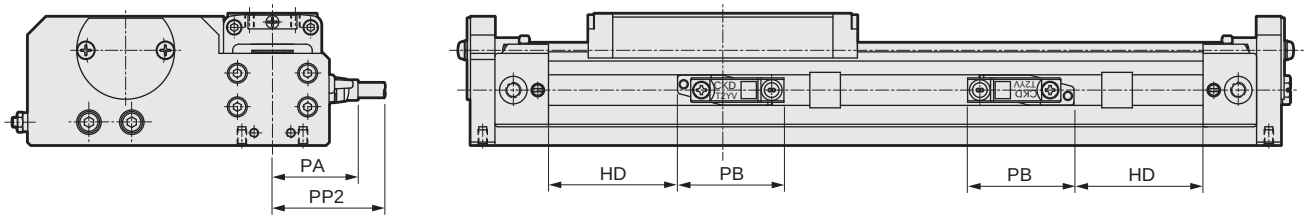
● With cylinder switch SRT3-00-**-***-M*H* (straight lead wire)



● With cylinder switch SRT3-00-**-***-T*H (T*W, T*Y, T2YD)

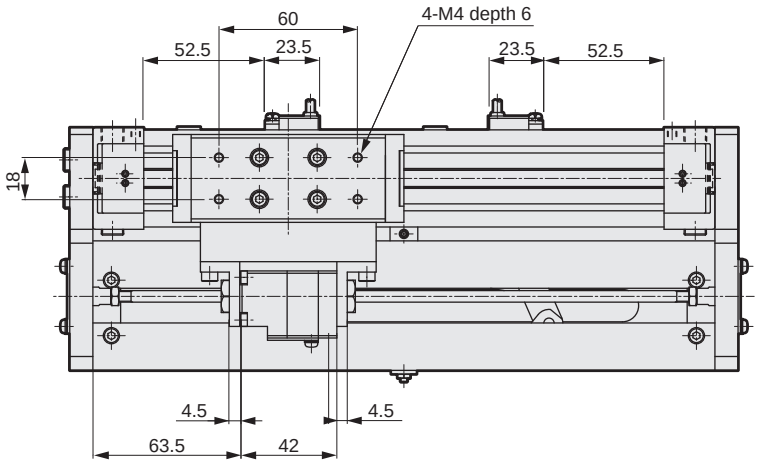


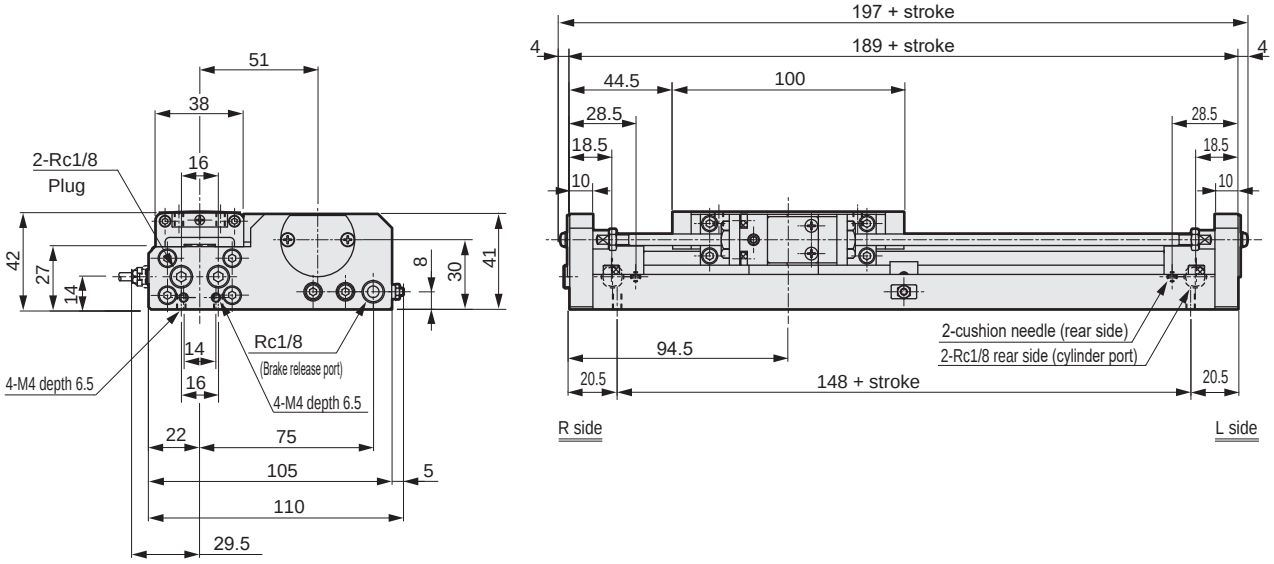
● With cylinder switch SRT3-00-**-***-T*V (T*W, T*Y)



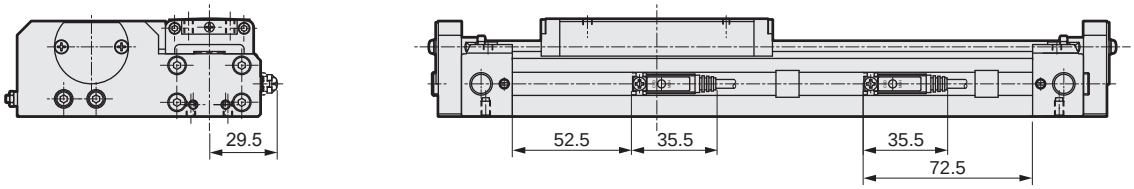
Dimensions (bore size: ø20, mounting: 00)

● With cylinder switch SRT3-00-20-***-M*V* (L-shaped lead wire)

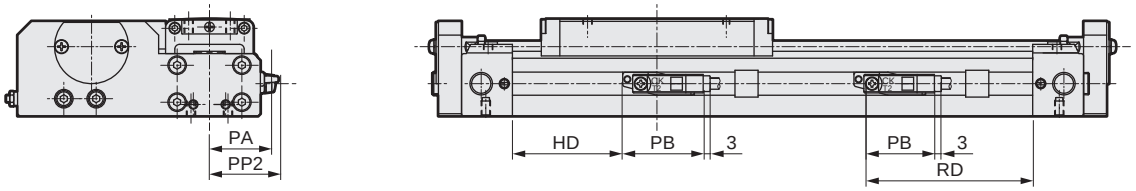




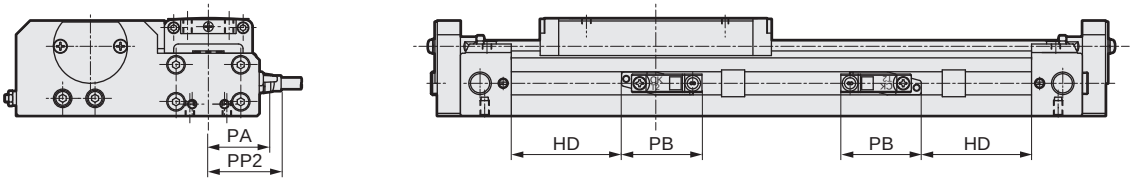
● With cylinder switch SRT3-00-20-***-M*H* (straight lead wire)



● With cylinder switch SRT3-00-20-***-T*H (T*W, T*Y, T2YD)

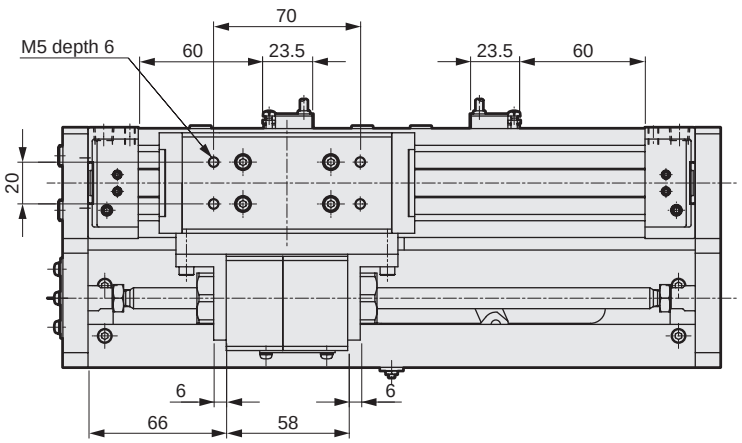


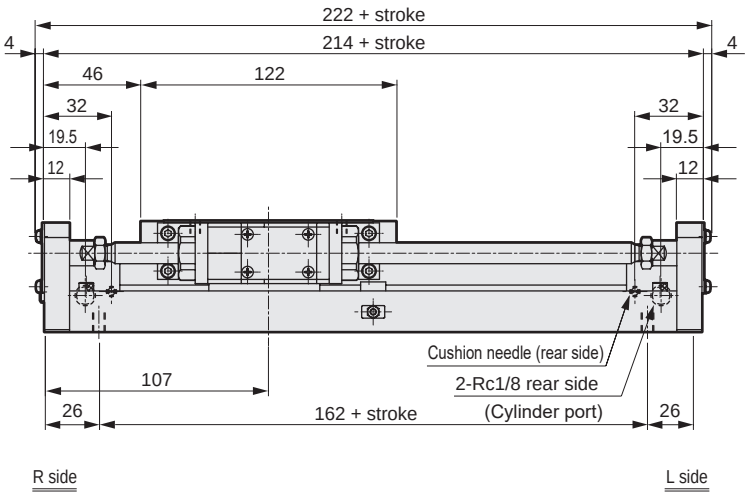
● With cylinder switch SRT3-00-20-***-T*V (T*W, T*Y)

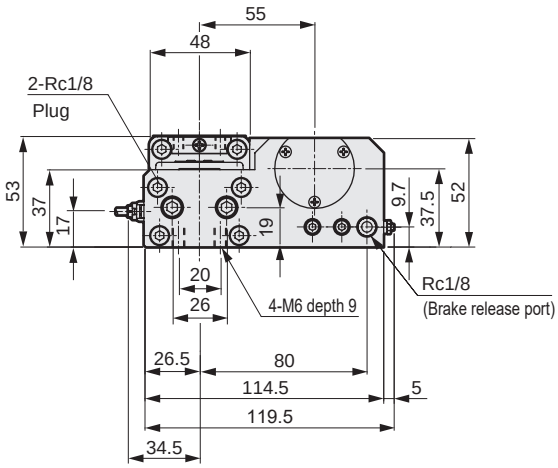


Dimensions (bore size: ø25, mounting: 00)

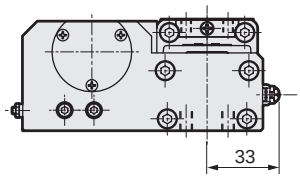
● With cylinder switch SRT3-00-25-***-M*V* (L-shaped lead wire)

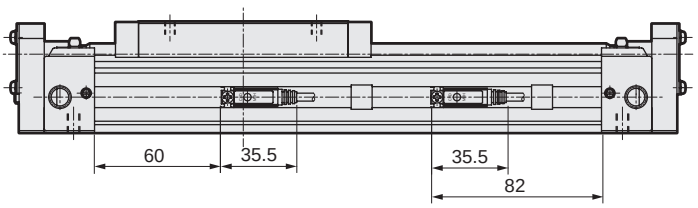




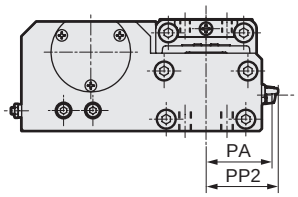


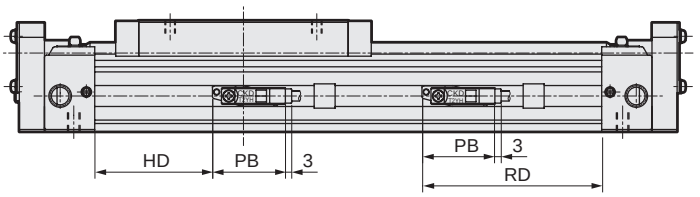
● With cylinder switch SRT3-00-25-***-M*H* (straight lead wire)



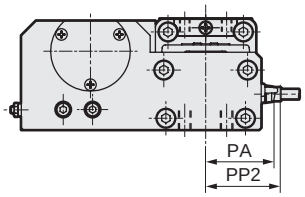


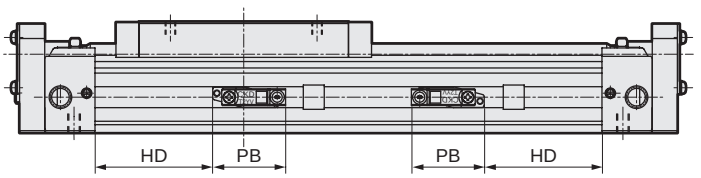
● With cylinder switch SRT3-00-25-***-T*H (T*W, T*Y, T2YD)





● With cylinder switch SRT3-00-25-***-T*V (T*W, T*Y)

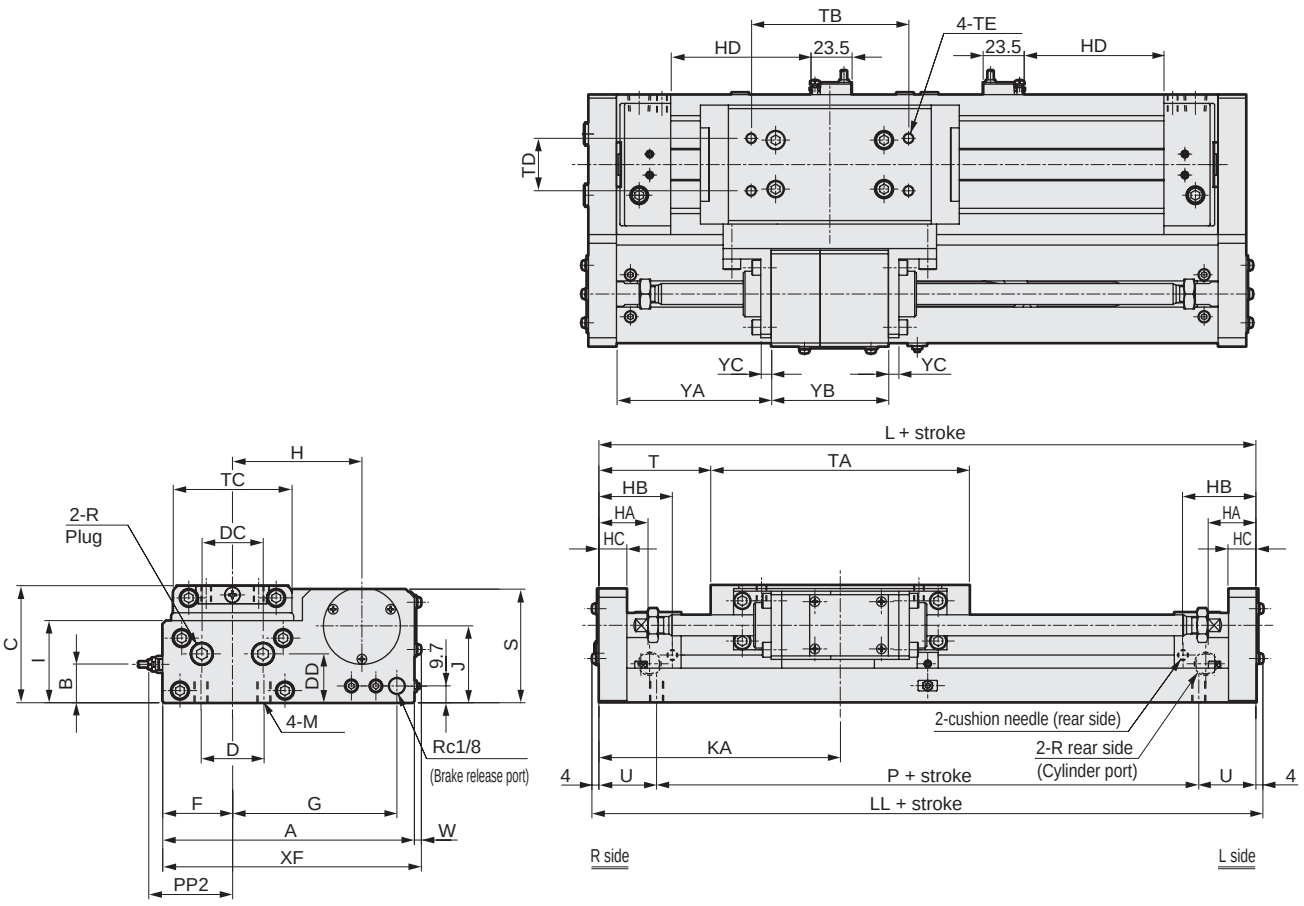




Dimensions (bore size: ø32 to ø63, mounting: 00)

CAD

● With cylinder switch SRT3-00-**-***-M*V* (L-shaped lead wire)



RD: Max. sensitivity installation position HD: Max. sensitivity installation position

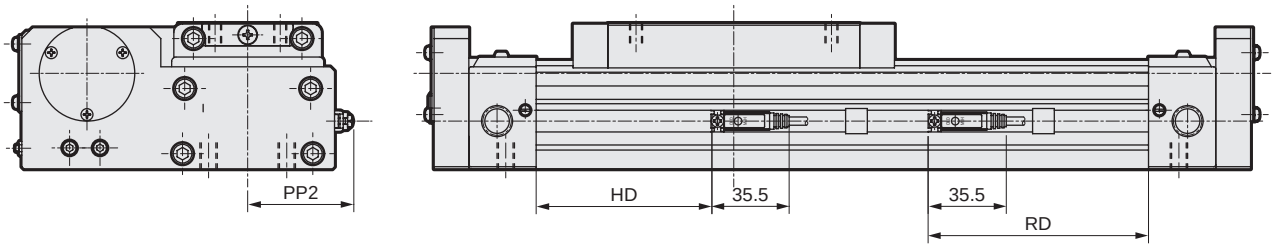
Code / Bore size (mm)	A	B	C	D	DC	DD	F	G	H	HA	HB	HC	I	J	KA	L	LL	M	P	R	S	T
ø32 or equiv.	129	18.5	57	32	27	21	33	87	66	24	37.5	14	39	39	127	254	262	M6 depth 9	196	Rc 1/4	56	60
ø40 or equiv.	144	22	67	36	35	28	40	94	74	29	42	16	47	44	138	276	284	M8 depth 12	210	Rc 1/4	65	64
ø50 or equiv.	177	28	82	45	35	35	48	102	89	33	51	18	57	52	147	294	302	M8 depth 12	212	Rc 3/8	77	71
ø63 or equiv.	209	35	95	50	39	42	59	113	105	35	52	20	68	60	168	336	344	M10 depth 15	258	Rc 3/8	93	84

Code / Bore size (mm)	TA	TB	TC	TD	TE	U	W	XF	YA	YB	YC
ø32 or equiv.	134	80	56	20	M6 depth 7.5	29	4	133	78.5	69	6
ø40 or equiv.	148	90	68	30	M6 depth 9	33	4	148	88.5	67	6
ø50 or equiv.	152	100	80	30	M8 depth 10.5	41	4	181	92.5	73	8
ø63 or equiv.	168	110	102	40	M8 depth 11.5	39	1	210	98.5	99	9

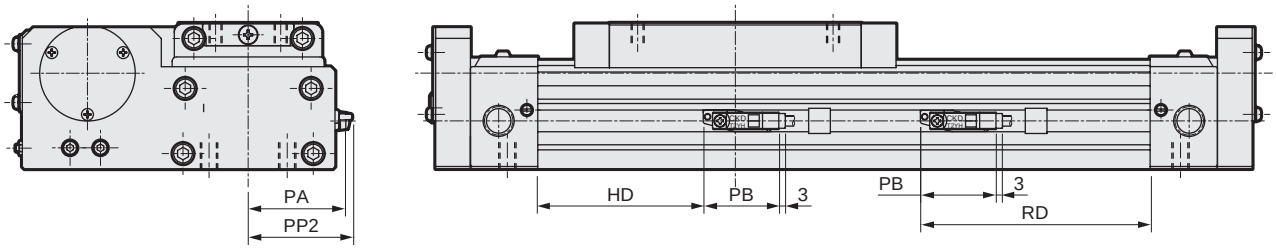
Code	With switch																
Bore size (mm)	HD			RD			PA	PB			PP2						
	M*	T*Y*	T*W	M*	T*Y*	T*W		T*Y*	T2YD	T*W*	M*V	M*H	T*YV	T*YH	T2YD	T*WV	T*WH
ø32 or equiv.	74	70	66	96	100	104	41.3	35	34	33.5	41.5	40	43	40	45.4	37.7	34.2
ø40 or equiv.	80	76	72	102	106	110	48.3	35	34	33.5	48.5	47	50	47	52.4	44.7	41.2
ø50 or equiv.	79	75	71	101	105	109	56.3	35	34	33.5	56.5	55	58	55	60.4	52.7	49.2
ø63 or equiv.	98	94	90	120	124	128	67.3	35	34	33.5	67.5	66	69	66	71.4	63.7	60.2

Dimensions (bore size: ø32 to ø63, mounting: 00)

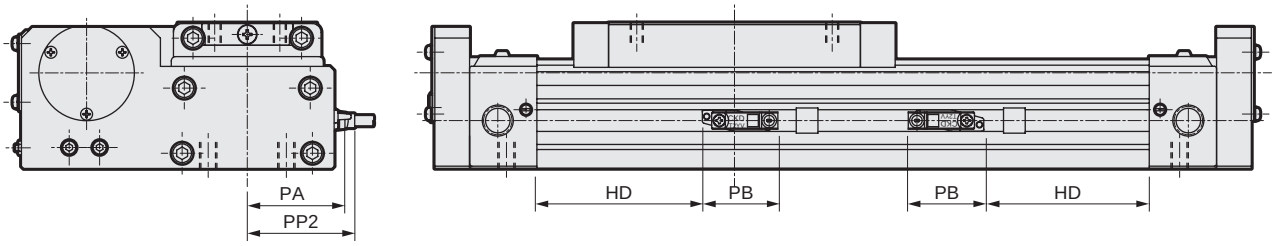
● With cylinder switch SRT3-00-**-***-M*H* (straight lead wire)



● With cylinder switch SRT3-00-**-***-T*H (T*W, T*Y, T2YD)

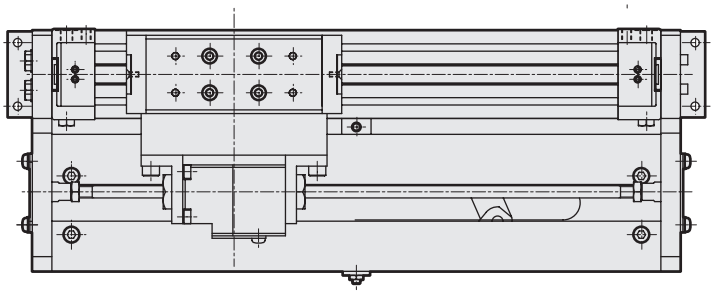


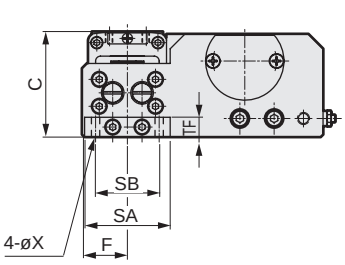
● With cylinder switch SRT3-00-**-***-T*V (T*W, T*Y)

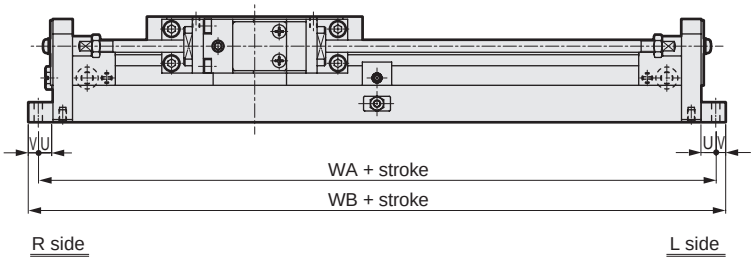


Dimensions (bore size: ø12, ø16, mounting: LB)

● With foot bracket SRT3-LB-**-** *



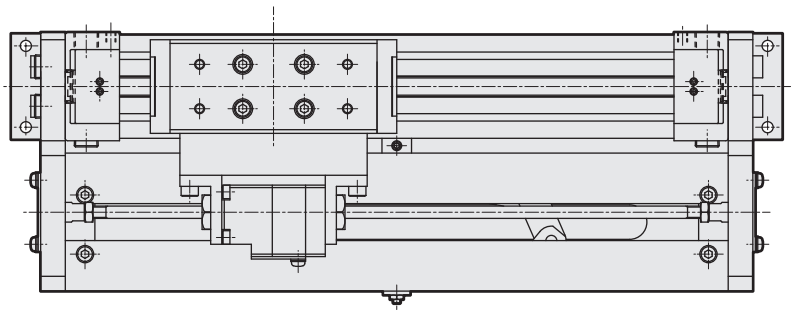


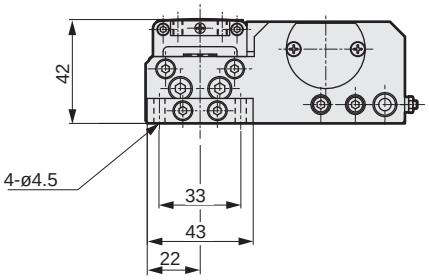


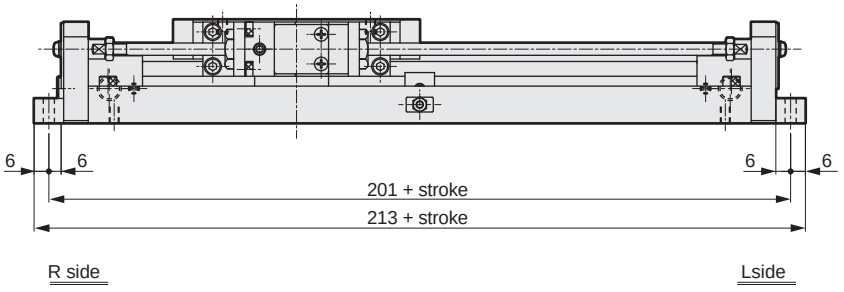
Code / Bore size(mm)	C	F	Mounting method							
			SA	SB	TF	U	V	X	WA	WB
ø12 or equiv.	39	16.5	32	24	8	6	4	3.4	164	172
ø16 or equiv.	43	18.5	35	26	8	6	4	3.4	177	185

Dimensions (bore size: ø20, mounting: LB)

● With foot bracket SRT3-LB-20-** *

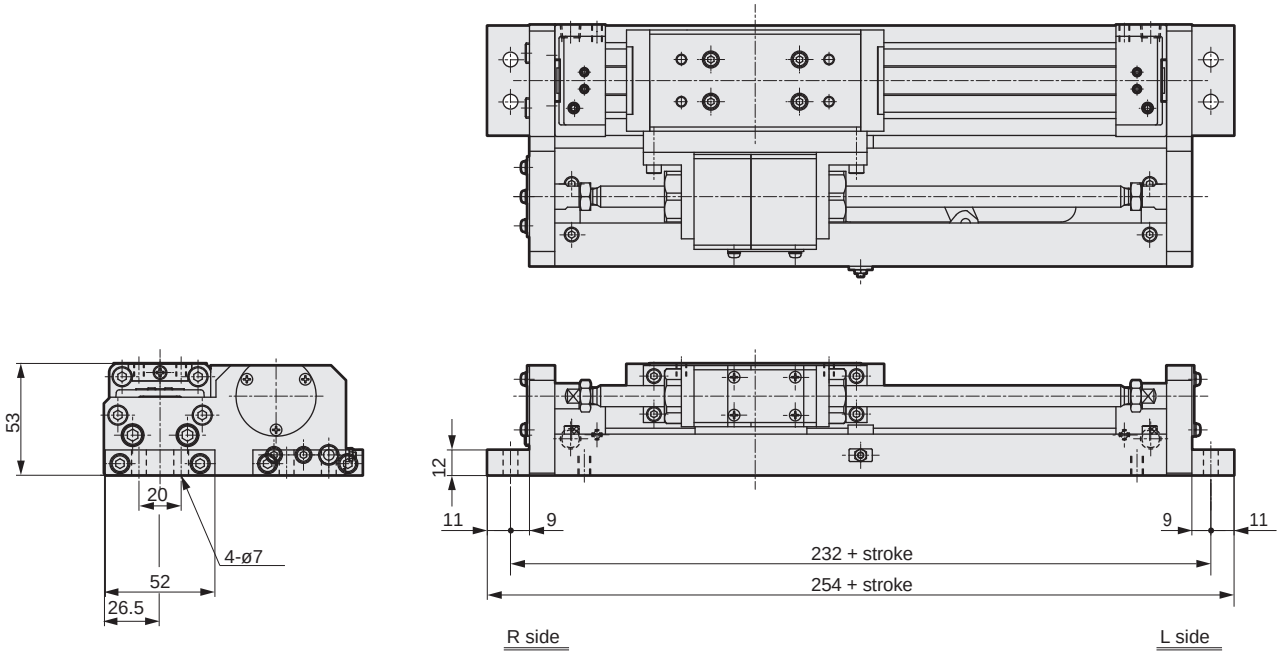






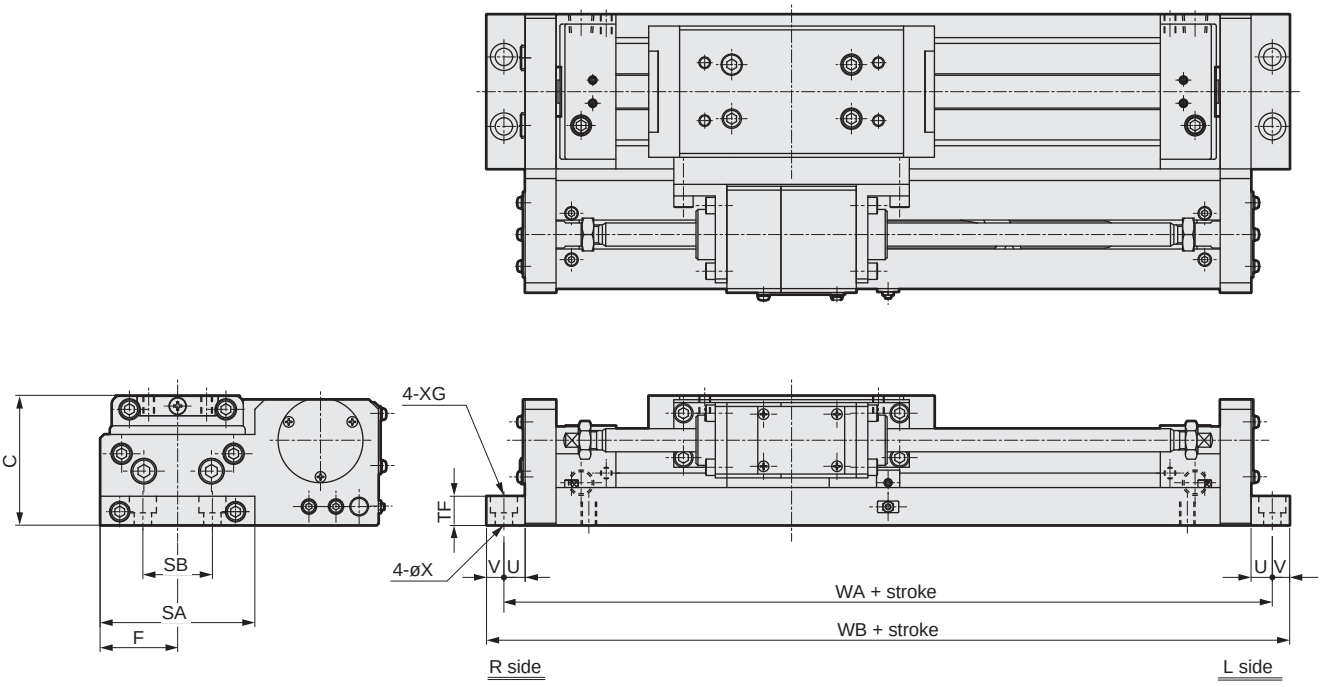
Dimensions (bore size: ø25, mounting: LB)

● With foot bracket SRT3-LB-25-** *



Dimensions (bore size: ø32 to ø63, mounting: LB)

● With foot bracket SRT3-LB-**-** *

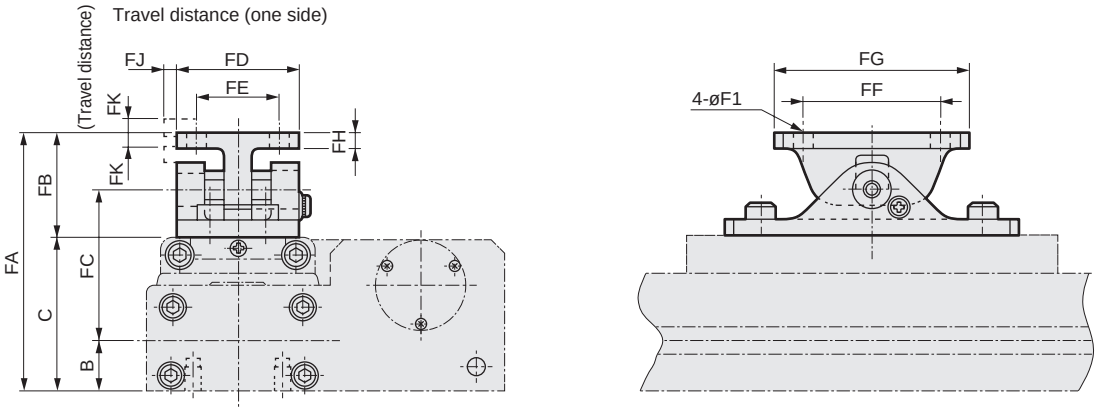


RD: Max. sensitivity installation position HD: Max. sensitivity installation position

Code / Bore size(mm)	C	F	Mounting method								
			SA	SB	TF	U	V	WA	WB	X	XG
ø32 or equiv.	57	33	64	32	12	9	11	272	294	7	-
ø40 or equiv.	67	40	80	36	15	11	9	298	316	9	14 spot face depth 8.6
ø50 or equiv.	82	48	94	45	20	11	9	316	334	9	14 spot face depth 8.6
ø63 or equiv.	95	59	116	50	25	13	12	362	386	11	17.5 spot face depth 10.8

Dimensions: Option CAD

● Floating fitting



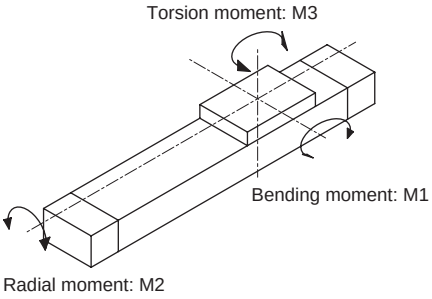
Code / Bore size (mm)	FA	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	B	C
ø12 or equiv.	54	21	31.5	24	16	30	40	3	3.4	3	3	10.5	33
ø16 or equiv.	58	21	34	24	16	30	40	3	3.4	3	3	12	37
ø20 or equiv.	67	25	39	30	20	40	56	4	4.5	3	3	14	42
ø25 or equiv.	78	25	47	30	20	40	56	4	6	3	3	17	53
ø32 or equiv.	95	38	55.5	45	30	50	70	6	7	5	5	18.5	57
ø40 or equiv.	105	38	62	45	30	50	70	6	7	5	5	22	67
ø50 or equiv.	126	44	73	60	40	70	90	8	9	5	5	28	82
ø63 or equiv.	139	44	79	60	40	70	90	8	9	5	5	35	95

Rodless cylinder with brake (SRT3) selection guide

[STEP1]

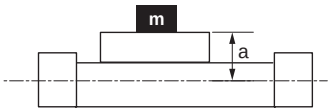
Moment actuates according to the cylinder mounting direction and the position of center of gravity of load.

● Types of moment caused by load



[Table 1] Value of a

Bore size	a(m)
ø12	0.023
ø16	0.025
ø20	0.028
ø25	0.036
ø32	0.039
ø40	0.045
ø50	0.054
ø63	0.060



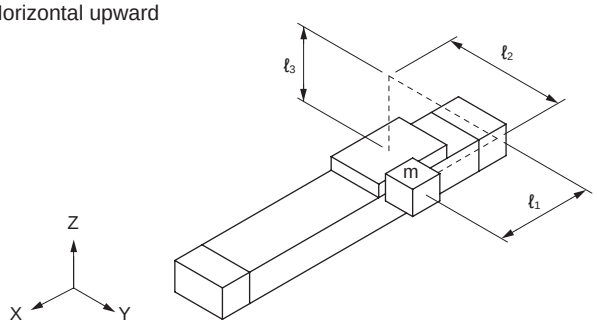
1 Obtain the static moment.

Unit: N·m

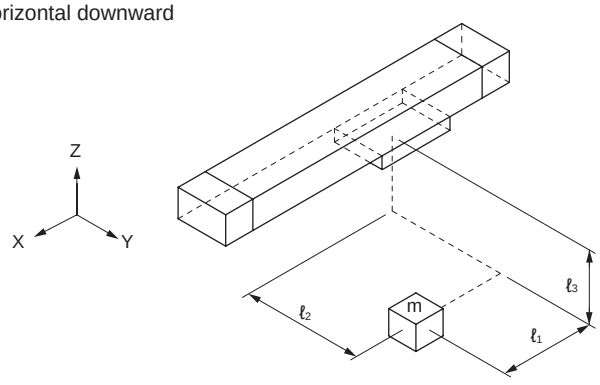
Mounting orientation		Horizontal upward	Horizontal downward	Horizontal lateral	Vertical
Vertical load W		mx9.8			-
Static moment	M1	W×ℓ_1	W×ℓ_1	-	W×(ℓ_3+a)
	M2	W×ℓ_2	W×ℓ_2	W×(ℓ_3+a)	-
	M3	-	-	W×ℓ_1	W×ℓ_2

m : Load weight [kg]
ℓ_1 : Length along the stroke direction from the center of table to the center of gravity of load [m]
ℓ_2 : Length in the width direction from the center of table to the center of gravity of load [m]
ℓ_3 : Length in the vertical direction from the center of table to the center of gravity of load [m]

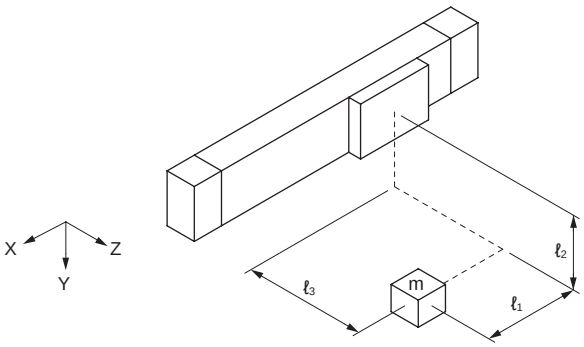
Horizontal upward



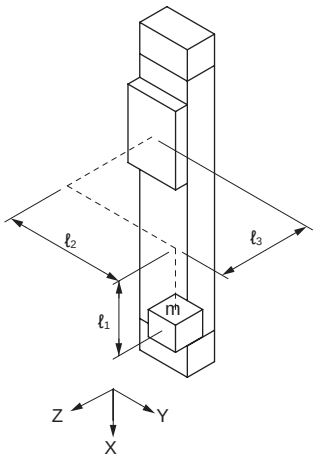
Horizontal downward



Horizontal lateral



Vertical



2 Obtain the dynamic moment caused by the load inertia at the stroke end.

Unit: N·m

Mounting orientation		Horizontal upward	Horizontal downward	Vertical	Horizontal lateral
Dynamic moment	M1i	Wx(ℓ_3 + a)xG			
	M2i	M2i dynamic moment is not generated.			
	M3i	Wxℓ_2xG			

Dynamic moment can be calculated with the formulas above regardless of the mounting direction.

Obtain an approximate G coefficient from Table 2.

[Table 2] Va (Average speed) = $\frac{\text{Moving distance}}{\text{Movement time}}$ (m/s)

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

G Coefficient = [ ]

3 Select an approximate bore size.

Select an approximate bore size.

M1 + M1$_i$ = [ ] (N·m)→(ø)
M2 = [ ] (N·m)→(ø)
M3 + M3$_i$ = [ ] (N·m)→(ø)
W = [ ] (N) →(ø)
E' = $\frac{1}{2}$ xmxVm^2 = [ ] (J) →(ø)

Select a temporary max. bore size.

ø [ ]

[Table 3] Allowable value

Item / Bore size (mm)	Wmax (N)	M1max (N·m)	M2max (N·m)	M3max (N·m)
ø12	30	1.5	0.6	0.6
ø16	140	5	1	1
ø20	200	10	1.5	3
ø25	360	17	5	10
ø32	620	36	10	21
ø40	970	77	23	26
ø50	1470	154	32	42
ø63	2320	275	52	76

[Table 4] Allowable absorbed energy value (E_0)

Bore size (mm)	Integrated air cushion (J)
ø12	0.03
ø16	0.22
ø20	0.59
ø25	1.40
ø32	2.57
ø40	4.27
ø50	9.13
ø63	17.4

Note) SRT3 with shock absorber attached is not available.
Install an external shock absorber if the kinetic energy of load: E' is larger than the allowable absorbed energy: E_0.

4 Obtain the resultant moment at the stroke end (M_T).
(Confirm that the bore size selected in **3** satisfies the formula below.)

$$M_T = \frac{M1+M1_i}{M1max} + \frac{M2}{M2max} + \frac{M3+M3i}{M3max} + \frac{W}{Wmax} < 1$$

M : Resultant moment (must be smaller than 1)
Wmax : Max. allowable value of W (from Table 3)
M1max : Max. allowable value of M1 (from Table 3)
M2max : Max. allowable value of M2 (from Table 3)
M3max : Max. allowable value of M3 (from Table 3)

· If M_T is much more than 1, change the selection condition.
· If M_T is slightly more than 1, improving the accuracy in STEP 2 may make the value 1 or less. Perform STEP 2 to see the result.

[STEP2]

Next, obtain a more accurate load factor, effective thrust, stroke end speed and resultant moment.

● Calculate the load factor.

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

α : Load factor
F_0 : Force (N) required to move the workpiece
F : Effective thrust of the cylinder (N) (Fig. 1 to 3)

For horizontal operation	For 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: Wx0.2(N)	F_1: M_1 x C1 Note(N)
F_2 : M2 x C2 Note (N)	F_3: M_3 x C3 Note(N)
F_L : Other kinds of resistance (e.g., guide resistance) (N)W : Load (N)	

Note: Coefficient to correct the increase of friction caused when moment is applied

[Table 5] Moment friction coefficients 1/m

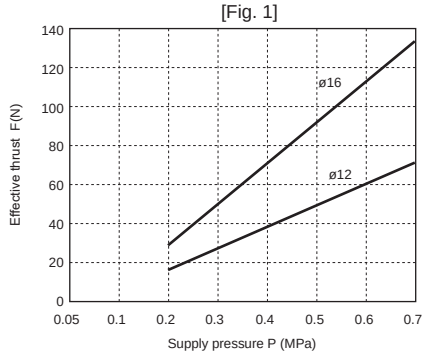
Bore size (mm)	C1	C2	C3
ø12 or equiv.	8	27	8
ø16 or equiv.	7	24	7
ø20 or equiv.	6	21	6
ø25 or equiv.	5	16	5
ø32 or equiv.	4	13	4
ø40 or equiv.	4	11	4
ø50 or equiv.	4	9	4
ø63 or equiv.	3	8	3

[Table 6] Load factor guidelines

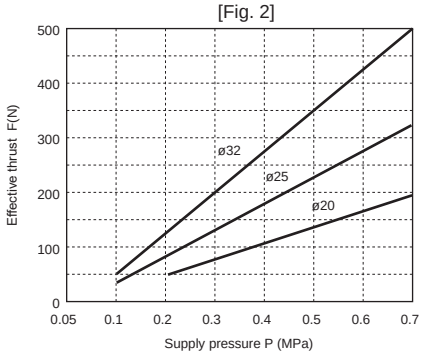
Working pressure (MPa)	Load factor (%)
0.2 to 0.3	α ≤ 40
0.3 to 0.6	α ≤ 50
0.6 to 0.7	α ≤ 60

● Graph for obtaining effective thrust

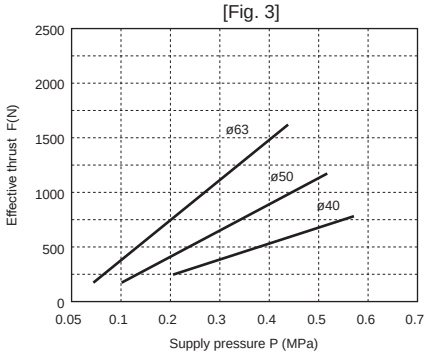
[Fig. 1]



[Fig. 2]



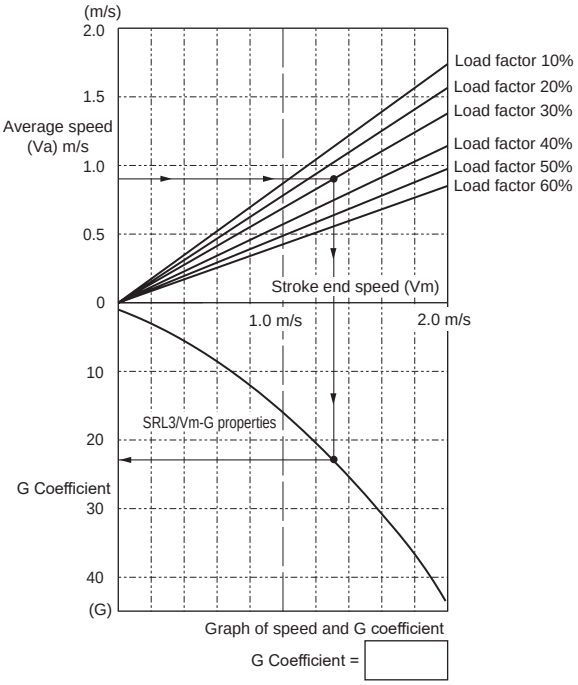
[Fig. 3]



[STEP3]

In [Fig. 3], obtain the stroke end speed (Vm) and G coefficient from the average speed (Va) and load factor obtained in STEP 2.

● Graph of speed and G coefficient [Fig. 3]



Graph of speed and G coefficient

G Coefficient = ☐

● The arrow (→) in the figure is the formula for obtaining

- Stroke end speed :1.3 m/s
- G Coefficient :22.5

at

- Average speed :0.9 m/s
- Load factor : 30%

[STEP4]

● Calculate the resultant moment (M_T) using the G coefficient obtained in STEP 3.

$M1 + M1_i$	=	☐	(N·m)
$M2$	=	☐	(N·m)
$M3 + M3_i$	=	☐	(N·m)
W	=	☐	(N)

$$M_T = \frac{M1 + M1_i}{M1max} + \frac{M2}{M2max} + \frac{M3 + M3i}{M3max} + \frac{W}{Wmax}$$

$M_T \leq 1$

↓

Bore size is decided. (* Refer to [Table 3] in STEP 1)

↓

Confirm cushion capacity

Unit: N·m

Mounting orientation		Horizontal upward	Horizontal downward	Vertical	Horizontal lateral
Dynamic moment	M1i	$Wx(\ell_3 + a)xG$			
	M2i	M2i dynamic moment is not generated.			
	M3i	$Wx\ell_2xG$			

Although the formulas are the same as those in STEP 1, use the G coefficient obtained in STEP 3 for calculation.

[STEP5]

● Confirming cushion capacity

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

E : Kinetic energy at stroke end (J)
m : Load weight (kg)
Vm : Speed of the piston entering the cushion (m/s)

[Table 7] Allowable absorbed energy value (E_0)

Bore size (mm)	Integrated air cushion (J)
ø12	0.03
ø16	0.22
ø20	0.59
ø25	1.40
ø32	2.57
ø40	4.27
ø50	9.13
ø63	17.4

Note: SRT3 with shock absorber attached is not available.
Install an external shock absorber if the kinetic energy at stroke end: E is larger than the allowable absorbed energy: E_0.

[STEP6]

● The bore size determined from the cushion performance is [øA]. (Bore size determined in STEP 5)

● The bore size determined from the load conditions is [øB]. (Bore size determined in STEP 4)

[øA ≥ øB] → Select [øA].
or
[øB] should be used with an external shock absorber.

[øA < øB] → Select [øB].

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: Rodless cylinder with brake SRT3 Series

Design/selection

⚠WARNING

■ Design a structure that prevents person(s) from coming into contact with the driven workpiece as well as the moving parts of the cylinder with brakes.
Provide a protective cover so that no one can directly touch the unit. In case of possible contact, provide safety measures such as a sensor for emergency stop before making contact and a buzzer to warn of danger.

■ Use a balanced circuit that accommodates the protrusion of the cylinder.
If pneumatic pressure is applied to only one side of the cylinder via operating the cylinder in any mid-stroke position (such as by braking), the piston pops out at high speed when the brake is released. This could cause physical harm, such as pinched hands or feet, or mechanical damage. Use a balance circuit, such as the recommended pneumatic pressure circuit, to prevent popping out.

■ As the rodless cylinder with brake requires no lubrication, never lubricate it. Otherwise, the brake may malfunction.

■ The holding force is the ability to hold static load that is not accompanied by vibration or shock, in a state where the brake is operating under no load.
Take care when constantly using near the upper limit of the holding force.

■ Do not apply loads with impact, strong vibration, or torque while brakes are activated.
If load is externally applied with impact, or if strong vibration or rotational force is externally applied, the holding force can be reduced, creating a dangerous situation.

■ Consider the stopping accuracy and overrun distance during the braking.
Because a mechanical lock is applied, 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 max. and min. width of the overrun distance is the 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) of the overrun distance + α.
- The operating range of CKD cylinder switches is 7 to 16 mm, depending on the switch model. If overrun distance exceeds this, provide self-holding of the contact at the switch load.

■ Do not use multiple synchronized cylinders with brakes.
If the synchronization deviates, an excess moment load or load concentration is applied to the cylinder where the brake was applied first, risking brake release defects, shortened service life, or damage.

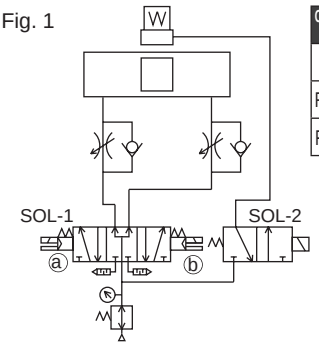
■ In order to improve stopping accuracy, ensure that the brake stops the cylinder as soon as possible after receiving the stop signal.
Use a high response DC control electricity circuit or valve, and set the valve as close to the cylinder as possible.

■ The stopping accuracy is susceptible to fluctuations in piston speed.
If the piston speed changes due to load fluctuations or by some disturbance while the cylinder is moving, the stopping position may vary sharply. Make sure that the piston speed stays the same up to just before the stop position. As well, since the speed changes significantly in the cushioned range and in the acceleration range after starting operation, the variability of the stopping position will increase.
The stopping accuracy at piston speed of 300 mm/s with no load is ±1.5 mm (reference value).

■ Notes for basic circuits

● Horizontal load
Pipe as shown in Figure 1. A rodless cylinder does not require a pressure balancing regulator since it has the same sectional area on both sides of the piston.

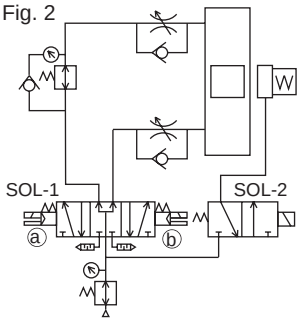
Fig. 1



Operational status	ⓐSOL-1ⓑ		SOL-2
Stop	OFF	OFF	OFF
Reverse	ON	OFF	ON
Forward	OFF	ON	ON

● Vertical load
If the load is facing downward as shown in Figure 2, the table moves incorrectly in the load direction when brakes are released. Install a regulator with a check valve on the upper side to reduce thrust in the load direction and balance the load.

Fig. 2



Operational status	ⓐ SOL-1ⓑ		SOL-2
Stop	OFF	OFF	OFF
Drop	ON	OFF	ON
Rise	OFF	ON	ON

(*1) When pressure fluctuates due to any other pneumatic component, install a special regulator to stabilize the operation.

■ Release brakes before cylinder operation. The brake may not be released when the cylinder is operating at high speeds.

■ If back pressure is applied to the locking mechanism, the lock may be released. Use the brake release valve as a single unit, or use an individual exhaust manifold.

■ Use a 3-position P/A/B connection (pressurization on both sides) valve for the cylinder drive to prevent the piston from popping out when starting.

■ To maintain balance of the thrust, including the load, the side with the larger thrust should have a regulator with a check valve.

⚠ CAUTION

■ Avoid environments where the cylinder is exposed to welding spatters.

■ 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.

■ 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 seal belt comes off. Do not use external force or inertia force, otherwise negative pressure will occur inside the cylinder.

■ Notes for stopping accuracy

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

Stop pitch	Load factor
50 mm or less	20% of thrust
50 mm to 100 mm	40% of thrust
100 mm or more	60% of thrust

● Selection of valve kit for brake
The stopping accuracy and overrun distance will change according to the responsiveness of the brake valve. Connect the valve directly to the brake port to improve stopping accuracy.

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

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

■ Wear powder may be generated when the cableveyor slides against the protective tape. Be especially careful in environments that should be free from dust.

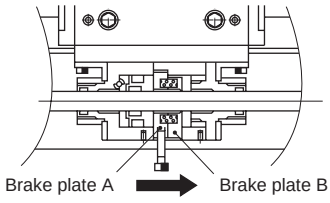
Mounting, installation and adjustment

⚠ WARNING

■ If the brake is released while air is applied to only one side of the cylinder, the piston can pop out at high speed, creating a dangerous situation. When releasing the brake during adjustment or other maintenance, always observe the following:

- Check that no one is in the movable range of the load and that no problems will arise if the load moves when brakes are released.
- When releasing the brake, perform position locking or take other measures
  ·Place the load to the bottom end
  ·Pressurize both sides
  ·Place a strut
  to prevent the load from falling.
- Confirm that air is not pressured on only one side of the cylinder when releasing brakes.

■ How to manually release the brake



- Remove the cover, screw the hexagon socket head cap screw into the brake plate A and turn it in the direction of the arrow. The brake plates A and B become horizontal and the piston rod is released.
  Note that the two brake plates should be turned completely. Otherwise the piston rod is released in one direction only.

Bore size	Thread size of brake plate A
ø12,ø16 ø20,ø25	M3
ø32,ø40 ø50,ø63	M4

- If no air pressure is supplied in vertical mounting, etc., brake force may not be sufficient when the lock is manually released. This may cause the table to move (drop) with the load's weight.
  For safety, take the following measures before manually releasing the lock:
  · Move the load to the bottom end
  · Provide a stopper to the load
  · Apply air pressure to the rodless cylinder to balance the load
- Remove the manual release bolt during normal use.

■ Brakes are released manually or by pressurizing the brake release port. When mounting the load, the brake release operation may cause the load to fall; make sure that the brake works in a state where the manual release operation is in its initial state or where there is no air in the brake release port.

■ Do not apply to the cylinder any force that exceeds the brake holding force listed in the catalog.

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

■ If the 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

■ 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.

■ Adjust the air balance in the cylinder.
With brakes released, place a load on the cylinder and balance the load by adjusting pneumatic pressure applied to the cylinder rod side and head side. Malfunctions such as cylinder popping out during brake release or abnormal brake release can be prevented by accurately balancing the load.

■ Adjust the installation position of the detector parts, including the cylinder switch.
When braking, consider the overrun distance with respect to the desired stop position and adjust the installation positions for detector parts, including the cylinder switch.

■ Load fluctuations during the reciprocating stroke of the cylinder can cause inconsistent piston speed, leading to greater variation in the stop position. Adjust the mounting of the load so as to prevent any load fluctuations during the reciprocating stroke of the cylinder, especially before the stop position.

■ Since the speed changes significantly in the cushioned range and in the acceleration range after starting operation, the variability of the stopping position will increase. For this reason, the accuracy described in the specifications may not be obtained when the stroke to the next point just after the start of operation is short.

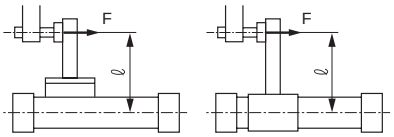
■ Wear powder may be generated when the cableveyor slides against the protective tape. Be especially careful in environments that should be free from dust.

■ Keep the moment, including inertia force caused by load transfer or stop, within the allowable load. If this value is exceeded, it will lead to damage.

● 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 the workpiece or the closest point to it.

● 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

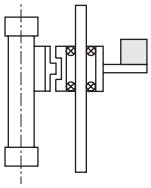


M1 = F· ℓ

M3 = F· ℓ
F : Cylinder thrust
ℓ : Length from the center of the cylinder to the stopper

● 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



■ 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.

■ Prevent scratches or dents on the cylinder body. Otherwise, malfunctions may result.

■ If external or inertia forces cause negative pressure inside the cylinder, the seal belt may come off and air may leak or malfunctions may occur.

■ CKD's shock absorber is a consumable part. Replace when the energy absorption performance has degraded or the operation is not smooth.

Use/maintenance

⚠ WARNING

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

■ Do not disassemble the brake section for inspection, or a hazardous situation may occur during use thereafter.

■ The required grease is already applied to the brakes and so do not wipe it off. Do not apply extra grease.

■ The brake section cannot be replaced.

■ Always use the product with the dust cover on, except for when performing manual release, in order to prevent failure or malfunction.

⚠ CAUTION

■ Air supply pipes that are too narrow or too long can reduce stopping accuracy.

■ 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 stopping accuracy. Conduct conditioning operations to obtain a stable stopping accuracy.