

Slider Type/Slide Bearing

Series *CY1S*

ø6, ø10, ø15, ø20, ø25, ø32, ø40



CY3B
CY3R

CY1S

CY1L

CY1H

CY1F

CYP

D-□

-X□

Individual
-X□

Technical
data

Series CY1S

Model Selection 1

E: Kinetic energy of load (J)

$$E = \frac{W}{2} \cdot \left(\frac{V}{1000} \right)^2$$

Es: Allowable kinetic energy for intermediate stop using an air pressure circuit (J)

Ps: Operating pressure limit for intermediate stop using an external stopper, etc. (MPa)

Pv: Maximum operating pressure for vertical operation (MPa)

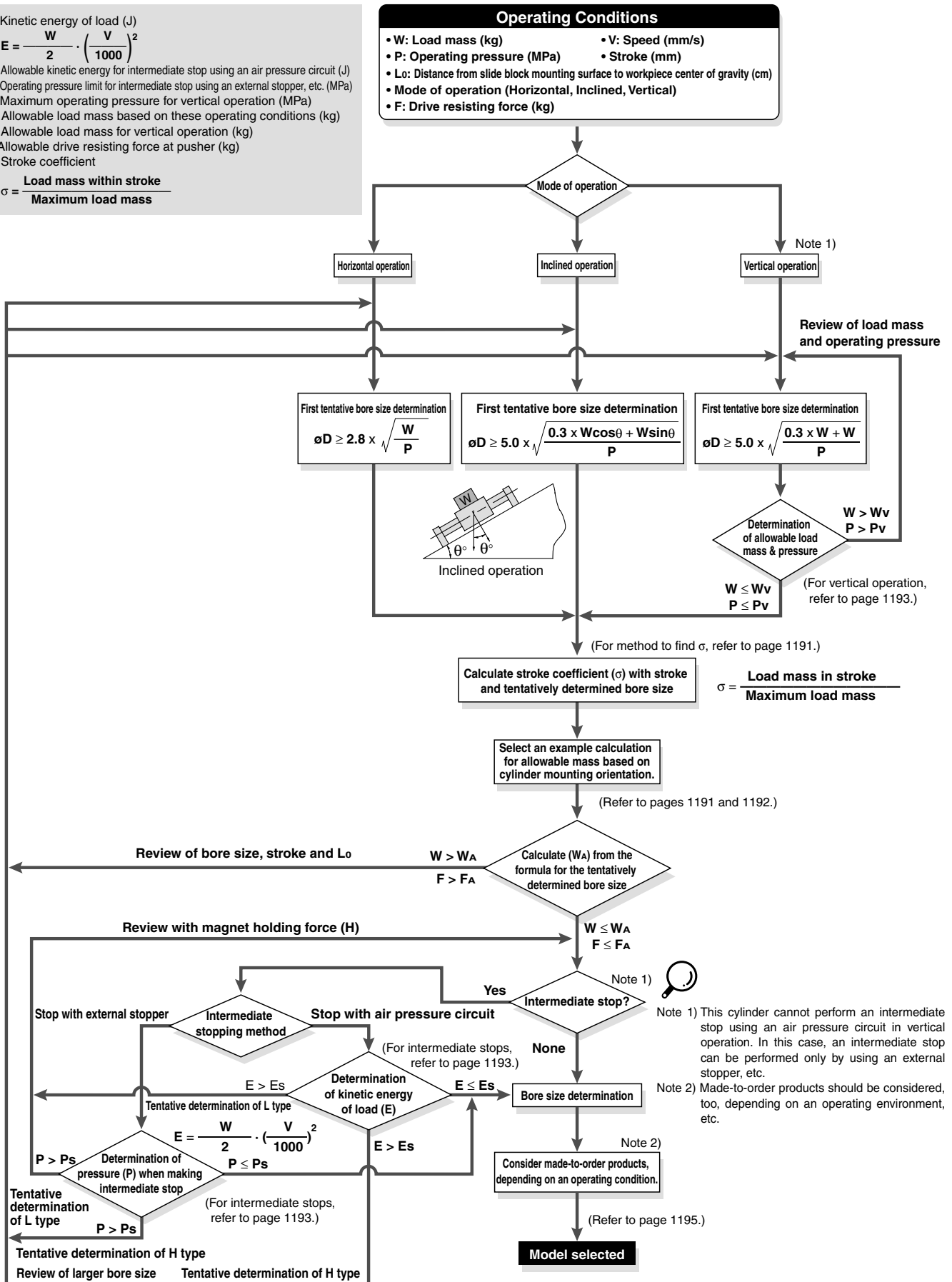
WA: Allowable load mass based on these operating conditions (kg)

Wv: Allowable load mass for vertical operation (kg)

FA: Allowable drive resisting force at pusher (kg)

σ: Stroke coefficient

$$\sigma = \frac{\text{Load mass within stroke}}{\text{Maximum load mass}}$$



Series CY1S

Model Selection 2

Caution on Design (1)

How to Find σ when Selecting the Allowable Load Mass

Since the maximum load mass with respect to the cylinder stroke changes as shown in the table below, σ should be considered as a coefficient determined in accordance with each stroke.

Example) CY1S25□-650

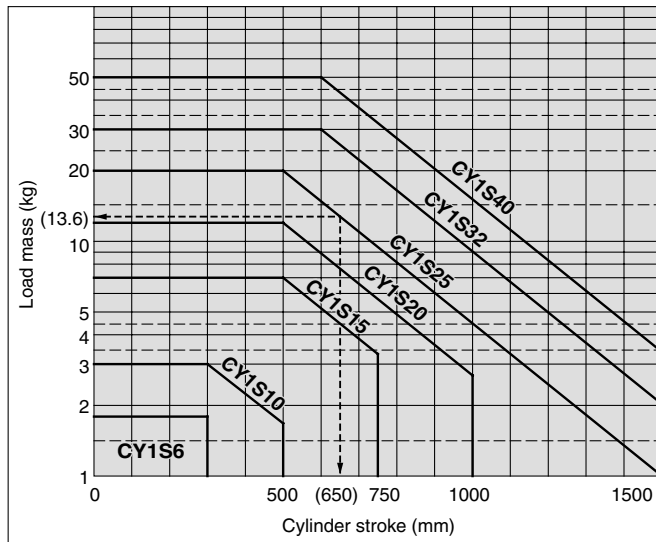
- (1) Maximum load mass = 20 kg
- (2) Load mass for 650 st = 13.6 kg
- (3) $\sigma = \frac{13.6}{20} = 0.68$ is the result.

Calculation Formula for σ ($\sigma \leq 1$)

ST: Stroke (mm)

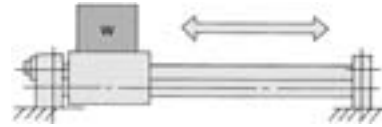
Model	CY1S6	CY1S10	CY1S15
$\sigma =$	1	$\frac{10^{(0.86 - 1.3 \times 10^{-3} \times ST)}}{3}$	$\frac{10^{(1.5 - 1.3 \times 10^{-3} \times ST)}}{7}$
Model	CY1S20	CY1S25	CY1S32
$\sigma =$	$\frac{10^{(1.71 - 1.3 \times 10^{-3} \times ST)}}{12}$	$\frac{10^{(1.98 - 1.3 \times 10^{-3} \times ST)}}{20}$	$\frac{10^{(2.26 - 1.3 \times 10^{-3} \times ST)}}{30}$
Model	CY1S40		
$\sigma =$	$\frac{10^{(2.48 - 1.3 \times 10^{-3} \times ST)}}{50}$		

Note) Calculate with $\sigma = 1$ for all applications up to $\phi 10 - 300$ mmST, $\phi 15 - 500$ mmST, $\phi 20 - 500$ mmST, $\phi 25 - 500$ mmST, $\phi 32 - 600$ mmST and $\phi 40 - 600$ mmST.



Example of Allowable Load Mass Calculation Based on Cylinder Mounting Orientation

1. Horizontal Operation (Floor mounting)

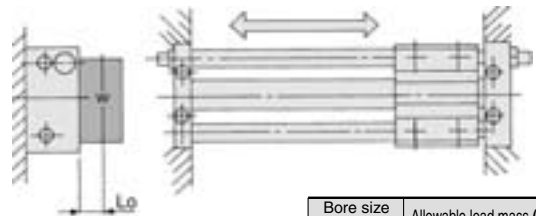


Maximum Load Mass (Center of slide block) (kg)

Bore size (mm)	6	10	15	20	25	32	40
Max. load mass (kg)	1.8	3	7	12	20	30	50
Stroke (Max)	Up to 300 st	Up to 300 st	Up to 500 st	Up to 500 st	Up to 500 st	Up to 600 st	Up to 600 st

The above maximum load mass values will change with the stroke length for each cylinder size, due to limitation from warping of the guide shafts. (Take note of the coefficient σ .) Moreover, depending on the operating direction, the allowable load mass may be different from the maximum load mass.

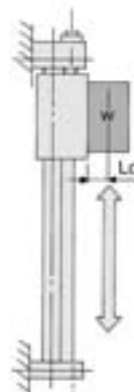
2. Horizontal Operation (Wall mounting)



L_o : Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	Allowable load mass (W_a) (kg)
6	$\frac{\sigma \cdot 5.44}{7 + 2L_o}$
10	$\frac{\sigma \cdot 12.0}{8.4 + 2L_o}$
15	$\frac{\sigma \cdot 36.4}{10.6 + 2L_o}$
20	$\frac{\sigma \cdot 74.4}{12 + 2L_o}$
25	$\frac{\sigma \cdot 140}{13.8 + 2L_o}$
32	$\frac{\sigma \cdot 258}{17 + 2L_o}$
40	$\frac{\sigma \cdot 520}{20.6 + 2L_o}$

3. Vertical Operation



Bore size (mm)	Allowable load mass (W_v) (kg)
6	$\frac{\sigma \cdot 1.33}{1.9 + L_o}$
10	$\frac{\sigma \cdot 4.16}{2.2 + L_o}$
15	$\frac{\sigma \cdot 13.23}{2.7 + L_o}$
20	$\frac{\sigma \cdot 26.8}{2.9 + L_o}$
25	$\frac{\sigma \cdot 44.0}{3.4 + L_o}$
32	$\frac{\sigma \cdot 88.2}{4.2 + L_o}$
40	$\frac{\sigma \cdot 167.8}{5.1 + L_o}$

L_o : Distance from mounting surface to load center of gravity (cm)

Note) Operating pressure should be equal to or less than the maximum operating pressure in the article, "Vertical Operation" listed on page 1193.

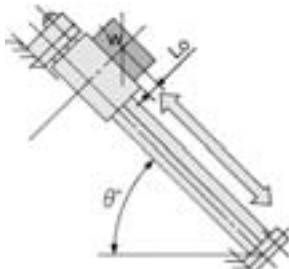
Series CY1S

Model Selection 3

Caution on Design (2)

Example of Allowable Load Mass Calculation Based on Cylinder Mounting Orientation

4. Inclined Operation (In operating direction)



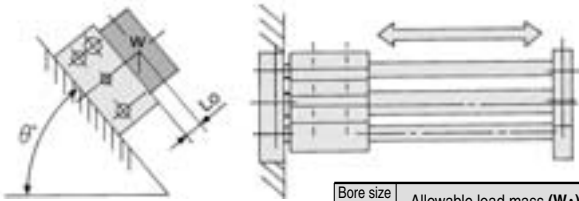
Angle	to 45°	to 60°	to 75°	to 90°
k	1	0.9	0.8	0.7

Angle coefficient (k): $k = [\text{to } 45^\circ (= \theta)] = 1$,
 $[\text{to } 60^\circ] = 0.9$, $[\text{to } 75^\circ] = 0.8$,
 $[\text{to } 90^\circ] = 0.7$

Lo: Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	Allowable load mass (WA) (kg)
6	$\frac{\sigma \cdot 5.1 K}{3 \cos \theta + 2 (1.9 + Lo) \sin \theta}$
10	$\frac{\sigma \cdot 10.5 K}{3.5 \cos \theta + 2 (2.2 + Lo) \sin \theta}$
15	$\frac{\sigma \cdot 35 K}{5 \cos \theta + 2 (2.7 + Lo) \sin \theta}$
20	$\frac{\sigma \cdot 72 K}{6 \cos \theta + 2 (2.9 + Lo) \sin \theta}$
25	$\frac{\sigma \cdot 120 K}{6 \cos \theta + 2 (3.4 + Lo) \sin \theta}$
32	$\frac{\sigma \cdot 210 K}{7 \cos \theta + 2 (4.2 + Lo) \sin \theta}$
40	$\frac{\sigma \cdot 400 K}{8 \cos \theta + 2 (5.1 + Lo) \sin \theta}$

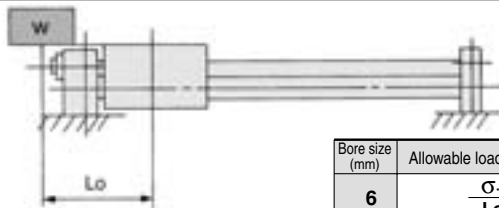
5. Inclined Operation (At a right angle to operating direction)



Lo: Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	Allowable load mass (WA) (kg)
6	$\frac{\sigma \cdot 5.44}{3.2 + 2 (1.9 + Lo) \sin \theta}$
10	$\frac{\sigma \cdot 12.0}{4 + 2 (2.2 + Lo) \sin \theta}$
15	$\frac{\sigma \cdot 36.4}{5.2 + 2 (2.7 + Lo) \sin \theta}$
20	$\frac{\sigma \cdot 74.4}{6.2 + 2 (2.9 + Lo) \sin \theta}$
25	$\frac{\sigma \cdot 140}{7 + 2 (3.4 + Lo) \sin \theta}$
32	$\frac{\sigma \cdot 258}{8.6 + 2 (4.2 + Lo) \sin \theta}$
40	$\frac{\sigma \cdot 520}{10.4 + 2 (5.1 + Lo) \sin \theta}$

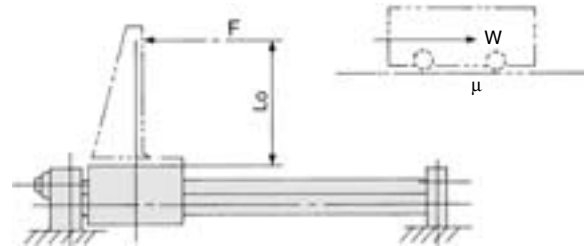
6. Load Center Offset in Operating Direction (Lo)



Lo: Distance from center of slide block to load's center of gravity (cm)

Bore size (mm)	Allowable load mass (WA) (kg)
6	$\frac{\sigma \cdot 2.55}{Lo + 3}$
10	$\frac{\sigma \cdot 5.25}{Lo + 3.5}$
15	$\frac{\sigma \cdot 17.5}{Lo + 5.0}$
20	$\frac{\sigma \cdot 36}{Lo + 6.0}$
25	$\frac{\sigma \cdot 60}{Lo + 6.0}$
32	$\frac{\sigma \cdot 105}{Lo + 7.0}$
40	$\frac{\sigma \cdot 200}{Lo + 8.0}$

7. Horizontal Operation (Pushing load, Pusher)

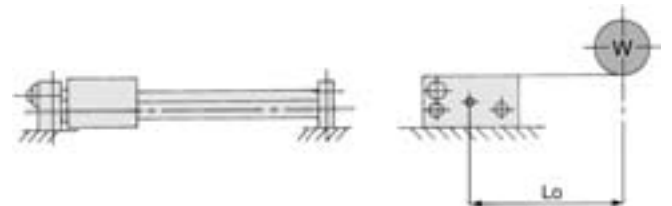


F: Drive (from slide block to position Lo) resistance force $W \times \mu$ (kg)
 Lo: Distance from mounting surface to load center of gravity (cm)
 μ: Friction coefficient

Bore size (mm)	6	10	15	20
Allowable drive resisting force (FA) (kg)	$\frac{\sigma \cdot 2.55}{1.9 + Lo}$	$\frac{\sigma \cdot 5.25}{2.2 + Lo}$	$\frac{\sigma \cdot 17.5}{2.7 + Lo}$	$\frac{\sigma \cdot 36}{2.9 + Lo}$

Bore size (mm)	25	32	40
Allowable drive resisting force (FA) (kg)	$\frac{\sigma \cdot 60}{3.4 + Lo}$	$\frac{\sigma \cdot 105}{4.2 + Lo}$	$\frac{\sigma \cdot 200}{5.1 + Lo}$

8. Horizontal Operation (Load, Lateral offset Lo)



Lo: Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	6	10	15	20
Allowable load mass (WA) (kg)	$\frac{\sigma \cdot 3.80}{3.2 + Lo}$	$\frac{\sigma \cdot 8.40}{4 + Lo}$	$\frac{\sigma \cdot 25.48}{5.2 + Lo}$	$\frac{\sigma \cdot 52.1}{6.2 + Lo}$

Bore size (mm)	25	32	40
Allowable load mass (WA) (kg)	$\frac{\sigma \cdot 98}{7.0 + Lo}$	$\frac{\sigma \cdot 180}{8.6 + Lo}$	$\frac{\sigma \cdot 364}{10.4 + Lo}$

Caution on Design (3)

Vertical Operation

When operating a load vertically, it should be operated within the allowable load mass and maximum operating pressures shown in the table below. Use caution, as operating above the prescribed values may lead to dropping of the load.

When the cylinder is mounted vertically or sidelong, sliders may move downwards due to the self-weight or workpiece mass. If an accurate stopping position is required at the stroke end or the middle-stroke, use an external stopper to secure accurate positioning.

Bore size (mm)	Model	Allowable load mass (Wv) (kg)	Maximum operating pressure (Pv) (MPa)
6	CY1S 6H	1.0	0.55
10	CY1S10H	2.7	0.55
15	CY1S15H	7.0	0.65
	CY1S15L	4.1	0.40
20	CY1S20H	11.0	0.65
	CY1S20L	7.0	0.40
25	CY1S25H	18.5	0.65
	CY1S25L	11.2	0.40
32	CY1S32H	30.0	0.65
	CY1S32L	18.2	0.40
40	CY1S40H	47.0	0.65
	CY1S40L	29.0	0.40

Note 1) Use caution, since the magnetic coupling may be dislocated if it is used over the maximum operating pressure.

Note 2) Allowable load mass above indicates the maximum load mass when loaded. The actual loadable mass must be determined referring to the flow chart in the Model Selection 1.

Intermediate Stop

1) Intermediate stopping of load with an external stopper, etc.

When stopping a load in mid-stroke using an external stopper (adjusting bolt, etc.), operate within the operating pressure limits shown in the table below. Use caution, as operation at a pressure exceeding these limits can result in breaking of the magnetic coupling.

Bore size (mm)	Model	Operating pressure limit for intermediate stop (Ps) (MPa)
6	CY1S 6H	0.55
10	CY1S10H	0.55
15	CY1S15H	0.65
	CY1S15L	0.40
20	CY1S20H	0.65
	CY1S20L	0.40
25	CY1S25H	0.65
	CY1S25L	0.40
32	CY1S32H	0.65
	CY1S32L	0.40
40	CY1S40H	0.65
	CY1S40L	0.40

2) Intermediate stopping of load with an air pressure circuit

When stopping a load using an air pressure circuit, operate at or below the kinetic energy shown in the table below. Use caution, as operation when exceeding the allowable value can result in breaking of the magnetic coupling.

(Reference values)

Bore size (mm)	Model	Allowable kinetic energy for intermediate stop (Es) (J)
6	CY1S 6H	0.007
10	CY1S10H	0.03
15	CY1S15H	0.13
	CY1S15L	0.076
20	CY1S20H	0.24
	CY1S20L	0.16
25	CY1S25H	0.45
	CY1S25L	0.27
32	CY1S32H	0.88
	CY1S32L	0.53
40	CY1S40H	1.53
	CY1S40L	0.95

CY3B
CY3R

CY1S

CY1L

CY1H

CY1F

CYP

D-□

-X□

Individual
-X□

Technical
data

Magnetically Coupled Rodless Cylinder Slider Type: Slide Bearing

Series CY1S

ø6, ø10, ø15, ø20, ø25, ø32, ø40

Series CY1S slider type slide bearing has been remodeled to achieve the lightweight design and shorten the overall length. When selecting this model, please consider the **new CY1S series**.

How to Order

CY1S 25 H - 300 -

With auto switch
CDY1S 25 H - 300 - J79W -

With switch rail

Slider type (Slide bearing)

Bore size

6	6 mm	25	25 mm
10	10 mm	32	32 mm
15	15 mm	40	40 mm
20	20 mm		

Port thread type

Symbol	Type	Bore size
Nil	M thread	ø6, ø10, ø15
TN	Rc	ø20, ø25, ø32, ø40
TF	G	

Magnetic holding force
Refer to page 1195 for specifications.

Standard stroke
Refer to "Standard Stroke" on page 1195.

Auto switch

Nil	Without auto switch (Built-in magnet)
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* For the applicable auto switch model, refer to the table below.

Adjustment type

Nil	With adjusting bolt
B	With shock absorbers (2 pcs.)
BS	With shock absorber (With plate A) * Installed on Side A at time of shipment.

Number of auto switches

Nil	2 pcs.
S	1 pc.
n	"n" pcs.

Shock Absorbers

Type	Bore size (mm)				
	6	10, 15	20	25	32, 40
Standard (shock absorber Series RB)	RB0805		RB1006	RB1411	RB2015
Shock absorber soft type Series RJ type (-XB22)	RJ0805	RJ0806H	RJ1007H	RJ1412H	—

* The shock absorber service life is different from that of the CY1S cylinder.
Refer to "Specific Product Precautions" for each shock absorber for the replacement period.
* The shock absorber soft type Series RJ type (-XB22) is a made to order specification.
For details, refer to page 1415-1.

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator/light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m) *				Pre-wired connector	Applicable load		
					DC	AC	Electrical entry direction		0.5 (Nil)	3 (L)	5 (Z)	None (N)				
							Perpendicular	In-line								
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	F7NV	F79	●	●	○	—	○	IC circuit	Relay, PLC	
				3-wire (PNP)			F7PV	F7P	●	●	○	—	○			
	Connector	2-wire		12 V	F7BV		J79	●	●	○	—	○	—			
		3-wire (NPN)		5 V, 12 V	J79C		—	●	●	●	●	—	—			
	3-wire (PNP)	F7N WV			F79W		●	●	○	—	○	IC circuit				
	Diagnostic indication (2-color indication)	Grommet		2-wire	12 V		—	F7P W	●	●	○	—	○	—		
				F7B WV	J79W		●	●	○	—	○	—				
	Water resistant (2-color indication)	Grommet		2-wire	12 V		F7B AV	F7B A	—	●	○	—	○	—		
	With diagnostic output (2-color indication)			4-wire (NPN)	5 V, 12 V		—	F79F	●	●	○	—	○	IC circuit		
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	A76H	●	●	—	—	—	IC circuit	Relay, PLC
				2-wire	—	200 V	A72	A72H	●	●	—	—	—	—		
					12 V	100 V	A73	A73H	●	●	●	—	—	—		
		5 V, 12 V			100 V or less	A80	A80H	●	●	—	—	—	IC circuit			
		12 V			—	A73C	—	●	●	●	●	—	—			
		Connector		5 V, 12 V	—	A80C	—	●	●	●	●	—	—	IC circuit		

* Lead wire length symbols: 0.5 m..... Nil (Example) J79W
3 m..... L (Example) J79WL
5 m..... Z (Example) J79WZ
None..... N (Example) J79CN

* Solid state auto switches marked with "○" are produced upon receipt of order.

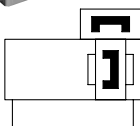
- Since there are other applicable auto switches than listed, refer to page 1199 for details.
- For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
- Auto switches are shipped together, (but not assembled).

Magnetically Coupled Rodless Cylinder Slider Type: Slide Bearing **Series CY1S**



JIS Symbol

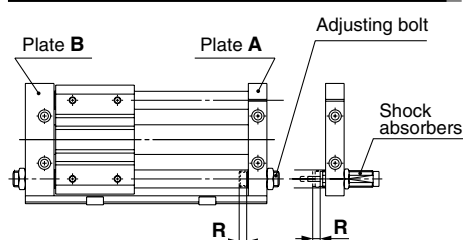
Rubber bumper
(Magnet type)



Made to Order Specifications
(For details, refer to pages 1395 to 1565.)

Symbol	Specifications
—XB9	Low speed cylinder (15 to 50 mm/s)
—XB13	Low speed cylinder (7 to 50 mm/s)
—XB22	Shock absorber soft type Series RJ type
—X116	Hydro specifications rodless cylinder
—X168	Helical insert thread specifications
—X210	Non-lubricated exterior specifications
—X322	Outside of cylinder tube with hard chrome plated
—X324	Non-lubricated exterior specifications (With dust seal)
—X431	Auto switch rails on both side faces (with 2 pcs.)

Amount of Adjustment for Adjusting Bolt and Shock Absorber



Bore size (mm)	R	Amount of adjustment by adjusting bolt (both ends: R x 2) (mm)
6	0 to 6	12
10	0 to 5.5	11
15	0 to 3.5	7
20	0 to 5.5	11
25	0 to 5	10
32	0 to 5.5	11
40	0 to 4.5	9

Bore size (mm)	Amount of adjustment by shock absorber: R (mm)	
	Plate A side	Plate B side
6	17	11
10	14	6
15	14	4
20	16	7
25	32	23
32	33	23
40	32	17

* Since the cylinder is in an intermediate stop condition when stroke adjustment is performed, use caution regarding the operating pressure and the kinetic energy of the load.

* The amount of adjustment for adjustment bolts is the total amount when adjusted on both plate ends. For the adjustment on a single plate end, the amount of adjustment is half of the figures in the table above.

* The Plate A: Piping port side

Specifications

Bore size (mm)	6	10	15	20	25	32	40
Fluid	Air						
Proof pressure	1.05 MPa						
Maximum operating pressure	0.7 MPa						
Minimum operating pressure	0.18 MPa						
Ambient and fluid temperature	-10 to 60°C (No freezing)						
Piston speed *	50 to 400 mm/s						
Cushion	Rubber bumper / Shock absorbers						
Lubrication	Non-lube						
Stroke length tolerance (mm)	0 to 250 st: $+1.0_0$, 251 to 1000 st: $+1.4_0$, 1001 st and up: $+1.8_0$						
Holding force (N)	Type H	19.6	53.9	137	231	363	922
	Type L	—	—	81.4	154	221	569

* In the case of setting an auto switch (CDY1S) at the intermediate position, the maximum piston speed is subject to restrict for detection upon the response time of a load (Relays, Sequence controller, etc.)

Standard Stroke

Bore size (mm)	Standard stroke (mm)	Maximum manufacturable stroke (mm)
6	50, 100, 150, 200	300
10	50, 100, 150, 200, 250, 300	500
15	50, 100, 150, 200, 250, 300, 350, 400, 450, 500	750
20	100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800	1000
25		1500
32		
40	100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	1500

Note) Intermediate stroke is available by the 1 mm interval.

Mass

		(kg)						
Number of magnets	Bore size (mm)	6	10	15	20	25	32	40
Basic mass	CY1S□H	0.27	0.48	0.91	1.48	1.84	3.63	4.02
	CY1S□L	—	—	0.85	1.37	1.75	3.48	3.84
Additional mass per each 50 mm of stroke		0.044	0.074	0.104	0.138	0.172	0.267	0.406

Calculation

(Example) CY1S32H-500

• Basic mass 3.63 kg • Additional mass 0.267/50 st

• Cylinder stroke 500 st $3.63 + 0.267 \times 500 \div 50 = 6.3$ kg

Shock Absorber Specifications

Refer to the Series RB in Best Pneumatics No. 3 for the details on shock absorbers.

Applicable rodless cylinder	CY1S ⁶ ₁₀ ¹⁵	CY1S20	CY1S25	CY1S ³² ₄₀
Shock absorber model	RB0805	RB1006	RB1411	RB2015
Maximum energy absorption: (J)	0.98	3.92	14.7	58.8
Stroke absorption: (mm)	5	6	11	15
Collision speed: (m/s)	0.05 to 5			
Max. operating frequency: (cycle/min) *	80	70	45	25
Ambient temperature range	-10 to 80 °C			
Spring force: (N)	Extended	1.96	4.22	6.86
	Retracted	3.83	6.18	15.3

* It denotes the values at the maximum energy absorption per one cycle. Therefore, the operating frequency can be increased according to the energy absorption.

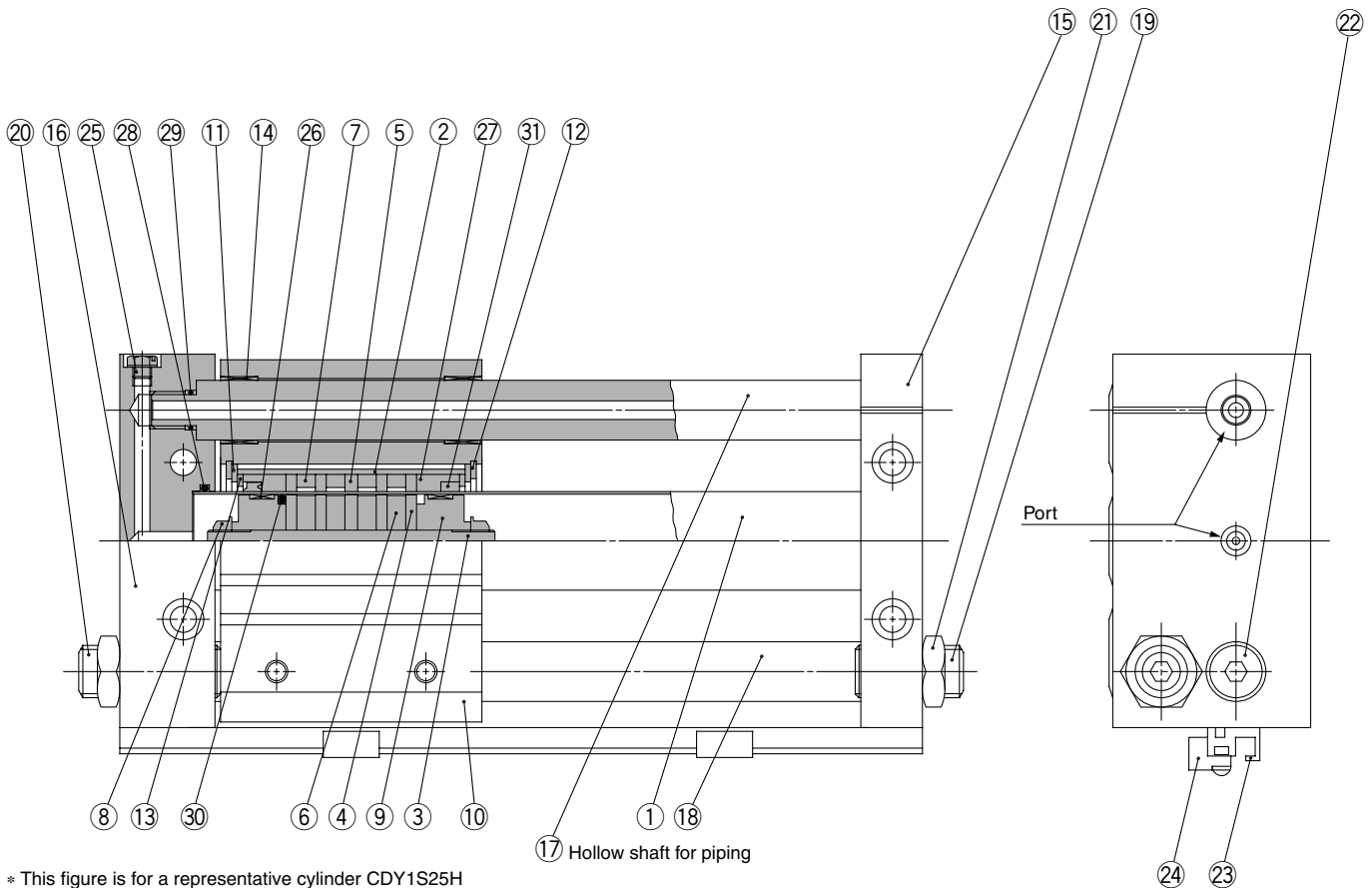
The shock absorber service life is different from that of the CY1S cylinder. Refer to the Specific Product Precautions for the replacement period.

Series CY1S

Construction

Slider type/Slide bearing

CY1S6 to 40



* This figure is for a representative cylinder CDY1S25H

Component Parts

No.	Description	Material	Note
1	Cylinder tube	Stainless steel	
2	External slider tube	Aluminum alloy	
3	Shaft	Stainless steel	
4	Piston side yoke	Rolled steel	Zinc chromated
5	External slider side yoke	Rolled steel	Zinc chromated
6	Magnet A	—	
7	Magnet B	—	
8	Piston nut	Carbon steel	Zinc chromated
9	Piston	Aluminum alloy ^{Note 1)}	Chromated
10	Slide block	Aluminum alloy	Anodized
11	Slider spacer	Rolled steel	Nickel plated
12	Retaining ring	Carbon tool steel	Phosphate coated
13	Spacer	Rolled steel	Nickel plated
14	Bushing	Oil retaining bearing material	
15	Plate A	Aluminum alloy	Anodized
16	Plate B	Aluminum alloy	Anodized
17	Guide shaft A	Carbon steel	Hard chrome plated
18	Guide shaft B	Carbon steel	Hard chrome plated
19	Adjusting bolt A	Chromium molybdenum steel	
20	Adjusting bolt B	Chromium molybdenum steel	
21	Hexagon nut	Carbon steel	Nickel plated
22	Hexagon socket head cap screw	Chromium molybdenum steel	
23	Switch mounting rail	Aluminum alloy	

Note 1) Brass for ø6

Note 2) Piston nuts are not included for ø6, ø10 and ø15.

No.	Description	Material	Note
24	Auto switch	—	
25	Plug	Brass	
26*	Wear ring A	Special resin	
27*	Wear ring B	Special resin	
28*	Cylinder tube gasket	NBR	
29*	Guide shaft gasket	NBR	
30*	Piston seal	NBR	
31*	Scraper	NBR	

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
6	CY1S6-PS-N	Set of nos. above 27, 28, 29, 30
10	CY1S10-PS-N	Nos. above 26, 27, 28, 29, 30, 31
15	CY1S15-PS-N	
20	CY1S20-PS-N	
25	CY1S25-PS-N	
32	CY1S32-PS-N	
40	CY1S40-PS-N	

* Seal kit includes 27 to 30 for ø6. 26 to 31 are for ø10 to ø40. Order the seal kit, based on each bore size.

* Seal kit includes a grease pack (ø6, ø10: 5 and 10 g, ø15 to ø40: 10 g). Order with the following part number when only the grease pack is needed.

Grease pack part no. for ø6, ø10: GR-F-005 (5 g) for external sliding parts, GR-S-010 (10 g) for tube interior

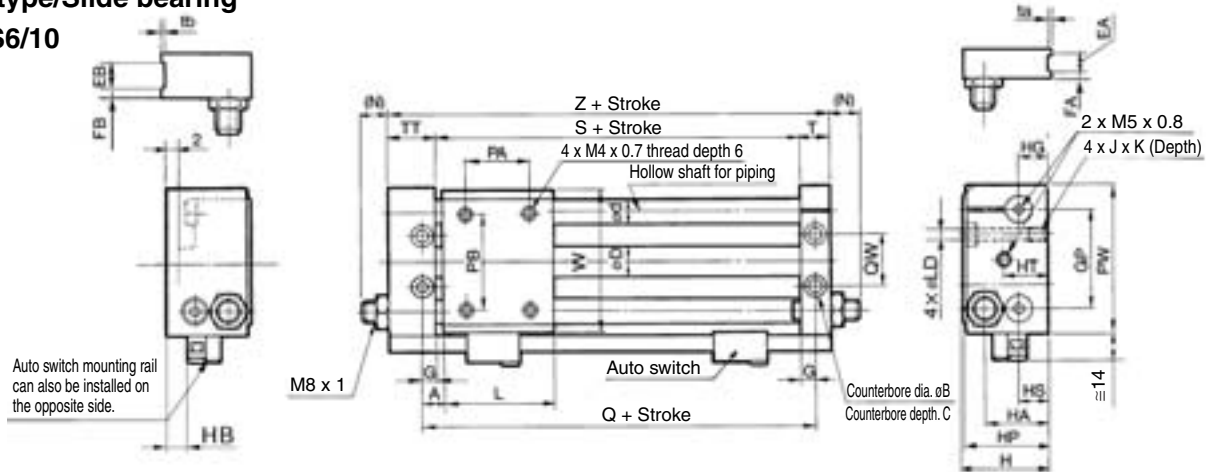
Grease pack part no. for ø15 to ø40: GR-S-010 (10 g)

Magnetically Coupled Rodless Cylinder Slider Type: Slide Bearing **Series CY1S**

Dimensions

Slider type/Slide bearing

C□Y1S6/10

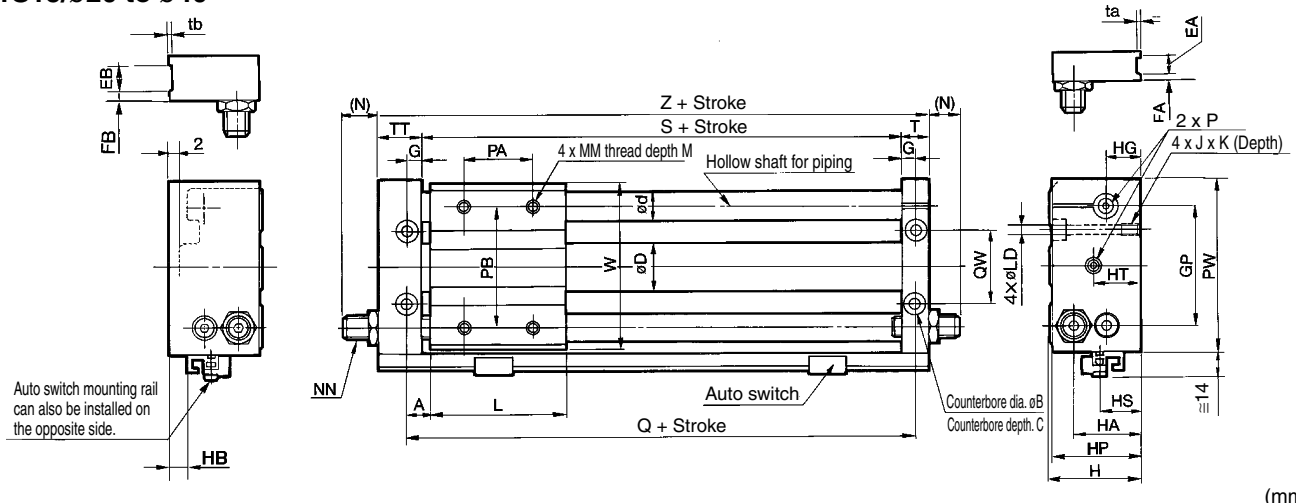


Model	A	B	C	D	d	EA	EB	FA	FB	G	GP	H	HA	HB*	HG	HP	HS	HT
CY1S6	6	6.5	3	7.6	8	—	—	—	—	5	32	27	19	4	8	26	8	17
CDY1S6	7.5	8	4	12	10	6	12	3	5	6.5	40	34	25.5	10	12	33	14	18

Model	J x K	L	LD	(N)	PA*	PB	PW	Q	QW	S	T	TT	ta	tb	W	Z
CY1S6	M4 x 0.7 x 6.5	40	3.5	11	25	25	50	52	16	42	10	16	—	—	46	68
CDY1S6	M5 x 0.8 x 9.5	45	4.3	10.5	25	38	60	60	24	47	12.5	20.5	0.5	1.0	58	80

* PA dimensions are for split from center. HB dimensions are for CDY1S.

C□Y1S15/ø20 to ø40

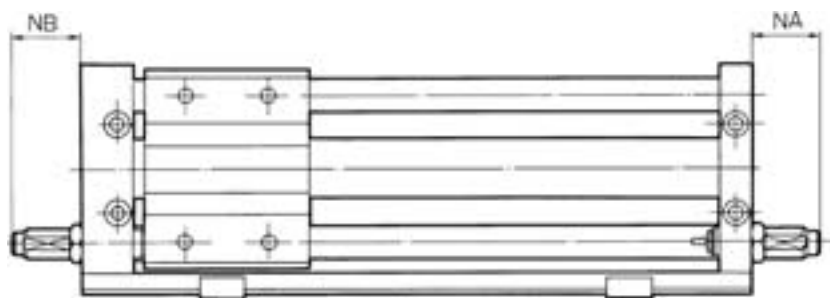


Model	A	B	C	D	d	EA	EB	FA	FB	G	GP	H	HA	HB*	HG	HP	HS	HT	J x K	L
CY1S15	7.5	9.5	5	16.6	12	6	13	3	6	6.5	52	40	29	1	13	39	15	21	M6 x 1.0 x 9.5	60
CDY1S15	10	9.5	5.2	21.6	16	—	—	—	—	8.5	62	46	36	4.5	17	45	25.5	20	M6 x 1.0 x 9.5	70
CY1S20	10	11	6.5	26.4	16	8	14	4	7	8.5	70	54	40	9	20	53	23	20	M8 x 1.25 x 10	70
CDY1S20	12.5	14	8	33.6	20	8	16	5	7	9.5	86	66	46	13	24	64	27	24	M10 x 1.5 x 15	85
CY1S25	12.5	14	8	41.6	25	10	20	5	10	10.5	104	76	57	17	25	74	31	25	M10 x 1.5 x 15	95
CDY1S25	5.6	8	M5 x 0.8	8.5	M8 x 1.0	M5 x 0.8	30	50	75	75	30	62	12.5	22.5	0.5	1	72	97		
CY1S32	5.6	10	M6 x 1.0	10	M10 x 1.0	Rc1/8	40	70	90	90	38	73	16.5	25.5	—	—	87	115		
CDY1S32	7	10	M6 x 1.0	12	M14 x 1.5	Rc1/8	40	70	100	90	42	73	16.5	25.5	0.5	1	97	115		
CY1S40	8.7	12	M8 x 1.25	11.5	M20 x 1.5	Rc1/8	40	75	122	110	50	91	18.5	28.5	0.5	1	119	138		
CDY1S40	8.7	12	M8 x 1.25	11.5	M20 x 1.5	Rc1/4	65	105	145	120	64	99	20.5	35.5	1	1	142	155		

* PA dimensions are for split from center. HB dimensions are for CDY1S.

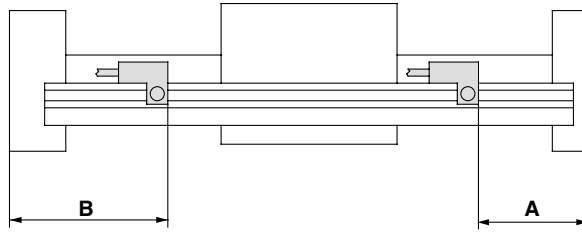
Series CY1S

Dimensions: With Shock Absorber



(mm)			
Model	Applicable shock absorber	NA	NB
C□Y1S 6	RB0805	30	24
C□Y1S10		27	19
C□Y1S15		27	17
C□Y1S20	RB1006	29	20
C□Y1S25	RB1411	49.5	40.5
C□Y1S32	RB2015	52	42
C□Y1S40		51	36

Proper Auto Switch Mounting Position (Detection at stroke end)



(mm)

Bore size (mm)	Applicable auto switch					
	D-A73, A80		D-A72/ A7□H/ A80H/ A73C/ D-A80C/ F7□/ J79/ F7□V/ J79C D-F7□W/ J79W/ F7□WV D-F7BAL/ F7BAVL/ D-F79F		D-F7NTL	
	A	B	A	B	A	B
6	27.5	40.5	28	40	33	35
10	35	45	35.5	44.5	40.5	39.5
15	34.5	62.5	35	62	40	57
20	64	50	64.5	49.5	69.5	44.5
25	44	71	44.5	70.5	49.5	65.5
32	55	83	55.5	82.5	60.5	77.5
40	61	94	61.5	93.5	66.5	88.5

Note 1) 50 mm is the minimum stroke available with 2 auto switches mounted. In the case of a stroke less than this, please contact SMC.

Note 2) Adjust the auto switch after confirming the operating conditions in the actual setting.

Operating Range

(mm)

Auto switch model	Bore size (mm)						
	6	10	15	20	25	32	40
D-A7□/ A8□	6	6	6	6	6	6	6
D-F7□/ J7□	3	3	4	3	3	3	3.5
D-F79F	4.5	4.5	4.5	4.5	4.5	4.5	4.5

* Since this is a guideline including hysteresis, not meant to be guaranteed.

(Assuming approximately ±30% dispersion)

There may be the case it will vary substantially depending on an ambient environment.

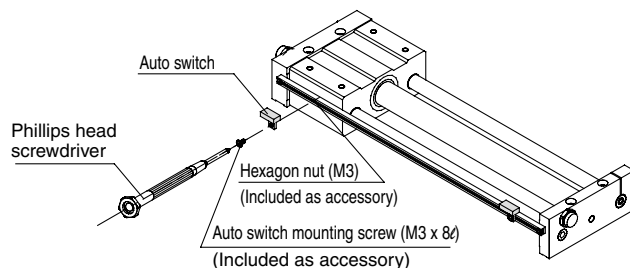
Other than the models listed in "How to Order", the following auto switches are applicable.
For detailed specifications, refer to page 1314.

Type	Model	Electrical entry (Fetching direction)	Features
Solid state auto switch	D-F7NTL	Grommet (In-line)	With timer

* With pre-wired connector is available for D-F7NTL type, too.
For details, refer to pages 1328 and 1329.

Mounting of Auto Switch

When mounting an auto switch, the auto switch mounting screw should be screwed into a hexagon nut (M3 x 0.5) which has been inserted into the groove of the switch mounting rail. (Tightening torque: Approx. 0.5 to 0.7 N·m.)



CY3B
CY3R

CY1S

CY1L

CY1H

CY1F

CYP

D-□

-X□

Individual
-X□

Technical
data



Series CY1S

Specific Product Precautions

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Operation

⚠ Warning

1. **Be aware of the space between the plates and the slide block.**
Take sufficient care to avoid getting your hands or fingers caught when the cylinder is operated.
2. **Do not apply a load to a cylinder which is greater than the allowable value stated in the "Model Selection" pages.**
This may cause malfunctions.
3. **When the cylinder is used in a place where water or cutting oil may splash or the lubrication condition on the cylinder sliding parts would be deteriorated, please consult SMC.**
4. **When applying grease to the cylinder, use the grease that has already been applied to the product. Contact SMC for available grease packs.**

Mounting

⚠ Caution

1. **Avoid operation with the external slider fixed to the mounting surface.**
The cylinder should be operated with the plates fixed to the mounting surface.
2. **Make sure that the cylinder mounting surface is a flatness of 0.2 mm or less.**
If the flatness of the cylinder mounting surface is not appropriate, 2 guide shafts may be twisted. This may adversely affect the operating conditions and shorten the service life due to the increase of sliding resistance and the early abrasion of bearings.
The cylinder mounting surface must be a flatness of 0.2 mm or less, and the cylinder must be mounted as it smoothly operates through the full stroke at the minimum operating pressure (0.18 MPa or less).

Service Life and Replacement Period of Shock Absorber

⚠ Caution

1. **Allowable operating cycle under the specifications set in this catalog is shown below.**
1.2 million times RB08□□
2 million times RB10□□ to RB2725
Note) Specified service life (suitable replacement period) is the value at room temperature (20 to 25°C).
The period may vary depending on the temperature and other conditions. In some cases the absorber may need to be replaced before the allowable operating cycle above.

Disassembly and Maintenance

⚠ Warning

1. **Use caution as the attractive force of the magnets is very strong.**
When removing the external slider and piston slider from the cylinder tube for maintenance, etc., handle with caution, since the magnets installed in each slider have a very strong attractive force.

⚠ Caution

1. **Use caution when removing the external slider, as the piston slider will be directly attracted to it.**
When removing the external slider or piston slider from the cylinder tube, first force the sliders out of their magnetically coupled positions, and then remove them individually when there is no longer any holding force. If they are removed while still magnetically coupled, they will be directly attracted to one another and will not come apart.
2. **Since the magnetic holding force can be changed (for example, from CY1S25L to CY1S25H), please contact SMC if this is necessary.**
3. **Do not disassemble the magnetic components (piston slider, external slider).**
This can cause a loss of holding force and malfunction.
4. **When disassembling to replace the seals and wear ring, refer to the separate disassembly instructions.**
5. **Use caution to the direction of the external slider and the piston slider.**
Since the external slider and piston slider are directional for $\phi 6$, $\phi 10$ and holding force type L, refer to the figures below when performing disassembly or maintenance. Put the external slider and piston slider together, and insert the piston slider into the cylinder tube so that they will have the correct positional relationship as shown in Fig. (1). If they align as shown in Fig. (2), insert the piston slider after turning it around 180°. If the direction is not correct, it will be impossible to obtain the specified holding force.

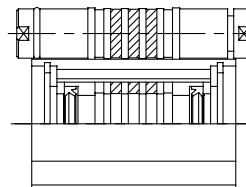


Fig. (1) Correct position

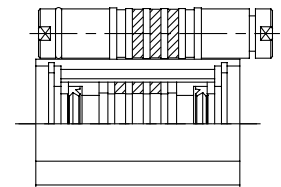


Fig. (2) Incorrect position

Example of $\phi 15$ with holding force type L

Slider Type/Ball Bushing Bearing

Series *CY1L*

ø6, ø10, ø15, ø20, ø25, ø32, ø40



CY3B
CY3R

CY1S

CY1L

CY1H

CY1F

CYP

D-□

-X□

Individual
-X□

Technical
data

Series CY1L

Model Selection 1

E: Kinetic energy of load (J)

$$E = \frac{W}{2} \cdot \left(\frac{V}{1000} \right)^2$$

Es: Allowable kinetic energy for intermediate stop using an air pressure circuit (J)

Ps: Operating pressure limit for intermediate stop using an external stopper, etc. (MPa)

Pv: Maximum operating pressure for vertical operation (MPa)

WA: Allowable load mass based on these operating conditions (kg)

Wv: Allowable load mass for vertical operation (kg)

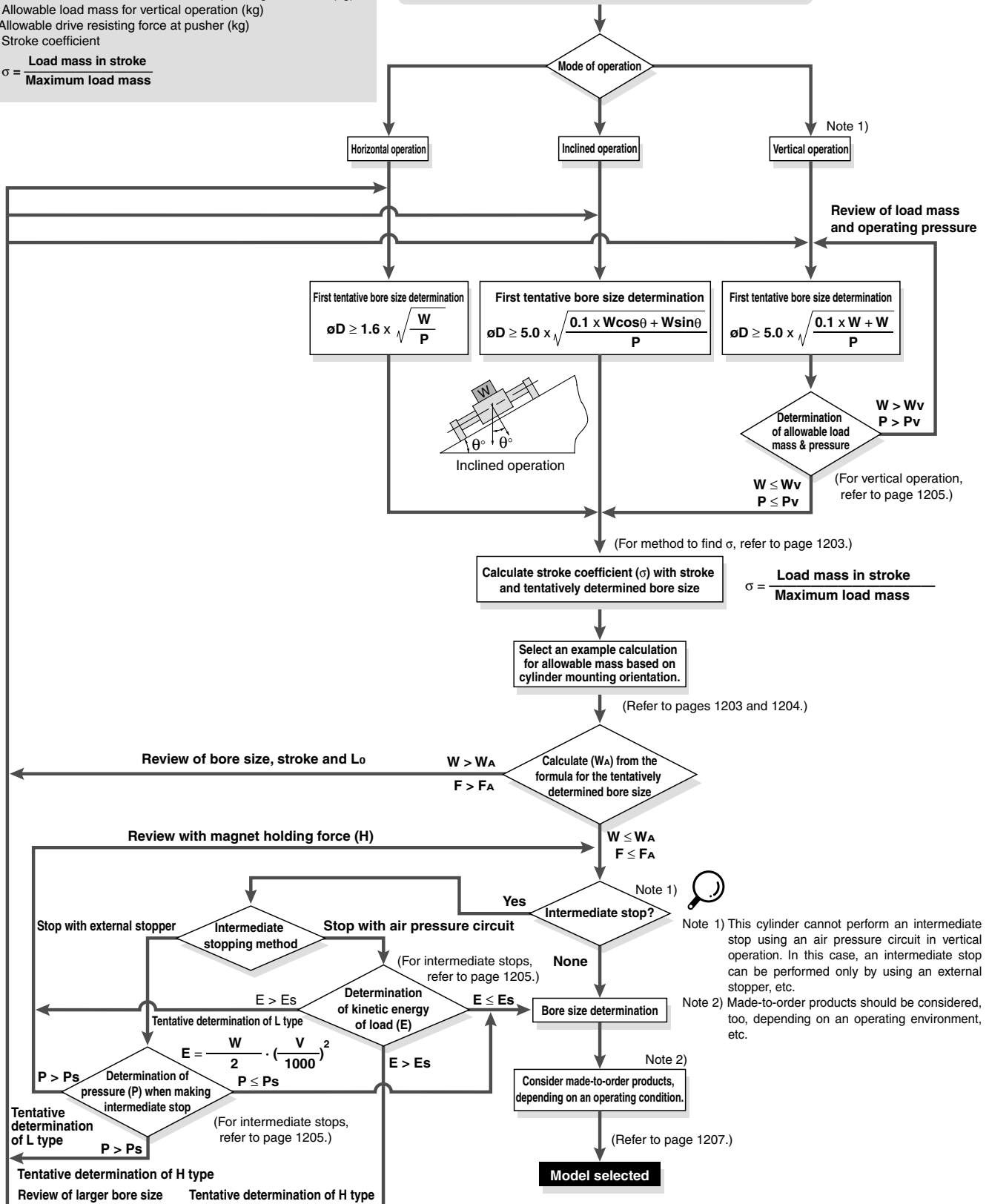
FA: Allowable drive resisting force at pusher (kg)

σ: Stroke coefficient

$$\sigma = \frac{\text{Load mass in stroke}}{\text{Maximum load mass}}$$

Operating Conditions

- W: Load mass (kg)
- V: Speed (mm/s)
- P: Operating pressure (MPa)
- Stroke (mm)
- Lo: Distance from slide block mounting surface to workpiece center of gravity (cm)
- Mode of operation (Horizontal, Inclined, Vertical)
- F: Drive resisting force (kg)



Caution on Design (1)

How to Find σ when Selecting the Allowable Load Mass

Since the maximum load mass with respect to the cylinder stroke changes as shown in the table below, σ should be considered as a coefficient determined in accordance with each stroke.

Example) CY1L25□-650

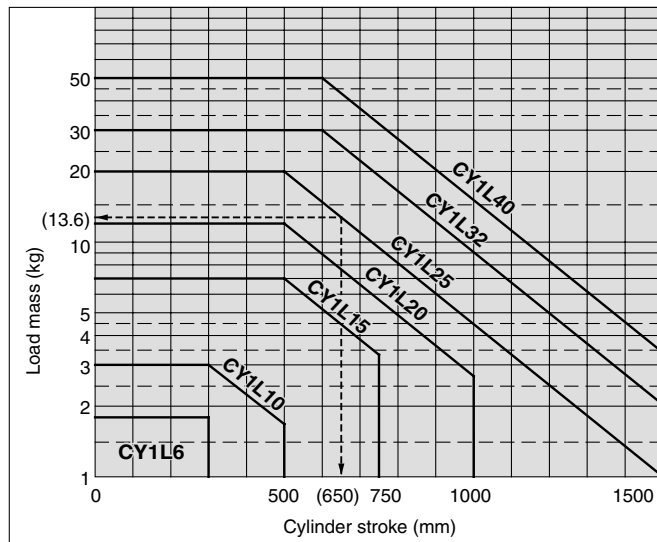
- (1) Maximum load mass = 20 kg
- (2) Load mass for 650 st = 13.6 kg
- (3) $\sigma = \frac{13.6}{20} = 0.68$ is the result.

Calculation Formula for σ ($\sigma \leq 1$)

ST: Stroke (mm)

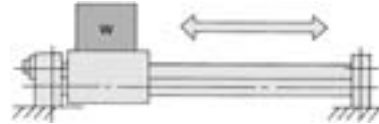
Model	CY1L6	CY1L10	CY1L15
$\sigma =$	1	$\frac{10^{(0.86 - 1.3 \times 10^{-3} \times \text{ST})}}{3}$	$\frac{10^{(1.5 - 1.3 \times 10^{-3} \times \text{ST})}}{7}$
Model	CY1L20	CY1L25	CY1L32
$\sigma =$	$\frac{10^{(1.71 - 1.3 \times 10^{-3} \times \text{ST})}}{12}$	$\frac{10^{(1.98 - 1.3 \times 10^{-3} \times \text{ST})}}{20}$	$\frac{10^{(2.26 - 1.3 \times 10^{-3} \times \text{ST})}}{30}$
Model	CY1L40		
$\sigma =$	$\frac{10^{(2.48 - 1.3 \times 10^{-3} \times \text{ST})}}{50}$		

Note) Calculate with $\sigma = 1$ for all applications up to $\phi 10 - 300$ mmST, $\phi 15 - 500$ mmST, $\phi 20 - 500$ mmST, $\phi 25 - 500$ mmST, $\phi 32 - 600$ mmST and $\phi 40 - 600$ mmST.



Examples of Allowable Load Mass Calculation Based on Cylinder Mounting Orientation

1. Horizontal Operation (Floor mounting)



Maximum Load Mass (Center of slide block)

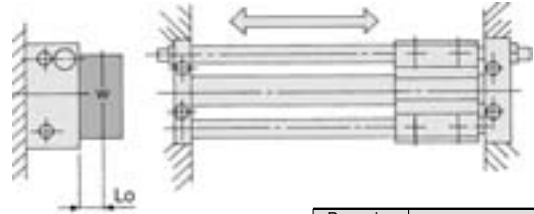
(kg)

Bore size (mm)	6	10	15	20	25	32	40
Max. load mass (kg)	1.8	3	7	12	20	30	50
Stroke (Max)	Up to 300 st	Up to 300 st	Up to 500 st	Up to 500 st	Up to 500 st	Up to 600 st	Up to 600 st

The above maximum load mass values will change with the stroke length for each cylinder size, due to limitation from warping of the guide shafts. (Take note of the coefficient σ .)

Moreover, depending on the operating direction, the allowable load mass may be different

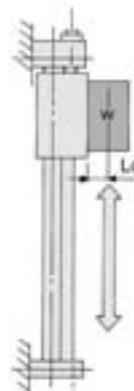
2. Horizontal Operation (Wall mounting)



L_o : Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	Allowable load mass (W_a) (kg)
6	$\frac{\sigma \cdot 6.48}{6.8 + 2L_o}$
10	$\frac{\sigma \cdot 15.0}{8.9 + 2L_o}$
15	$\frac{\sigma \cdot 45.5}{11.3 + 2L_o}$
20	$\frac{\sigma \cdot 101}{13.6 + 2L_o}$
25	$\frac{\sigma \cdot 180}{15.2 + 2L_o}$
32	$\frac{\sigma \cdot 330}{18.9 + 2L_o}$
40	$\frac{\sigma \cdot 624}{22.5 + 2L_o}$

3. Vertical Operation



Bore size (mm)	Allowable load mass (W_v) (kg)
6	$\frac{\sigma \cdot 1.53}{1.6 + L_o}$
10	$\frac{\sigma \cdot 5.00}{1.95 + L_o}$
15	$\frac{\sigma \cdot 15.96}{2.4 + L_o}$
20	$\frac{\sigma \cdot 31.1}{2.8 + L_o}$
25	$\frac{\sigma \cdot 54.48}{3.1 + L_o}$
32	$\frac{\sigma \cdot 112.57}{3.95 + L_o}$
40	$\frac{\sigma \cdot 212.09}{4.75 + L_o}$

L_o : Distance from mounting surface to load center of gravity (cm)

Note) Operating pressure should be equal to or less than the maximum operating pressure in the article, "Vertical Operation" listed on page 1205.

CY3B
CY3R

CY1S

CY1L

CY1H

CY1F

CYP

D-□

-X□

Individual

-X□

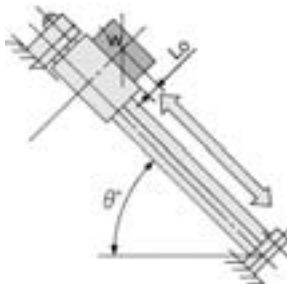
Technical

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Caution on Design (2)

Example of Allowable Load Mass Calculation Based on Cylinder Mounting Orientation

4. Inclined Operation (In operating direction)



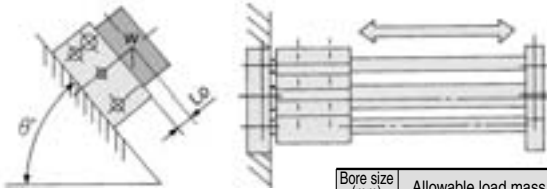
Angle	up to 45°	up to 60°	up to 75°	up to 90°
k	1	0.9	0.8	0.7

Angle coefficient (**k**) : $k = [\text{to } 45^\circ (= \theta)] = 1$,
 $[\text{to } 60^\circ] = 0.9$, $[\text{to } 75^\circ] = 0.8$,
 $[\text{to } 90^\circ] = 0.7$

Lo: Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	Allowable load mass (WA) (kg)
6	$\sigma \cdot 4.05 \cdot K$ $1.7 \cos \theta + 2 (1.6 + Lo) \sin \theta$
10	$\sigma \cdot 10.2 \cdot K$ $2.8 \cos \theta + 2 (1.95 + Lo) \sin \theta$
15	$\sigma \cdot 31.1 \cdot K$ $2.9 \cos \theta + 2 (2.4 + Lo) \sin \theta$
20	$\sigma \cdot 86.4 \cdot K$ $6 \cos \theta + 2 (2.8 + Lo) \sin \theta$
25	$\sigma \cdot 105.4 \cdot K$ $3.55 \cos \theta + 2 (3.1 + Lo) \sin \theta$
32	$\sigma \cdot 178 \cdot K$ $4 \cos \theta + 2 (3.95 + Lo) \sin \theta$
40	$\sigma \cdot 361.9 \cdot K$ $5.7 \cos \theta + 2 (4.75 + Lo) \sin \theta$

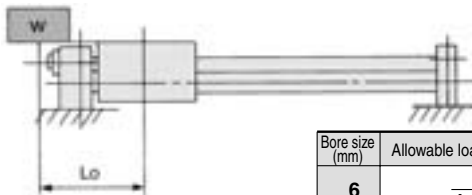
5. Inclined Operation (At a right angle to operating direction)



Lo: Distance from mounting surface to load center of gravity (cm)

Bore size (mm)	Allowable load mass (WA) (kg)
6	$\sigma \cdot 6.48$ $3.6 + 2 (1.6 + Lo) \sin \theta$
10	$\sigma \cdot 15$ $5 + 2 (1.95 + Lo) \sin \theta$
15	$\sigma \cdot 45.5$ $6.5 + 2 (2.4 + Lo) \sin \theta$
20	$\sigma \cdot 115$ $8 + 2 (2.8 + Lo) \sin \theta$
25	$\sigma \cdot 180$ $9 + 2 (3.1 + Lo) \sin \theta$
32	$\sigma \cdot 330$ $11 + 2 (3.95 + Lo) \sin \theta$
40	$\sigma \cdot 624$ $13 + 2 (4.75 + Lo) \sin \theta$

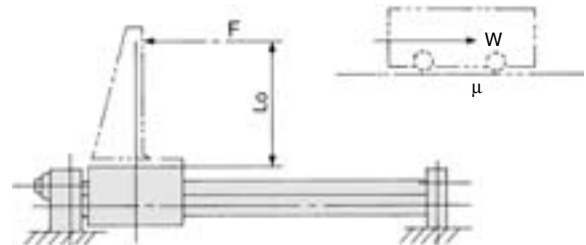
6. Load Center Offset in Operating Direction (Lo)



Lo: Distance from center of slide block to load's center of gravity (cm)

Bore size (mm)	Allowable load mass (WA) (kg)
6	$\frac{\sigma \cdot 2}{Lo + 1.7}$
10	$\frac{\sigma \cdot 5.6}{Lo + 2.8}$
15	$\frac{\sigma \cdot 13.34}{Lo + 2.9}$
20	$\frac{\sigma \cdot 43.2}{Lo + 6}$
25	$\frac{\sigma \cdot 46.15}{Lo + 3.55}$
32	$\frac{\sigma \cdot 80}{Lo + 4}$
40	$\frac{\sigma \cdot 188.1}{Lo + 5.7}$

7. Horizontal Operation (Pushing load, Pusher)

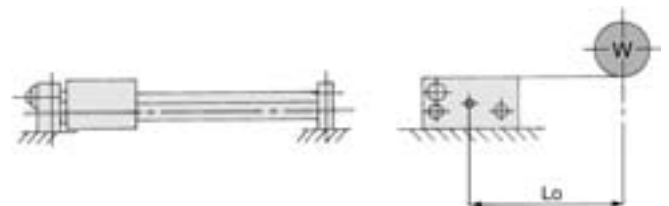


F: Drive (from slide block to position **Lo**) resistance force $W \times \mu$ (kg)
Lo: Distance from mounting surface to load center of gravity (cm)
 μ : Friction coefficient

Bore size (mm)	6	10	15	20
Allowable drive resisting force (FA) (kg)	$\frac{\sigma \cdot 2.72}{1.6 + Lo}$	$\frac{\sigma \cdot 5.55}{1.95 + Lo}$	$\frac{\sigma \cdot 15.96}{2.4 + Lo}$	$\frac{\sigma \cdot 41.7}{2.8 + Lo}$

Bore size (mm)	25	32	40
Allowable drive resisting force (FA) (kg)	$\frac{\sigma \cdot 58.9}{3.1 + Lo}$	$\frac{\sigma \cdot 106.65}{3.95 + Lo}$	$\frac{\sigma \cdot 228}{4.75 + Lo}$

8. Horizontal Operation (Load, Lateral offset Lo)



Lo: Distance from center of side block to load's center of gravity (cm)

Bore size (mm)	6	10	15	20
Allowable load mass (WA) (kg)	$\frac{\sigma \cdot 6.48}{3.6 + Lo}$	$\frac{\sigma \cdot 15}{5 + Lo}$	$\frac{\sigma \cdot 45.5}{6.5 + Lo}$	$\frac{\sigma \cdot 80.7}{8 + Lo}$

Bore size (mm)	25	32	40
Allowable load mass (WA) (kg)	$\frac{\sigma \cdot 144}{9 + Lo}$	$\frac{\sigma \cdot 275}{11 + Lo}$	$\frac{\sigma \cdot 520}{13 + Lo}$

Caution on Design (3)

Vertical Operation

When operating a load vertically, it should be operated within the allowable load mass and maximum operating pressures shown in the table below. Use caution, as operating above the prescribed values may lead to dropping of the load.

When the cylinder is mounted vertically or sidelong, sliders may move downwards due to the self-weight or workpiece mass. If an accurate stopping position is required at the stroke end or the middle-stroke, use an external stopper to secure accurate positioning.

Bore size (mm)	Model	Allowable load mass (Wv) (kg)	Maximum operating pressure (Pv) (MPa)
6	CY1L 6H	1.0	0.55
10	CY1L10H	2.7	0.55
15	CY1L15H	7.0	0.65
	CY1L15L	4.1	0.40
20	CY1L20H	11.0	0.65
	CY1L20L	7.0	0.40
25	CY1L25H	18.5	0.65
	CY1L25L	11.2	0.40
32	CY1L32H	30.0	0.65
	CY1L32L	18.2	0.40
40	CY1L40H	47.0	0.65
	CY1L40L	29.0	0.40

Note 1) Use caution, since the magnetic coupling may be dislocated if it is used over the maximum operating pressure.

Note 2) Allowable load mass above indicates the maximum load mass when loaded. The actual loadable mass must be determined referring to the flow chart in the Model Selection 1.

Intermediate Stop

1. Intermediate stopping of load with an external stopper, etc.

When stopping a load in mid-stroke using an external stopper (adjusting bolt, etc.), operate within the operating pressure limits shown in the table below. Use caution, as operation at a pressure exceeding these limits can result in breaking of the magnetic coupling.

Bore size (mm)	Model	Operating pressure limit for intermediate stop (Ps) (MPa)
6	CY1L 6H	0.55
10	CY1L10H	0.55
15	CY1L15H	0.65
	CY1L15L	0.40
20	CY1L20H	0.65
	CY1L20L	0.40
25	CY1L25H	0.65
	CY1L25L	0.40
32	CY1L32H	0.65
	CY1L32L	0.40
40	CY1L40H	0.65
	CY1L40L	0.40

2. Intermediate stopping of load with an air pressure circuit

When stopping a load using an air pressure circuit, operate at or below the kinetic energy shown in the table below. Use caution, as operation when exceeding the allowable value can result in breaking of the magnetic coupling.

(Reference values)

Bore size (mm)	Model	Allowable kinetic energy for intermediate stop (Es) (J)
6	CY1L 6H	0.007
10	CY1L10H	0.03
15	CY1L15H	0.13
	CY1L15L	0.076
20	CY1L20H	0.24
	CY1L20L	0.16
25	CY1L25H	0.45
	CY1L25L	0.27
32	CY1L32H	0.88
	CY1L32L	0.53
40	CY1L40H	1.53
	CY1L40L	0.95

CY3B
CY3R

CY1S

CY1L

CY1H

CY1F

CYP

D-□

-X□

Individual
-X□

Technical
data

Magnetically Coupled Rodless Cylinder Slider Type: Ball Bushing Bearing

Series CY1L

ø6, ø10, ø15, ø20, ø25, ø32, ø40

How to Order

Ball Bushing Bearing

CY1L 25 H - 300 - J79W

Slider type
(Ball bushing bearing)

Bore size

6	6 mm	25	25 mm
10	10 mm	32	32 mm
15	15 mm	40	40 mm
20	20 mm		

Port thread type

Symbol	Type	Bore size
Nil	M thread	ø6, ø10, ø15
	Rc	ø20, ø25, ø32, ø40
TN	NPT	
TF	G	

Magnetic holding force

Refer to page 1207 for specifications.

Standard stroke

Refer to "Standard Stroke" on page 1207.

Auto switch

Nil	Without auto switch (Built-in magnet)
-----	--

* For the applicable auto switch model, refer to the table below.

Number of auto switches

Nil	2 pcs.
S	1 pc.
n	"n" pcs.

Refer to page 1207 for details.

Adjustment type

Nil	With adjusting bolt
B	With shock absorbers (2 pcs.)
BS	With shock absorber (With plate A) * Installed on side A at time of shipment.

Shock Absorbers

Type	Bore size (mm)				
	6	10, 15	20	25	32, 40
Standard (shock absorber Series RB)	RB0805		RB1006	RB1411	RB2015
Shock absorber soft type Series RJ type (-XB22)	RJ0805	RJ0806H	RJ1007H	RJ1412H	—

* The shock absorber service life is different from that of the CY1L cylinder. Refer to "Specific Product Precautions" for each shock absorber for the replacement period.

* The shock absorber soft type Series RJ type (-XB22) is a made to order specification. For details, refer to page 1415-1.

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m) *				Pre-wired connector	Applicable load				
					DC	AC	Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)	None (N)						
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	F7NV	F79	●	●	○	—	○	IC circuit	Relay PLC			
		3-wire (PNP)		F7PV			F7P	●	●	○	—	○						
	Connector	2-wire		12 V	F7BV		J79	●	●	○	—	○	—					
		3-wire (NPN)		5 V, 12 V	F7NC		—	●	●	○	●	—						
	Diagnostic indication (2-color indication)	Grommet		3-wire (PNP)	5 V, 12 V		F7NWX	F79W	●	●	○	—	○	IC circuit				
				2-wire	12 V		—	F7PW	●	●	○	—	○					
	Water resistant (2-color indication)	Grommet		4-wire (NPN)	12 V		F7BWV	J79W	●	●	○	—	○	—				
	With diagnostic output (2-color indication)				5 V, 12 V		—	F7BAV	F7BA	—	●	○	—			○		
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	A76H	●	●	—	—	—	IC circuit	—		
				2-wire	—	—	200 V	A72	A72H	●	●	—	—	—	—			
					12 V	100 V	A73	A73H	●	●	●	—	—					
					5 V, 12 V	100 V or less	A80	A80H	●	●	—	—	—					
		Connector		No	2-wire	12 V	—	—	A73C	—	●	●	●	●	—	IC circuit	Relay PLC	
						5 V, 12 V	—	—	A80C	—	●	●	●	●	—	IC circuit		

* Lead wire length symbols: 0.5 m..... Nil
3 m..... L
5 m..... Z
None..... N

(Example) J79W
(Example) J79WL
(Example) J79WZ
(Example) J79CN

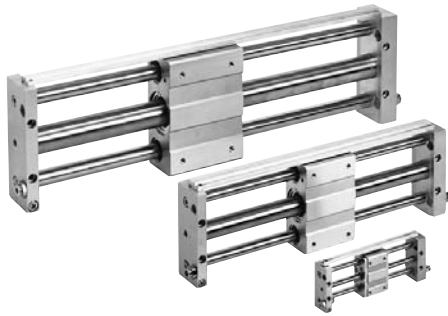
* Solid state auto switches marked with "○" are produced upon receipt of order.

• Since there are other applicable auto switches than listed, refer to page 1210 for details.

• For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.

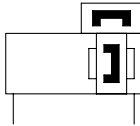
* Auto switches are shipped together, (but not assembled).

Magnetically Coupled Rodless Cylinder Slider Type: Ball Bushing Bearing **Series CY1L**



JIS Symbol

Rubber bumper
(Magnet type)



Easy piping and wiring

Hollow shafts are used, and centralization of ports on one side makes piping easy. Auto switches can be mounted through the use of special switch rails.

Shock absorbers and adjusting bolt are standard equipment

Impacts at stroke end due to high speed use can be absorbed, and fine adjustment of the stroke is possible.

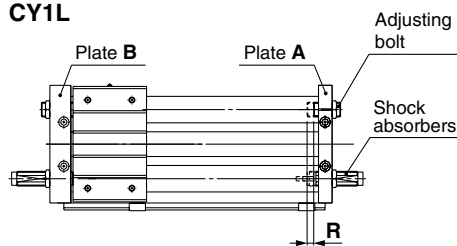


Made to Order Specifications
(For details, refer to pages 1395 to 1565.)

Symbol	Specifications
—XB9	Low speed cylinder (15 to 50 mm/s)
—XB13	Low speed cylinder (7 to 50 mm/s)
—XB22	Shock absorber soft type Series RJ type
—X116	Hydro specifications rodless cylinder
—X168	Helical insert thread specifications
—X322	Outside of cylinder tube with hard chrome plated

Amount of Adjustment by Adjusting Bolt

CY1L



Bore size (mm)	Amount of adjustment by adjusting bolt: R(mm)	
	Single side	Both sides
6	6	12
10	5.5	11
15	3.5	7
20	5.5	11
25	5	10
32	5.5	11
40	4.5	9

- * Since the cylinder is in an intermediate stop condition when stroke adjustment is performed, use caution regarding the operating pressure and the kinetic energy of the load.
- * The amount of adjustment for adjustment bolts is the total amount when adjusted on both plate ends. For the adjustment on a single plate end, the amount of adjustment is half of the figures in the table above.
- * Adjust the stroke adjustment with an adjustment bolt. It cannot be adjusted by a shock absorber.

Specifications

Bore size (mm)		6	10	15	20	25	32	40
Fluid		Air						
Proof pressure		1.05 MPa						
Maximum operating pressure		0.7 MPa						
Minimum operating pressure		0.18 MPa						
Ambient and fluid temperature		-10 to 60°C (No freezing)						
Piston speed *		50 to 500 mm/s						
Cushion		Rubber bumper/Shock absorber						
Lubrication		Not required (Non-lube)						
Stroke length tolerance (mm)		0 to 250 st: $+1.0_0$, 251 to 1000 st: $+1.4_0$, 1001 st and up: $+1.8_0$						
Holding force (N)	Type H	19.6	53.9	137	231	363	588	922
	Type L	—	—	81.4	154	221	358	569
Standard equipment		Auto switch mounting rail						

* In the case of setting an auto switch at the intermediate position, the maximum piston speed is subject to restrict for detection upon the response time of a load (Relays, Sequence controller, etc.).

Standard Stroke

Bore size (mm)	Standard stroke (mm)	Maximum available stroke (mm)
6	50, 100, 150, 200	300
10	50, 100, 150, 200, 250, 300	500
15	50, 100, 150, 200, 250, 300, 350, 400, 450, 500	750
20	100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800	1000
25		1500
32		1500
40	100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	1500

Note) Intermediate stroke is available by the 1 mm interval.

Mass

		(kg)						
Bore size (mm)	Number of magnets	6	10	15	20	25	32	40
	Basic mass	0.324	0.580	1.10	1.85	2.21	4.36	4.83
	CY1L□H	—	—	1.02	1.66	2.04	4.18	4.61
	CY1L□L	—	—	1.02	1.66	2.04	4.18	4.61
Additional mass per each 50mm of stroke		0.044	0.077	0.104	0.138	0.172	0.267	0.406

Calculation

(Example) CY1L32H-500

• Basic mass 4.36 kg • Additional mass 0.267/50 st • Cylinder stroke 500 st
4.36 + 0.267 x 500 ÷ 50 = 7.03 kg

Shock Absorber Specifications

Refer to the Series RB in Best Pneumatics No. 3 for the details on shock absorbers.

Applicable rodless cylinder	CY1L ⁶ ₁₀ ¹⁵	CY1L20	CY1L25	CY1L ³² ₄₀
Shock absorber model	RB0805	RB1006	RB1411	RB2015
Maximum energy absorption: (J)	0.98	3.92	14.7	58.8
Stroke absorption: (mm)	5	6	11	15
Collision speed: (m/s)	0.05 to 5			
Max. operating frequency: (cycle/min) *	80	70	45	25
Ambient temperature range	-10 to 80 °C			
Spring force: (N)	Extended	1.96	4.22	6.86
	Retracted	3.83	6.18	15.3

* It denotes the values at the maximum energy absorption per one cycle. Therefore, the operating frequency can be increased according to the energy absorption.

The shock absorber service life is different from that of the CY1L cylinder. Refer to the Specific Product Precautions for the replacement period.

CY3B
CY3R

CY1S

CY1L

CY1H

CY1F

CYP

D-□

-X□

Individual
-X□

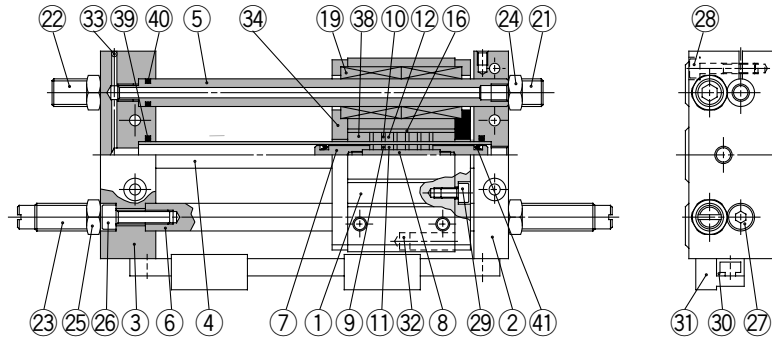
Technical
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Series CY1L

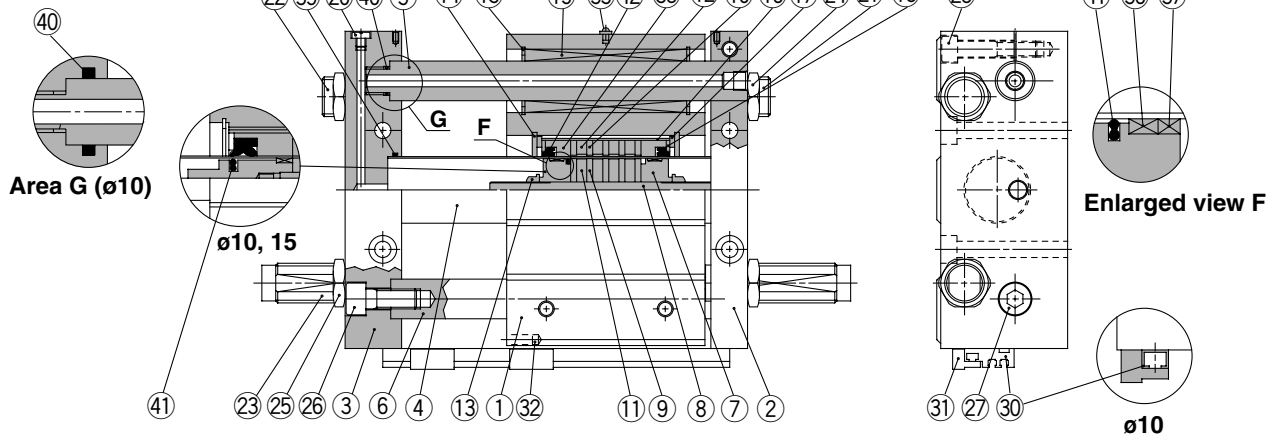
Construction

Slider type/Ball bushing bearing

CY1L6



CY1L10 to 40



Component Parts

No.	Description	Material	Note
1	Slide block	Aluminum alloy	Anodized
2	Plate A	Aluminum alloy	Anodized
3	Plate B	Aluminum alloy	Anodized
4	Cylinder tube	Stainless steel	
5	Guide shaft A	Carbon steel	Hard chrome plated
6	Guide shaft B	Carbon steel	Hard chrome plated
7	Piston	Aluminum alloy ^{Note 1)}	Chromated
8	Shaft	Stainless steel	
9	Piston side yoke	Rolled steel	Zinc chromated
10	External slider side yoke	Rolled steel	Zinc chromated
11	Magnet A	—	
12	Magnet B	—	
13	Piston nut	Carbon steel	Zinc chromated ø25 to ø40
14	Retaining ring	Carbon tool steel	Phosphate coated
15	Retaining ring	Carbon tool steel	Phosphate coated
16	External slider tube	Aluminum alloy	
17	Slider spacer	Rolled steel	Nickel plated
18	Spacer	Rolled steel	Nickel plated
19	Ball bushing	—	
20	Plug	Brass	ø25, ø32, ø40 only
21	Adjusting bolt A	Chromium molybdenum steel	Nickel plated
22	Adjusting bolt B	Chromium molybdenum steel	Nickel plated
23	Shock absorber	—	
24	Hexagon nut	Carbon steel	Nickel plated
25	Hexagon nut	Carbon steel	Nickel plated
26	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated
27	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated
28	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated

Note 1) Brass for ø6

No.	Description	Material	Note
29	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated
30	Switch mounting rail	Aluminum alloy	
31	Auto switch	—	
32	Magnet for auto switch	—	
33	Steel ball	—	ø6, ø10, ø15 only
34	Side cover	Carbon steel	ø6 only
35	Grease cup	Carbon steel	ø15 or larger
36 *	Wear ring A	Special resin	
37 *	Wear ring	Special resin	
38 *	Wear ring B	Special resin	
39 *	Cylinder tube gasket	NBR	
40 *	Guide shaft gasket	NBR	
41 *	Piston seal	NBR	
42 *	Scraper	NBR	

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
6	CY1S6-PS-N	Set of nos. above 38, 39, 40, 41
10	CY1L10-PS-N	Set of nos. above 36, 38, 39, 40, 41, 42
15	CY1L15-PS-N	
20	CY1L20-PS-N	Set of nos. above 36, 37, 38, 39, 40, 41, 42
25	CY1L25-PS-N	
32	CY1L32-PS-N	
40	CY1L40-PS-N	

* Seal kit includes 38, 39, 40, 41 for ø6. 36, 38 to 42 are for ø10, ø15. 36 to 42 are for ø20 to ø40. Order the seal kit, based on each bore size.

* ø6: Same for CY1S6

* Seal kit includes a grease pack (ø6, ø10: 5 and 10 g, ø15 to ø40: 10 g). Order with the following part number when only the grease pack is needed.

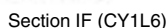
Grease pack part no. for ø6, ø10: GR-F-005 (5 g) for external sliding parts,

GR-S-010 (10 g) for tube interior

Grease pack part no. for ø15 to ø40: GR-S-010 (10 g)

Series CY1L

CY1L6/10



* PA dimensions are for split from center.

CY1L15/20/25/32/40

Technical drawing of the CY1L15/20/25/32/40 solenoid valve, showing front, side, and detail views with dimensions and labels.

Front View Dimensions:

- HA: Height of the coil assembly
- HB: Height of the base
- HA (II): Height of the base (II)
- HB: Height of the base
- EB: End bracket
- FB: Fastening bracket
- TD: Thread diameter

Side View Dimensions:

- HO: Overall height
- HI: Height of the coil assembly
- W: Width

Top View Dimensions:

- (NB), (N), TT, NN, (NA), T, (N): Port and connection labels
- Z + Stroke: Stroke length
- Hollow shaft for piping: Hollow shaft for piping
- 4 x MM: 4 x MM
- Depth M: Depth M
- PA, PB: Port labels
- øD: Bore diameter
- G: Gasket
- L: Length
- Q + Stroke: Stroke length
- A: Mounting flange
- 4 x Counterbore dia. øB: 4 x Counterbore dia. øB
- 4 x Counterbore depth. C: 4 x Counterbore depth. C

Detail View Dimensions:

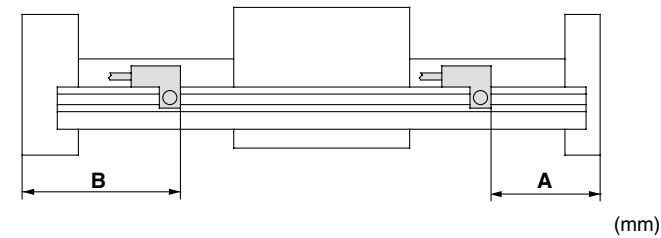
- Auto switch mountable: Auto switch mountable
- H, HP, HG: Height labels
- 2 x P, 4 x J, Depth JK: 2 x P, 4 x J, Depth JK
- OW: Overall width
- LD: Lead
- GP, PW: Port labels
- HT: Height
- HS: Height
- FA: Fastening bracket
- EA: End bracket
- 1a: Thread diameter

Shock absorber: Shock absorber

* PA dimensions are for split from center.

Series CY1L

Proper Auto Switch Mounting Position (Detection at stroke end)



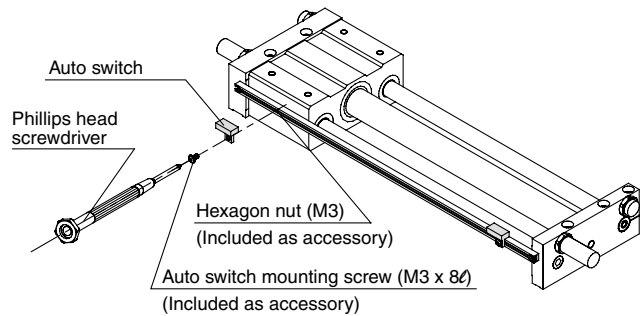
Bore size (mm)	Applicable auto switch					
	D-A73/A80		D-A72 D-A7□H/A80H D-A73C/A80C D-F7□/J79 D-F7□V/J79C D-F7□W/J79W D-F7□WV D-F7BAL/F7BAVL D-F79F		D-F7NTL	
	A	B	A	B	A	B
6	23	45	23.5	44.5	28.5	39.5
10	58	45	58.5	44.5	63.5	39.5
15	65	47	65.5	46.5	70.5	41.5
20	76	54	76.5	53.5	81.5	48.5
25	76	54	76.5	53.5	81.5	48.5
32	92	57	92.5	56.5	97.5	51.5
40	130	64	130.5	63.5	135.5	58.5

Note 1) 50 mm is the minimum stroke available with 2 auto switches mounted.
In the case of a stroke less than this, please contact SMC.

Note 2) Adjust the auto switch after confirming the operating conditions in the actual setting.

Mounting of Auto Switch

When mounting an auto switch, the auto switch mounting screw should be screwed into a hexagon nut (M3 x 0.5) which has been inserted into the groove of the switch mounting rail. (Tightening torque: Approx. 0.5 to 0.7 N·m)



Operating Range

Auto switch model	Bore size (mm)						
	6	10	15	20	25	32	40
D-A7□/A8□	6	6	6	6	6	6	6
D-F7□/J7□	3	3	4	3	3	3	3.5
D-F79F	4.5	4.5	4.5	4.5	4.5	4.5	4.5

* Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion)
There may be the case it will vary substantially depending on an ambient environment.

Other than the models listed in “How to Order”, the following auto switches are applicable.
For detailed specifications, refer to page 1314.

Type	Model	Electrical entry (Fetching direction)	Features
Solid state auto switch	D-F7NTL	Grommet (In-line)	With timer

* With pre-wired connector is available for D-F7NTL type, too.
For details, refer to pages 1328 and 1329.



Series CY1L

Specific Product Precautions

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Operation

⚠ Warning

- 1. Be aware of the space between the plates and the slide block.**
Take sufficient care to avoid getting your hands or fingers caught when the cylinder is operated.
- 2. Do not apply a load to a cylinder which is greater than the allowable value stated in the "Model Selection" pages.**
This may cause malfunctions.
- 3. When the cylinder is used in a place where water or cutting oil may splash or the lubrication condition on the cylinder sliding parts would be deteriorated, please consult with SMC.**
- 4. When applying grease to the cylinder, use the grease that has already been applied to the product. Contact SMC for available grease packs.**

Mounting

⚠ Caution

- 1. Avoid operation with the external slider fixed to the mounting surface.**
The cylinder should be operated with the plates fixed to the mounting surface.
- 2. Make sure that the cylinder mounting surface is a flatness of 0.2 mm or less.**
If the flatness of the cylinder mounting surface is not appropriate, 2 guide shafts may be twisted. This may adversely affect the operating conditions and shorten the service life due to the increase of sliding resistance and the early abrasion of bearings.
The cylinder mounting surface must be a flatness of 0.2 mm or less, and the cylinder must be mounted as it smoothly operates through the full stroke at the minimum operating pressure (0.18 MPa or less).

Service Life and Replacement Period of Shock Absorber

⚠ Caution

- 1. Allowable operating cycle under the specifications set in this catalog is shown below.**
1.2 million times RB08□□
2 million times RB10□□ to RB2725
Note) Specified service life (suitable replacement period) is the value at room temperature (20 to 25°C).
The period may vary depending on the temperature and other conditions. In some cases the absorber may need to be replaced before the allowable operating cycle above.

Disassembly and Maintenance

⚠ Warning

- 1. Use caution as the attractive power of the magnets is very strong.**
When removing the external slider and piston slider from the cylinder tube for maintenance, etc., handle with caution, since the magnets installed in each slider have a very strong attractive force.

⚠ Caution

- 1. Use caution when removing the external slider, as the piston slider will be directly attracted to it.**
When removing the external slider or piston slider from the cylinder tube, first force the sliders out of their magnetically coupled positions, and then remove them individually when there is no longer any holding force. If they are removed while still magnetically coupled, they will be directly attracted to one another and will not come apart.
- 2. Since the magnetic holding force can be changed (for example, from CY1L25L to CY1L25H), please contact SMC if this is necessary.**
- 3. Do not disassemble the magnetic components (piston slider, external slider).**
This can cause a loss of holding force and malfunction.
- 4. When disassembling to replace the seals and wear ring, refer to the separate disassembly instructions.**
- 5. Use caution to the direction of the external slider and the piston slider.**
Since the external slider and piston slider are directional for ø6, ø10 and holding force type L, refer to the figures below when performing disassembly or maintenance. Put the external slider and piston slider together, and insert the piston slider into the cylinder tube so that they will have the correct positional relationship as shown in Fig. (1). If they align as shown in Fig. (2), insert the piston slider after turning it around 180°. If the direction is not correct, it will be impossible to obtain the specified holding force.

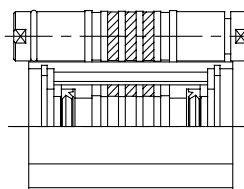


Fig. (1) Correct position

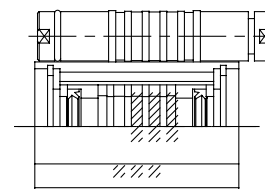


Fig. (2) Incorrect position

Example of ø15 with holding force type L

CY3B
CY3R

CY1S

CY1L

CY1H

CY1F

CYP

D-□

-X□

Individual
-X□

Technical
data