

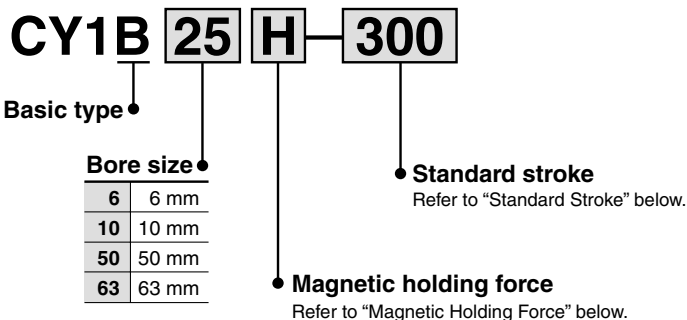
Magnetically Coupled Rodless Cylinder Basic Type



Series **CY1B**

ø6, ø10, ø50, ø63

How to Order



Standard Stroke

Bore size (mm)	Standard stroke (mm)	Manufacturable ^{Note)} maximum stroke (mm)
6	50, 100, 150, 200	300
10	50, 100, 150, 200, 250, 300	500
50	100, 150, 200, 250, 300, 350, 400, 450	6000
63	500, 600, 700, 800, 900, 1000	

Note) Please contact SMC if it is used by exceeding the maximum stroke length.

Magnetic Holding Force

Bore size (mm)		6	10	50	63
Holding force	Type H	19.6	53.9	1471	2256
	Type L	—	—	863	1373

(N)

Magnetically Coupled Rodless Cylinder Basic Type Series CY1B



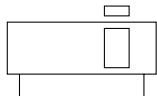
Strong holding force

Type H/ø63 — 2256 N
Type L/ø63 — 1373 N

Available up to 6000 mm stroke
(ø50, ø63)

Long service life with no external leakage

JIS Symbol



Made to Order Specifications
(For details, refer to page 8-31-1.)

Symbol	Specifications
-XB6	Heat resistant cylinder (150°C)
-XB9	Low speed cylinder (10 to 50 mm/s)
-XB11	Long stroke type
-XB13	Low speed cylinder (5 to 50 mm/s)
-XC18	NPT finish piping port
-XC24	With magnetic shielding plate
-XC57	With floating joint
-X116	Hydro specifications rodless cylinder
-X132	Air supply port relocated in axial direction
-X160	High speed specifications rodless cylinder
-X168	Helical insert thread specifications
-X206	Additional mounting tap positions for slider
-X210	Non-lubricated exterior specifications
-X211	CY series mounting dimensions
-X322	Outside of cylinder tube with hard chrome plated
-X324	Oil-free exterior (With dust seal)

Specifications

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
Piston speed	50 to 400 mm/s
Cushion	Rubber bumper on both ends
Lubrication	Non-lube
Stroke length tolerance	0 to 250 st: $^{+1.0}_0$, 251 to 1000 st: $^{+1.4}_0$, 1001 st and up: $^{+1.8}_0$
Mounting orientation	Free
Mounting nuts (2 pcs.)	Standard equipment (Accessory)

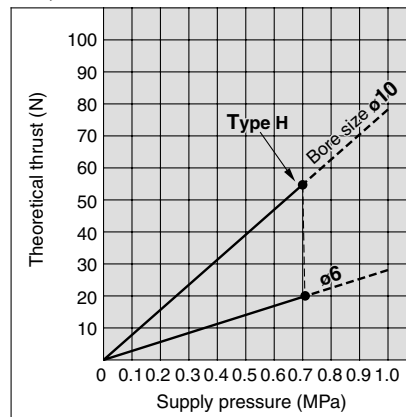
Theoretical Cylinder Thrust



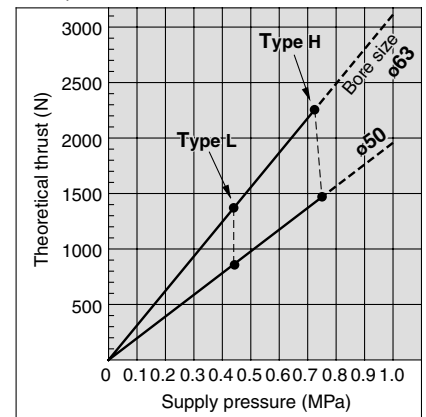
Caution

When calculating the actual thrust, design should consider the minimum actuating pressure.

ø6, ø10



ø50, ø63



Weight

		(kg)			
		Bore (mm)			
		6	10	50	63
Magnetic holding force					
Basic weight	CY1B□H	0.075	0.08	3.4	5.7
	CY1B□L	—	—	3.1	5.2
Additional weight per each 50mm of stroke		0.004	0.014	0.095	0.12

Calculation
(Example) CY1B10H-300

Basic weight 0.08 kg
 Additional weight 0.014/50 st } 0.08 + 0.014 x 300 + 50 = 0.16 kg
 Cylinder stroke 500 st

Principal Parts Material

Description	Material	Note
Head cover	Aluminum alloy	Electroless nickel plated
Cylinder tube	Stainless steel	
Body	Aluminum alloy	Hard anodized
Magnet	Rare earth	

MX□

MTS

MY□

CY□

MG□

CX□

D-

-X

20-

Data

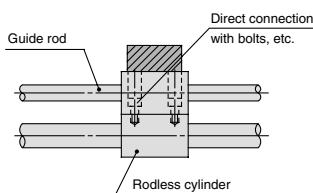
⚠ Precautions

Be sure to read before handling. Refer to pages 8-34-3 to 8-34-6 for Safety Instructions and Actuator Precautions.

Mounting

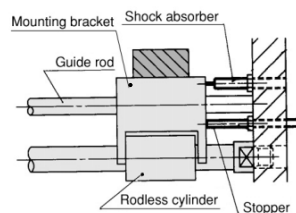
⚠ Caution

- Take care to avoid nicks or other damage on the outside surface of the cylinder tube.**
This can lead to a damage of the scraper and the wear ring, which in turn can cause malfunction.
- Use caution to the rotation of the external slider.**
Rotation should be controlled by connecting it to another shaft (linear guide, etc.).
- Do not operate with the magnetic coupling out of position.**
If the magnetic coupling is out of position, push the external slider by hand (or the piston slider with air pressure) back to the proper position at the stroke end.
- Be sure that both head covers are secured to the mounting surface before operating the cylinder.**
Avoid operation with the external slider secured to the surface.
- Do not apply a lateral load to the external slider.**
When a load is mounted directly to the cylinder, variations in the alignment of each shaft center cannot be offset, which results in the generation of a lateral load that can cause malfunction. The cylinder should be operated using a connection method which allows for shaft alignment variations and deflection due to the cylinder's own weight. A drawing of a recommended mounting is shown in Fig. (2).



Variations in the load and cylinder shaft alignment cannot be offset and may result in a malfunction.

Fig. (1)
Incorrect mounting



Shaft alignment variations are offset by providing clearance between the mounting bracket and cylinder. Moreover, the mounting bracket is extended above the cylinder shaft center, so that the cylinder is not subjected to moment.

Fig. (2)
Recommended mounting

6. Use caution regarding the allowable load weight when operating in a vertical direction.

The allowable load weight when operating in a vertical direction (reference values on page 8-15-29) is determined by the model selection method, however, if a load greater than the allowable value is applied, the magnetic coupling may break and there is a possibility of dropping the load. When using this type of application, please contact SMC regarding the operating conditions (pressure, load, speed, stroke, frequency, etc.).

Disassembly and Maintenance

⚠ Warning

- 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

- When reattaching the head covers after disassembly, confirm that they are tightened securely.**
When disassembling, hold the wrench flats of one head cover with a vise, and remove the other cover using a spanner or adjustable wrench on the wrench flats. When retightening, first coat with Loctite® (no. 542 red), and retighten 3° to 5° past the original position prior to removal.
- Use caution when taking off 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.
- Since it is possible to change the magnetic holding force (for example, from CY1B50L to CY1B50H), please contact SMC if this is necessary.**
- Do not disassemble the magnetic components (piston slider, external slider).**
This can cause a loss of holding force and malfunction.
- When disassembling to replace the seals and wear ring, refer to the separate disassembly instructions.**
- 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. (3). If they align as shown in Fig. (4), 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.

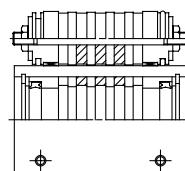


Fig. (3)
Correct position

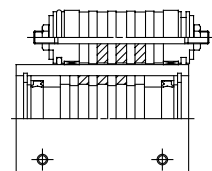


Fig. (4)
Incorrect position

Example of $\phi 20$ to $\phi 63$ with holding force type L

Series CY1B Model Selection 1

E: Kinetic energy of load (J)

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

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

Fn: Allowable driving force (N)

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

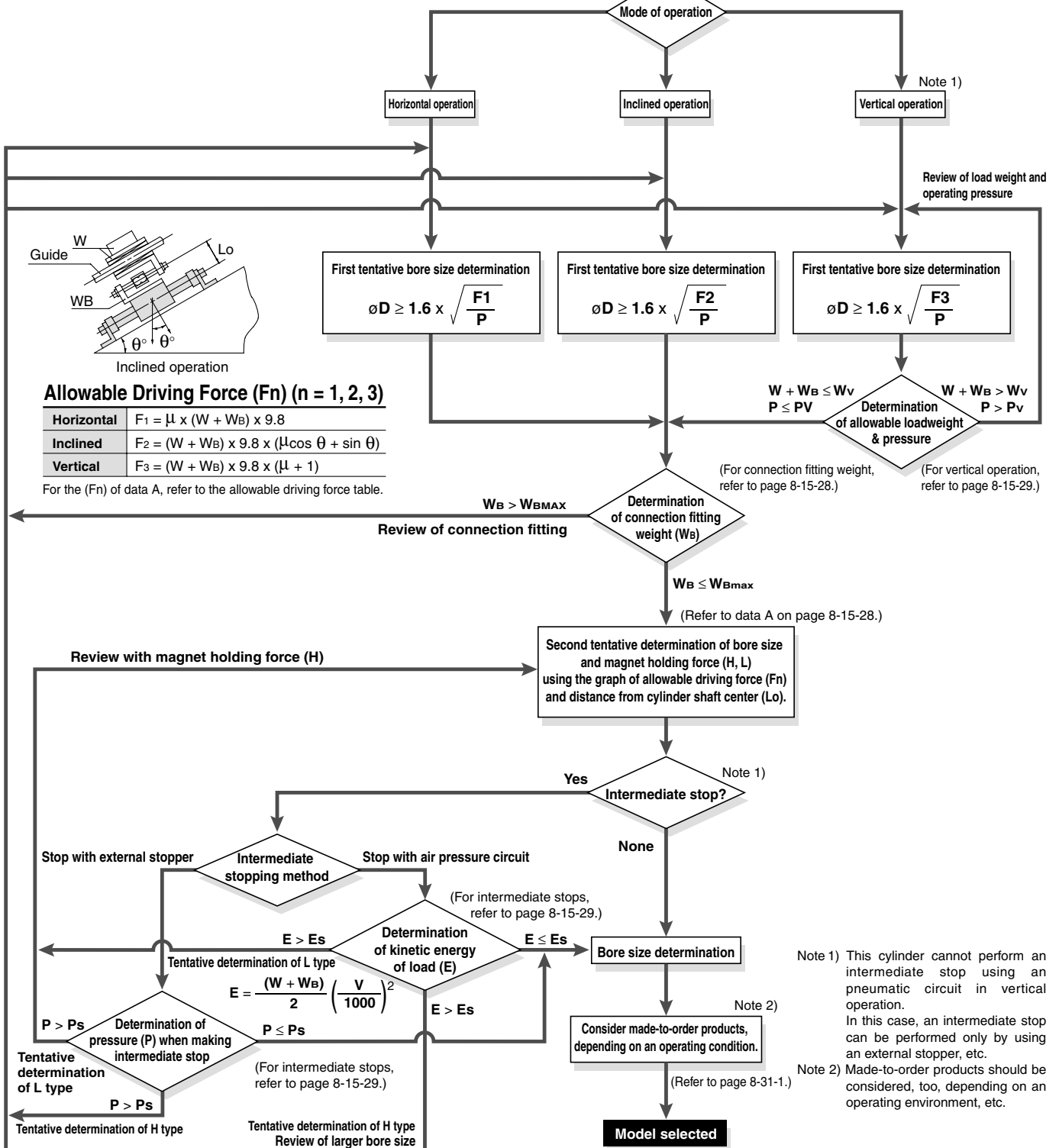
Pv: Maximum operating pressure for vertical operation (MPa)

WBmax.: Maximum connection fitting weight (kg)

Wv: Allowable load weight for vertical operation (kg)

Operating Conditions

- W: Load weight (kg)
- WB: Connection fitting weight (kg)
- μ: Guide's coefficient of friction
- Lo: Distance from cylinder shaft center to workpiece point of application (cm)
- Mode of operation (Horizontal, Inclined, Vertical)
- P: Operating pressure (MPa)
- V: Speed (mm/s)
- Stroke (mm)



- MX
- MTS
- MY
- CY
- MG
- CX
- D-
- X
- 20-
- Data

Note 1) This cylinder cannot perform an intermediate stop using an pneumatic circuit in vertical operation. In this case, an intermediate stop can be performed only by using an external stopper, etc.

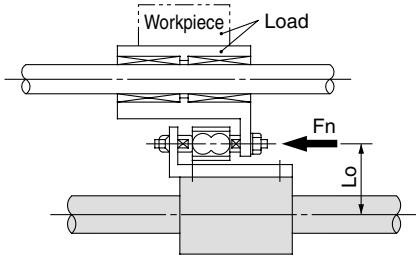
Note 2) Made-to-order products should be considered, too, depending on an operating environment, etc.

Caution on Design (1)

Selection Method

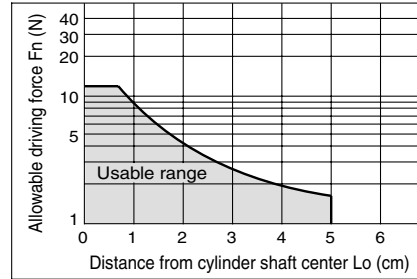
Selection procedure

1. Find the drive resisting force F_n (N) when moving the load horizontally.
2. Find the distance L_o (cm) from the point of the load where driving force is applied, to the center of the cylinder shaft.
3. Select the bore size and type of magnet holding force (types H, L) from L_o and F_n based on data (A).

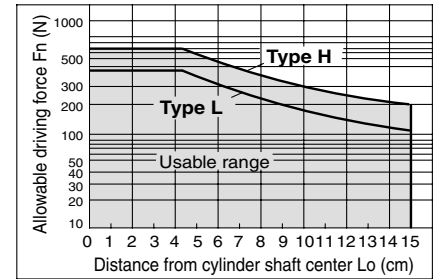


<Data (A): Distance from cylinder shaft center — Allowable driving capacity>

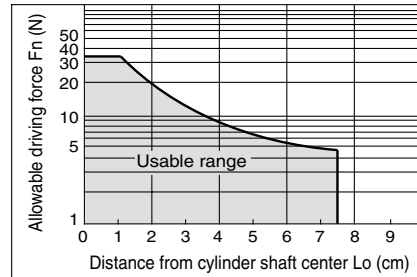
CY1B6



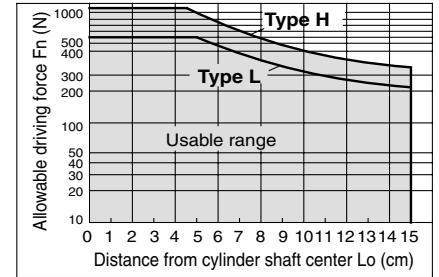
CY1B50



CY1B10



CY1B63

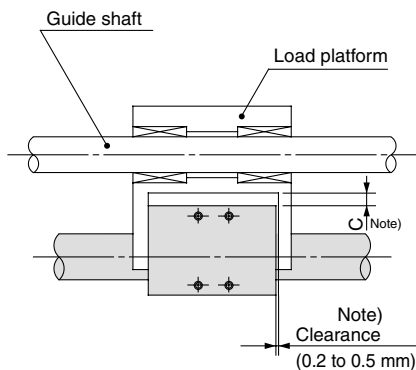


Series CY1B Model Selection 3

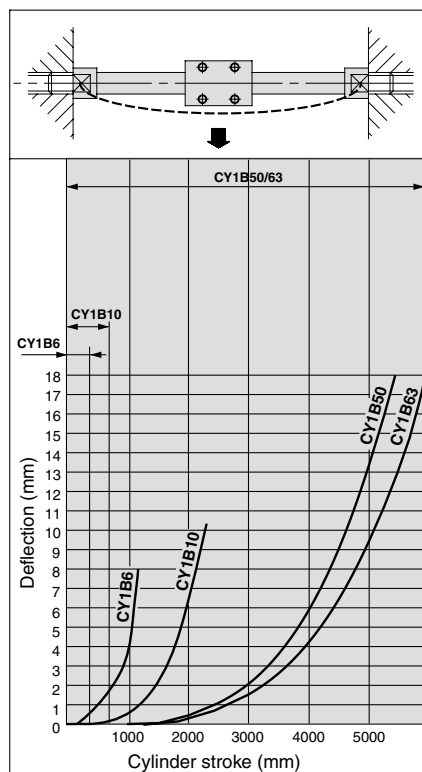
Caution on Design (2)

Cylinder Self Weight Deflection

When the cylinder is mounted horizontally, deflection appears due to its own weight as shown in the data, and the longer the stroke is, the greater the amount of variation in the shaft center.



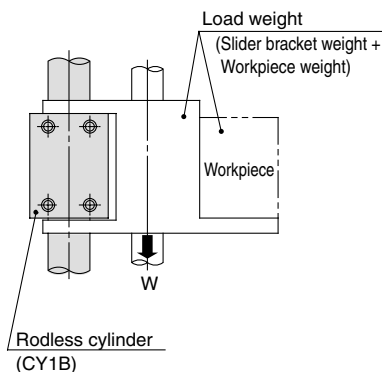
Note) Referring to the self-weight deflection in the graph below, provide clearance so that the cylinder does not touch the mounting surface or the load section, and is able to operate smoothly within the minimum operating pressure range for a full stroke.



* The above deflection data indicate values when the external slider has moved to the middle of the stroke.

Vertical Operation

The load should be guided by a ball type bearing (LM guide, etc.). If a slide bearing is used, sliding resistance increases due to the load weight and load moment, which can cause malfunction.



Bore size (mm)	Model	Allowable load weight (Wv) (kg)	Maximum operating pressure (Pv) (MPa)
6	CY1B6H	1.0	0.55
10	CY1B10H	2.7	0.55
50	CY1B50H	75.0	0.65
	CY1B50L	44.0	0.40
63	CY1B63H	115.0	0.65
	CY1B63L	70.0	0.40

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

Max. Connection Fitting Weight

The CY1B (Basic type) is not directly connected to the load, and is guided by another shaft (LM guide, etc.). Load connection fittings should be designed so that they do not exceed the weights given in the table below. (Refer to the separate instruction manual for the connection method.)

Max. Connection Fitting Weight

Model	Maximum connection fitting weight (W _{max}) (kg)
CY1B6H	0.2
CY1B10H	0.4
CY1B50□	2.5
CY1B63□	3.0

Please contact SMC before using fittings which exceed the above weights.

Intermediate Stop

(1) Intermediate Stopping of Load with an External Stopper, etc.

When stopping a load in mid-stroke using an external stopper, 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	CY1B6H	0.55
10	CY1B10H	0.55
50	CY1B50H	0.65
	CY1B50L	0.40
63	CY1B63H	0.65
	CY1B63L	0.40

(2) Intermediate Stopping of Load with an Air pressure Circuit

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

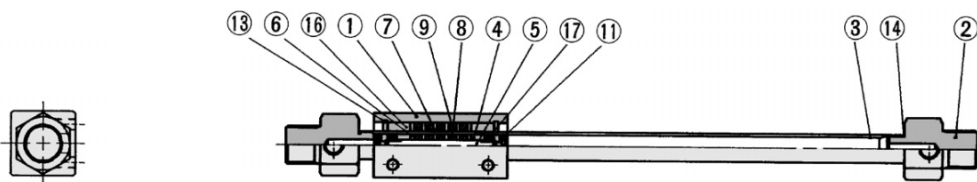
(Reference values)		
Bore size (mm)	Model	Allowable kinetic energy for intermediate stop (Es) (J)
6	CY1B 6H	0.007
10	CY1B10H	0.03
50	CY1B50H	3.12
	CY1B50L	1.83
63	CY1B63H	5.07
	CY1B63L	3.09

For "Stroke End Stopping Method", refer to page 8-15-39.

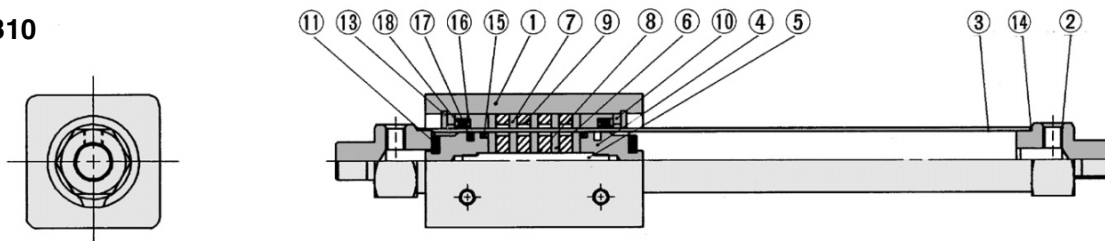
Series CY1B

Construction

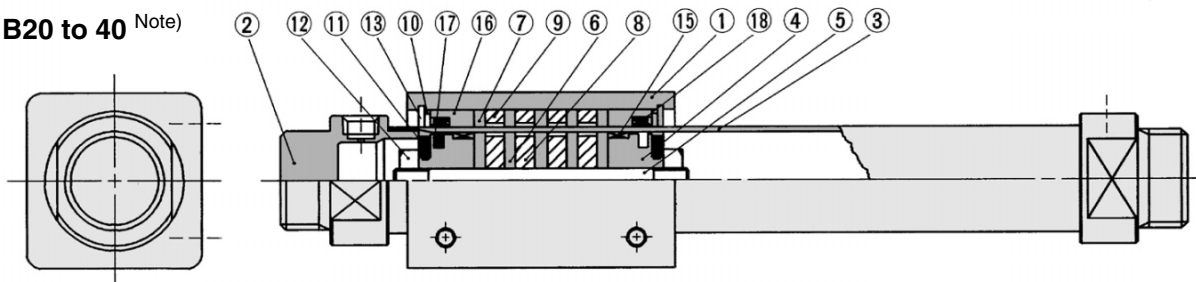
Basic type CY1B6



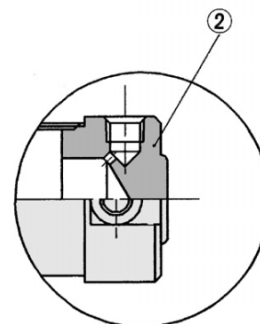
CY1B10



CY1B20 to 40 (Note)



Note) Now the CY1B series bore size 15 to 40 are replaced by the CY3B series respectively.



CY1B50/63

Component Parts

No.	Description	Material	Note
①	Body	Aluminum alloy	Hard anodized
②	Head cover	Aluminum alloy	Electroless nickel plated
③	Cylinder tube	Stainless steel	
④	Piston	Aluminum alloy (Note)	Chromated
⑤	Shaft	Stainless steel	
⑥	Piston side yoke	Rolled steel	Zinc chromated
⑦	External slider side yoke	Rolled steel	Zinc chromated
⑧	Magnet A	Rare earth magnet	
⑨	Magnet B	Rare earth magnet	
⑩	Spacer	Rolled steel	Nickel plated
⑪	Bumper	Urethane rubber	
⑫	Piston nut	Carbon steel	Zinc chromated
⑬	Snap ring	Carbon tool steel	Nickel plated
⑭*	Cylinder tube gasket	NBR	CY1B6: $\phi 7 \times \phi 5 \times \phi 1$ CY1B10: $\phi 11 \times \phi 9 \times \phi 1$
⑮*	Wear ring A	Special resin	The 6 mm bore cylinder is not available.
⑯*	Wear ring B	Special resin	
⑰*	Piston seal	NBR	
⑱*	Scraper	NBR	The 6 mm bore cylinder is not available.

Note) Brass for $\phi 6$ to $\phi 20$

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
6	CY1B6-PS-N	Nos. at left ⑭, ⑯, ⑰
10	CY1B10-PS-N	Nos. at left ⑭, ⑮, ⑯, ⑰, ⑱
50	CY1B50-PS-N	Set of nos. at left ⑮, ⑯, ⑰, ⑱
63	CY1B63-PS-N	

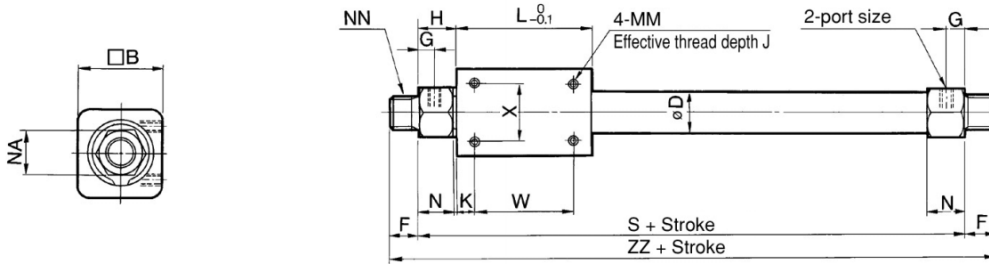
* Seal kit includes ⑭, ⑯, ⑰ for $\phi 6$, $\phi 10$. ⑭ to ⑱ are for $\phi 10$. ⑮ to ⑱ are for $\phi 50$ and $\phi 63$. Order the seal kit, based on each bore size.

Magnetically Coupled Rodless Cylinder Basic Type **Series CY1B**

Dimensions

Basic type

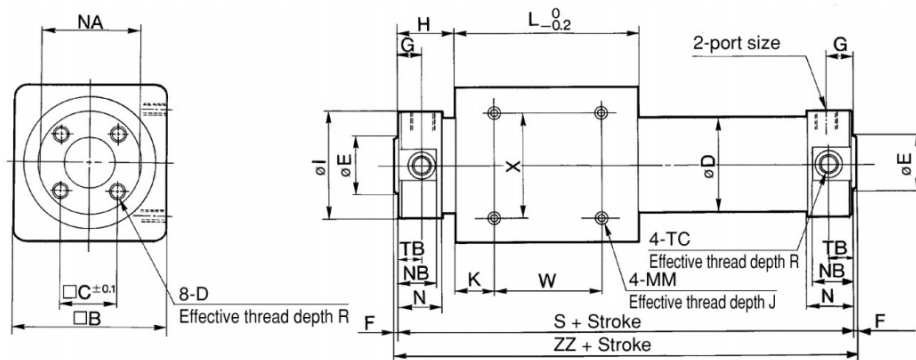
CY1B6/10



Model	Port size	D	B	F	G	H	K	L	N	NA	MM x J	NN	S	W	X	ZZ
CY1B6	M5 x 0.8	7.6	17	9	5	14	5	35	10	14	M3 x 0.5 x 4.5	M10 x 1.0	63	25	10	81
CY1B10	M5 x 0.8	12	25	9	5	12.5	4	38	11	14	M3 x 0.5 x 4.5	M10 x 1.0	63	30	16	81

(mm)

CY1B50/63

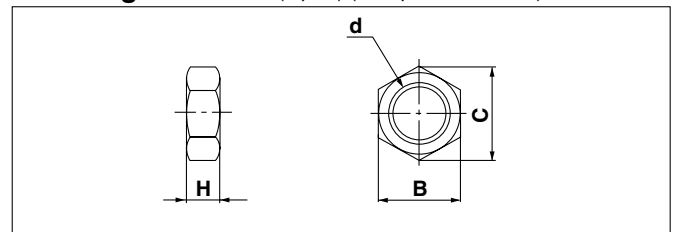


Model	Port size	B	C	D	E	F	G	H	I	K	L	MM x J	N	NA	NB	NN
CY1B50	Rc 1/4	86	32	53	30 ^{-0.007}	2	14	33	58.2	25	110	M8 x 1.25 x 12	25	55	23	—
CY1B63	Rc 1/4	100	38	66	32 ^{-0.007}	2	14	33	72.2	26	122	M8 x 1.25 x 12	25	69	23	—

(mm)

Model	Q x R	S	TB	TC x R	W	X	ZZ
CY1B50	M8 x 1.25 x 16	176	14	M12 x 1.25 x 7.5	60	60	180
CY1B63	M10 x 1.5 x 16	188	14	M14 x 1.5 x 11.5	70	70	192

Mounting Nut/included (2 pcs.) (Except $\phi 50$ and $\phi 63$)



Part no.	Applicable bore size (mm)	d	H	B	C
SNJ-016B	6, 10	M10 x 1.0	4	14	16.2

MX□

MTS

MY□

CY□

MG□

CX□

D-

-X

20-

Data