Magnetic
Rodless
Cylinder

Series CY1B
Basic Type

How to Order

Basic type **CY1B 25 H — 300**

Basic type

Bore size

6	6mm
10	10mm
15	15mm
20	20mm
25	25mm
32	32mm
40	40mm
50	50mm
63	63mm

Magnetic holding force
Refer to the magnet holding force table below.

Standard stroke
Refer to the standard stroke table below.

Standard Stroke Table

Bore size (mm)	Standard stroke (mm)	Maximum available stroke (mm) Note)
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	1000
20	100, 150, 200, 250, 300, 350, 400, 450 500, 600, 700, 800	2000
25		4000
32		
40	100, 150, 200, 250, 300, 350, 400, 450 500, 600, 700, 800, 900, 1000	5000
50		6000
63		

Note) Contact P/A if the maximum stroke will be exceeded.

Magnetic Holding Force (N)

1N: Approx. 0.102kgf

Bore size (mm)		**6**	**10**	**15**	**20**	**25**	**32**	**40**	**50**	**63**
Holding force type	**H type**	19.6	53.9	137	231	363	588	922	1471	2256
	L type	–	–	81.4	154	221	358	569	863	1373

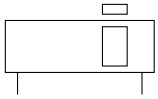
Series CY1B

Strong holding force
H type/ø63 --- 2256 N
L type/ø63 --- 1373 N

Available up to 6000mm stroke
(ø50, ø63)

Long life with no external leakage

JIS symbol



Mounting bracket type
• When mounting a floating bracket to a Series CY1B body, refer to P.67 for details, as this will be an order made product.

Specifications

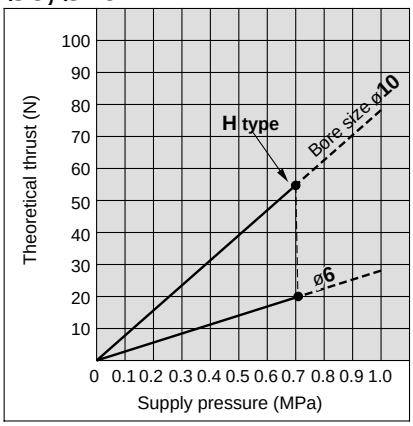
1MPa: Approx. 10.2kgf/cm²

Fluid	Air
Proof pressure	1.05MPa {10.7kgf/cm²}
Max. operating pressure	0.7MPa {7.1kgf/cm²}
Min. operating pressure	0.18MPa {1.8kgf/cm²}
Ambient & fluid temperature	–10 to 60°C
Piston speed	50 to 400mm/s
Cushion	Rubber bumpers at both ends
Lubrication	Non-lube
Stroke length tolerance	0 to 250st: $^{+1.0}_{0}$, 251 to 1000st: $^{+1.4}_{0}$, 1001st & up: $^{+1.8}_{0}$
Mounting orientation	Unrestricted
Mounting nuts (2pcs.)	Standard equipment (accessory)

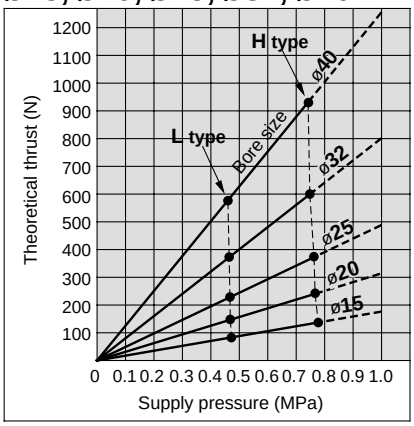
Theoretical Cylinder Thrust

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

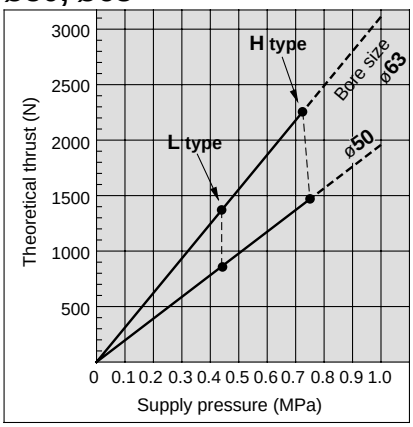
ø6, ø10



ø15, ø20, ø25, ø32, ø40



ø50, ø63



Weight Table

kg

Magnet holding force / Bore size (mm)		6	10	15	20	25	32	40	50	63
Basic weight	CY1B□H	0.075	0.08	0.28	0.37	0.71	1.34	2.15	3.4	5.7
	CY1B□L	—	—	0.22	0.26	0.62	1.19	1.97	3.1	5.2
Additional weight per 50mm of stroke		0.004	0.014	0.02	0.04	0.05	0.07	0.08	0.095	0.12

Calculation method/Example: CY1B32H-500

Basic weight 1.34kg
Additional weight 0.07/50s
Cylinder stroke 500st
} 1.34 + 0.07 x 500 ÷ 50 = 2.04kg

Principal Materials

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

Series CY1B
Model Selection Method 1

E: Kinetic energy of load (J)

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

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)
W_{Bmax}: Maximum connection fitting weight (kg)
Wv: Allowable load weight for vertical operation (kg)

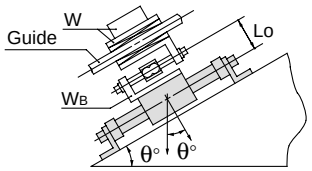
Operating conditions

- **W: Load weight (kg)**
- **W_B: Connection fitting weight (kg)**
- **μ: Guide's coefficient of friction**
- **Lo: Distance from cylinder shaft center to work piece point of application (cm)**
- **Mode of operation (horizontal, inclined, vertical)**
- **P: Operating pressure (MPa)**
- **V: Speed (mm/s)**
- **Stroke (mm)**

Mode of operation

Horizontal operation | **Inclined operation** | **Vertical operation** Note 1)

Review of load weight and operating pressure



Inclined operation

First tentative bore size determination

$$\text{øD} \geq 1.6 \times \sqrt{\frac{F_1}{P}}$$

$$\text{øD} \geq 1.6 \times \sqrt{\frac{F_2}{P}}$$

$$\text{øD} \geq 1.6 \times \sqrt{\frac{F_3}{P}}$$

Allowable driving force table (Fn) (n = 1, 2, 3)

Horizontal	$F_1 = \mu \times (W + W_B) \times 9.8$
Inclined	$F_2 = (W + W_B) \times 9.8 \times (\mu\cos\theta + \sin\theta)$
Vertical	$F_3 = (W + W_B) \times 9.8 \times (\mu + 1)$

Refer to the allowable driving force table for the (Fn) of data Ⓐ.

Determination of allowable load weight & pressure

$W + W_B \leq W_V$, $P \leq P_V$

$W + W_B > W_V$, $P > P_V$

(Refer to page 5 for vertical operation.)

Determination of connection fitting weight (W_B)

(Refer to page 5 for connection fitting weight.)

$W_B > W_{Bmax}$

Review of connection fitting

$W_B \leq W_{Bmax}$

(Refer to page 4 for data Ⓐ.)

Second tentative determination of bore size and magnet holding force (H, L) using the graph of allowable driving force (Fn) and distance from cylinder shaft center (Lo)

Review with magnet holding force (H)

Intermediate stop? Note 1)

Yes

Intermediate stopping method

Stop with external stopper

Stop with air pressure circuit

(Refer to page 5 for intermediate stops.)

No

Determination of load's kinetic energy (E)

E > Es

E ≤ Es

Tentative determination of L type

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

Determination of pressure (P) when making intermediate stop

P > Ps

P ≤ Ps

Tentative determination of L type

(Refer to page 5 for intermediate stops.)

P > Ps

Tentative determination of H type

Tentative determination of H type
Review of larger bore size

Bore size determination

Review of order made products based on operating conditions Note 2)

(Refer to pages 64 to 71.)

Model determination

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

Note 2) Depending on the operating environment, etc., order made products should also be reviewed.

Series CY1B
Model Selection Method 2

Precautions on Design (1)

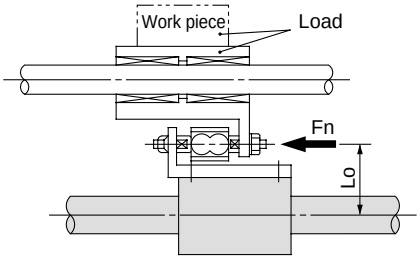
Selection Method

Selection procedure

1. Find the drive resisting force Fn (N) when moving the load horizontally.

2. Find the distance Lo (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 Lo and Fn based on data Ⓐ.



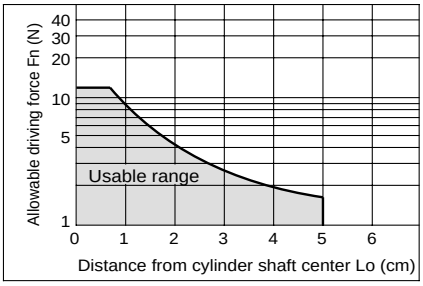
Selection example

Given a load drive resisting force of Fn = 100 (N) and a distance from the cylinder shaft center to the load application point of Lo = 8cm, find the intersection point by extending upward from the horizontal axis of data Ⓐ where the distance from the shaft center is 8cm, and then extending to the side, find the allowable driving force on the vertical axis.

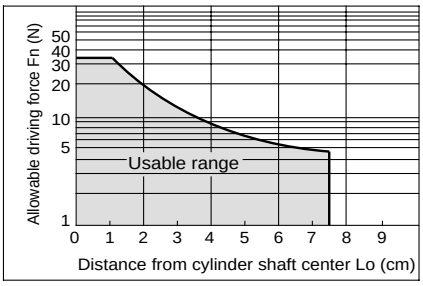
Models suitable to satisfy the requirement of 100 (N) are **CY1B32H** or **CY1B40H**, **CY1B40L.**

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

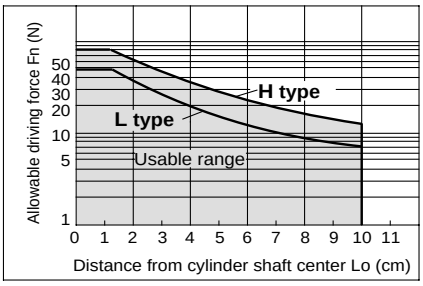
CY1B6



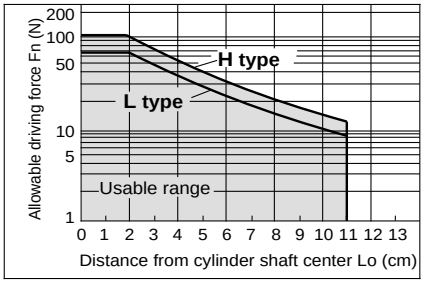
CY1B10



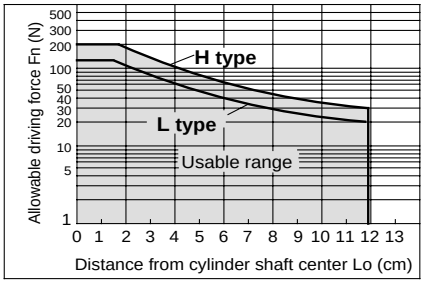
CY1B15



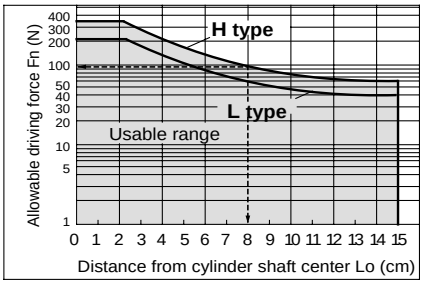
CY1B20



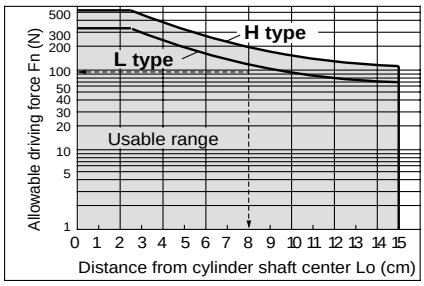
CY1B25



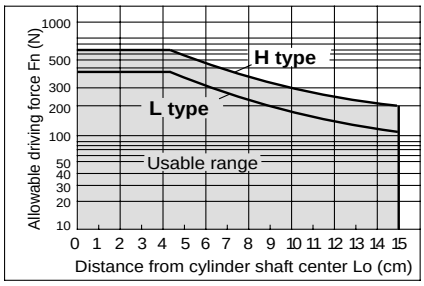
CY1B32



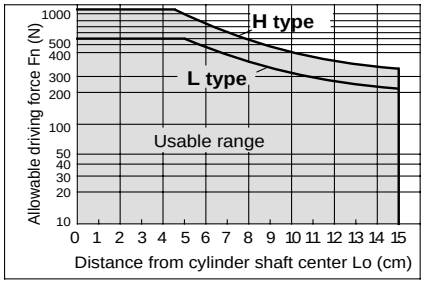
CY1B40



CY1B50



CY1B63

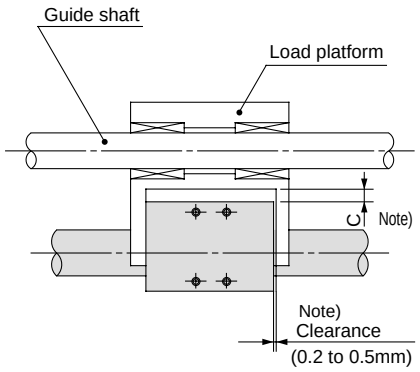


Series CY1B
Model Selection Method 3

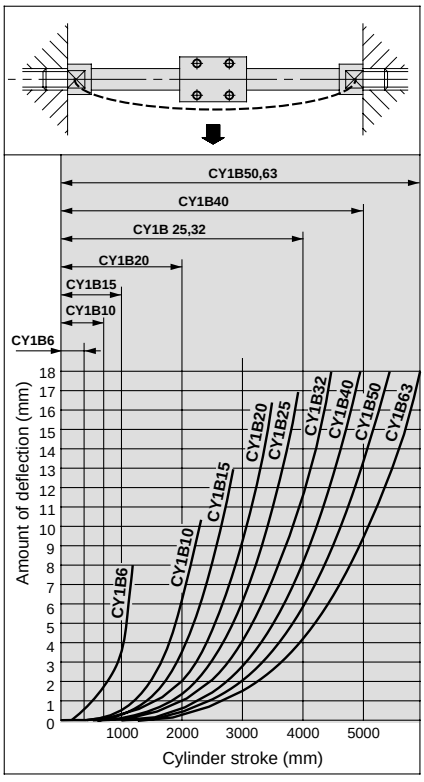
Precautions on Design (2)

Cylinder Dead 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.



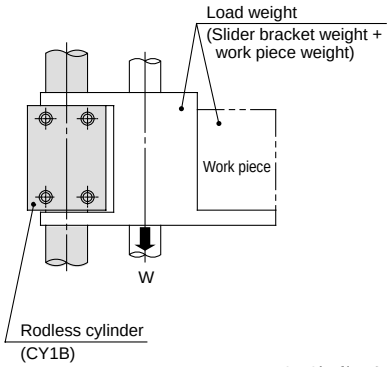
(Note) Referring to the self weight deflection in the figure below, provide clearance so that the cylinder does not touch the mounting surface or the load section, and is able to operate smoothly within the minimum operating pressure range for a full stroke.



∗ 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.



1MPa: Approx. 10.19kgf/cm²

Cylinder bore size (mm)	Model	Allowable load weight (Wv) (kg)	Max. operating pressure (Pv) (MPa)
6	CY1B 6H	1.0	0.55
10	CY1B10H	2.7	0.55
15	CY1B15H	7.0	0.65
	CY1B15L	4.1	0.40
20	CY1B20H	11.0	0.65
	CY1B20L	7.0	0.40
25	CY1B25H	18.5	0.65
	CY1B25L	11.2	0.40
32	CY1B32H	30.0	0.65
	CY1B32L	18.2	0.40
40	CY1B40H	47.0	0.65
	CY1B40L	29.0	0.40
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, as operation above the maximum operating pressure can result in breaking of the magnetic coupling.

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.)

Maximum connection fitting weight

Model	Max. connection fitting weight (W_{Bmax})(kg)
CY1B 6H	0.2
10H	0.4
15□	1.0
20□	1.1
25□	1.2
32□	1.5
40□	2.0
50□	2.5
63□	3.0

Contact P/A before using fittings which exceed the above weights.

Intermediate Stops

(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.

1MPa: Approx. 10.19kgf/cm²

Bore size (mm)	Model	Operating pressure limit for intermediate stop (Ps)(MPa)
6	CY1B 6H	0.55
10	CY1B10H	0.55
15	CY1B15H	0.65
	CY1B15L	0.40
20	CY1B20H	0.65
	CY1B20L	0.40
25	CY1B25H	0.65
	CY1B25L	0.40
32	CY1B32H	0.65
	CY1B32L	0.40
40	CY1B40H	0.65
	CY1B40L	0.40
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 within 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.

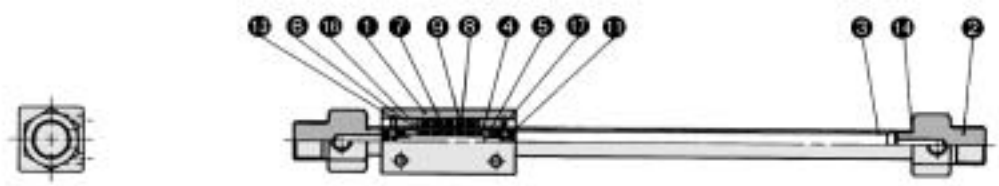
(Reference values)

Bore size (mm)	Model	Allowable kinetic energy for intermediate stop (Es)(J)
6	CY1B 6H	0.007
10	CY1B10H	0.03
15	CY1B15H	0.13
	CY1B15L	0.076
20	CY1B20H	0.24
	CY1B20L	0.16
25	CY1B25H	0.45
	CY1B25L	0.27
32	CY1B32H	0.88
	CY1B32L	0.53
40	CY1B40H	1.53
	CY1B40L	0.95
50	CY1B50H	3.12
	CY1B50L	1.83
63	CY1B63H	5.07
	CY1B63L	3.09

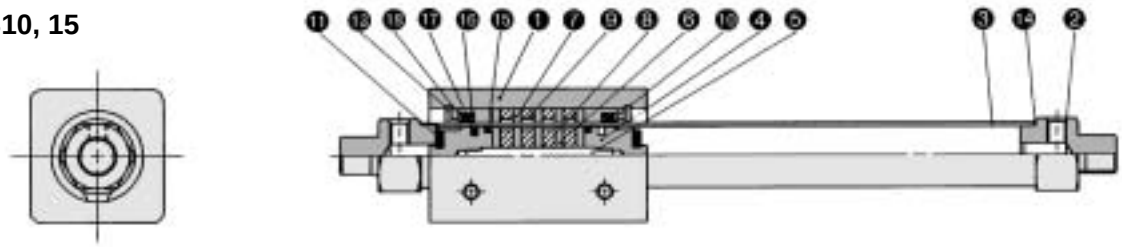
Construction

Basic type

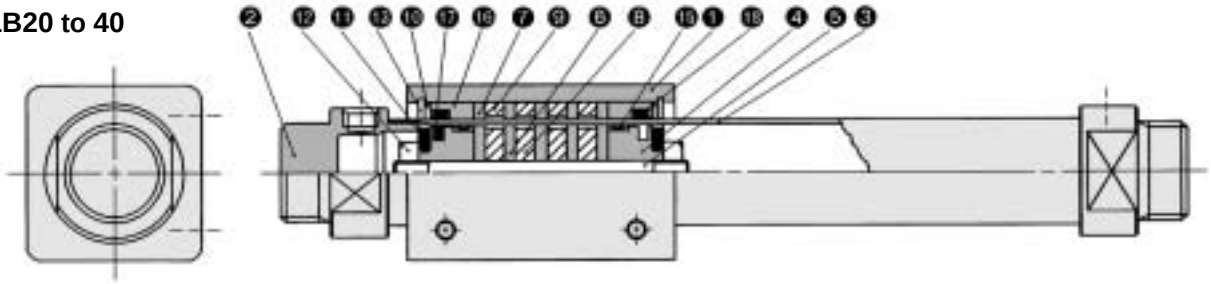
CY1B6

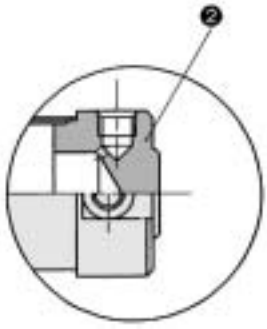


CY1B10, 15



CY1B20 to 40





For CY1B50, 63

Parts list

No.	Description	Material	Note
1	Body	Aluminum alloy	Hard anodized
2	Head cover	Aluminum alloy	Kanigen plated
3	Cylinder tube	Stainless steel	
4	Piston	Aluminum alloy Note 1)	Chromated
5	Shaft	Stainless steel	
6	Piston side yoke	Rolled steel plate	Zinc chromated
7	External slider side yoke	Rolled steel plate	Zinc chromated
8	Magnet A	Rare earth magnet	
9	Magnet B	Rare earth magnet	
10	Spacer	Rolled steel plate	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:** ø7 x ø5 x ø1 **CY1B10:** ø11 x ø9 x ø1
* **15**	Wear ring A	Special resin	ø6 not available
* **16**	Wear ring B	Special resin	
* **17**	Piston seal	NBR	
* **18**	Scraper	NBR	ø6 not available

Note 1) Brass in the case of ø6 to ø15

Replacement parts: Seal kits

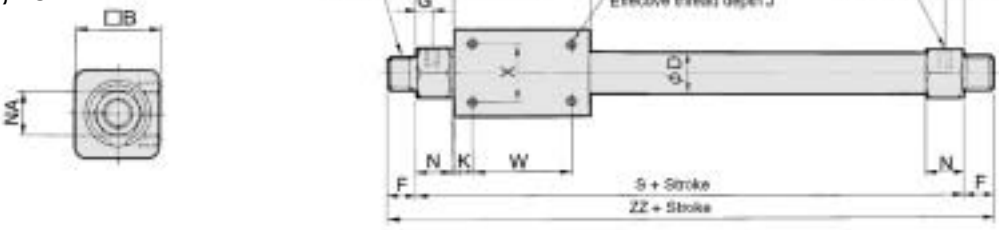
Bore size (mm)	Order No.	Content
6	CY1B6-PS-N	Nos. 14, 16, 17 at the left
10	CY1B10-PS-N	Nos. 14, 15, 16, 17, 18 at the left
15	CY1B15-PS-N	Nos. 15, 16, 17, 18 at the left
20	CY1B20-PS-N	
25	CY1B25-PS-N	
32	CY1B32-PS-N	
40	CY1B40-PS-N	
50	CY1B50-PS-N	
63	CY1B63-PS-N	

* Seal kits are sets consisting of numbers 14 through 18, and may be ordered using the order number for each bore size.

Dimensions

Basic type

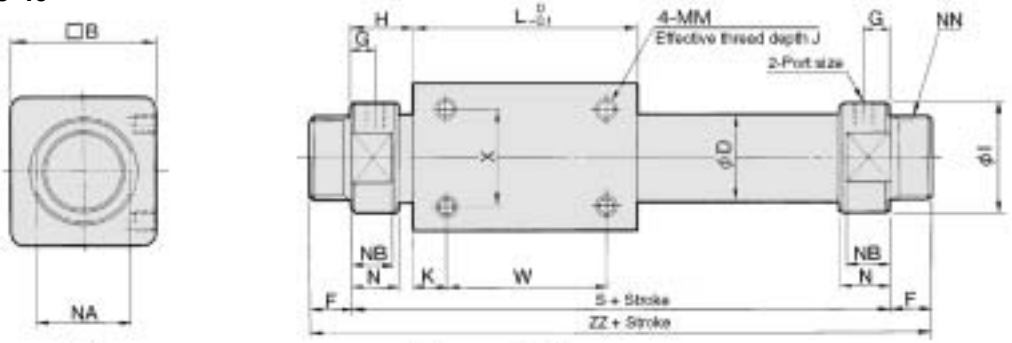
CY1B6, 10, 15



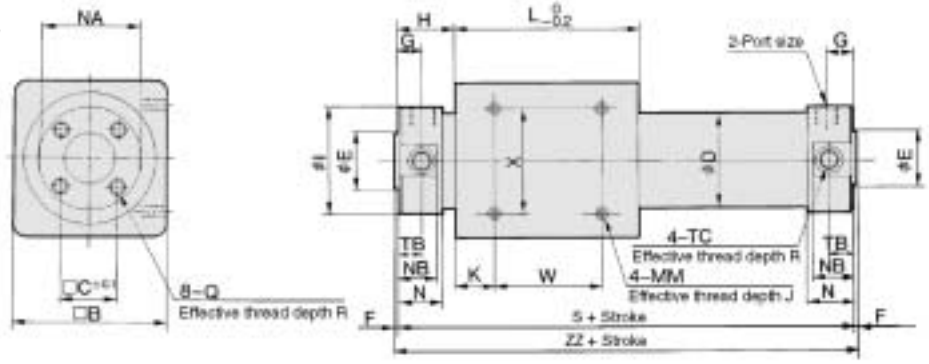
(mm)

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
CY1B15	M5 x 0.8	17	35	10	5.5	13	11	57	11	17	M4 x 0.7 x 6	M10 x 1.0	83	35	19	103

CY1B20 to 40



CY1B50, 63



(mm)

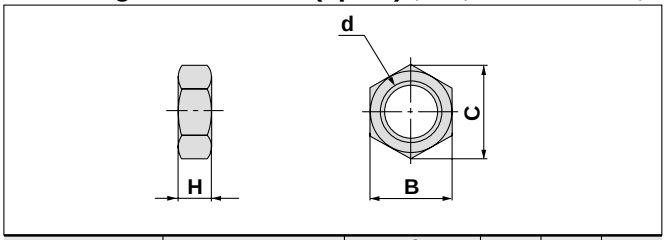
Model	Port size	B	C	D	E	F	G	H	I	K	L	MM x J	N	NA	NB	NN
CY1B20	Rc(PT)1/8	36	—	22.8	—	13	8	20	28	8	66	M4 x 0.7 x 6	15	24	13	M20 x 1.5
CY1B25	Rc(PT)1/8	46	—	27.8	—	13	8	20.5	34	10	70	M5 x 0.8 x 8	15	30	13	M26 x 1.5
CY1B32	Rc(PT)1/8	60	—	35	—	16	9	22	40	15	80	M6 x 1.0 x 8	17	36	15	M26 x 1.5
CY1B40	Rc(PT)1/4	70	—	43	—	16	11	29	50	16	92	M6 x 1.0 x 10	21	46	19	M32 x 2.0
CY1B50	Rc(PT)1/4	86	32	53	$30^{-0.007}_{-0.037}$	2	14	33	58.2	25	110	M8 x 1.25 x 12	25	55	23	—
CY1B63	Rc(PT)1/4	100	38	66	$32^{-0.007}_{-0.043}$	2	14	33	72.2	26	122	M8 x 1.25 x 12	25	69	23	—

Model	Q x R	S	TB	TC x R	W	X	ZZ
CY1B20	—	106	—	—	50	25	132
CY1B25	—	111	—	—	50	30	137
CY1B32	—	124	—	—	50	40	156
CY1B40	—	150	—	—	60	40	182
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

CAD

CY1B6 -------- SCY1B, #1
CY1B10 -------- SCY1B, #2
CY1B15 -------- SCY1B, #3
CY1B20 -------- SCY1B20, #1
CY1B25 -------- SCY1B, #4
CY1B32 -------- SCY1B, #5
CY1B40 -------- SCY1B, #6
CY1B50 -------- SCY1B, #7
CY1B63 -------- SCY1B, #8

Mounting nut/included (2pcs.) (except for ø50 and ø63)



Part No.	Applicable bore size (mm)	d	H	B	C
SNJ-016B	**6**, **10**, **15**	M10 x 1.0	4	14	16.2
SN-020B	**20**	M20 x 1.5	8	26	30
SN-032B	**25**, **32**	M26 x 1.5	8	32	37
SN-040B	**40**	M32 x 2.0	10	41	47.3