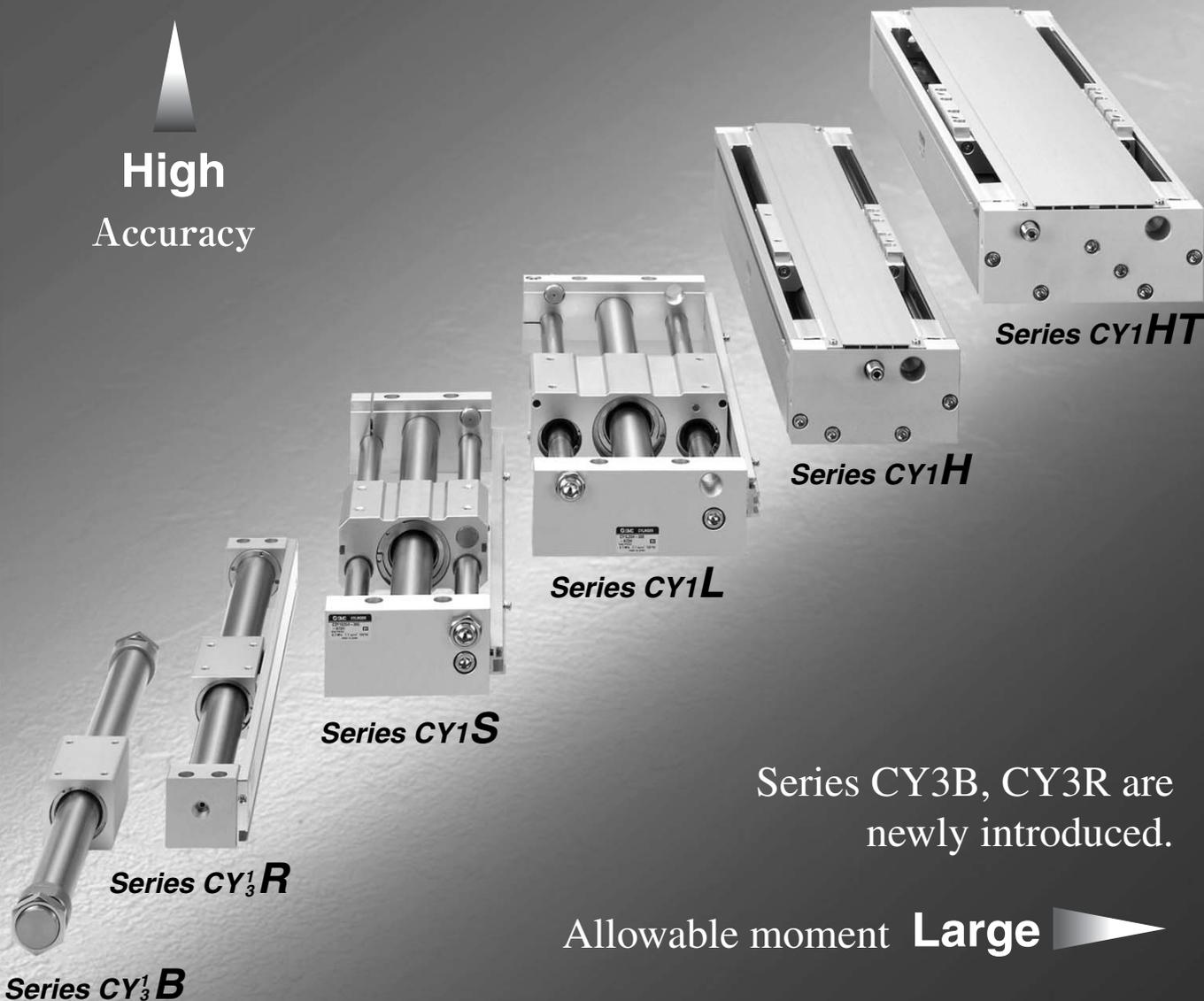


Magnetically Coupled Rodless Cylinder

Series $CY3^B_R/CY1$

High Accuracy



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

Series $CY3^B$, $CY3^R$ are newly introduced.

Allowable moment **Large**

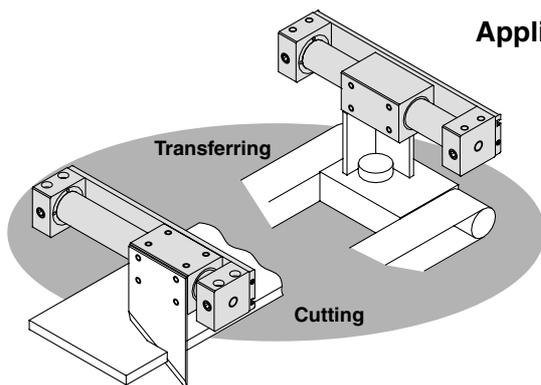
Series Variations

Guide type	Series	Page
Basic type	$CY3^B$	8-15-6/8-15-24
Direct mount type	$CY3^R$	8-15-16/8-15-32
Slider type (Slide bearing)	$CY1S$	8-15-46
Slider type (Ball bushing bearing)	$CY1L$	8-15-58
High precision guide type (Single axis)	$CY1H$	8-15-68
High precision guide type (Double axes)	$CY1HT$	8-15-68

Series $CY_3B/CY_3R/CY1S/CY1L/CY1H$ Model Selection Criteria

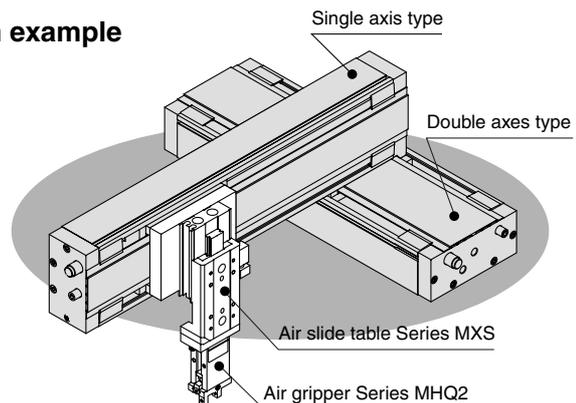
Model selection criteria	Recommended cylinder		
	Appearance	Features	
<ul style="list-style-type: none"> When many different types of guides are used. When a long stroke is necessary. 	Guide non-integrated type	<p>Series CY_3B Size: $\phi 6, \phi 10, \phi 15, \phi 20, \phi 25, \phi 32, \phi 40, \phi 50, \phi 63$</p> 	<ul style="list-style-type: none"> Long strokes available. Variations of $\phi 6$ to $\phi 63$. $\phi 15$ to $\phi 40$ are now replaced by Series $CY3B/R$. Cylinder can be directly mounted. Auto switch capable, with no lurching from cylinder. Rotation can be stopped within an allowable range. Piping can be concentrated with the centralized piping type. Compact external dimensions Mounting can be performed from the top or one side.
<ul style="list-style-type: none"> When many different types of guides are used. When auto switches are added to the basic style. When used without a guide for a light load. (Application example 1) When space is very limited 		<p>Series CY_3R Size: $\phi 6, \phi 10, \phi 15, \phi 20, \phi 25, \phi 32, \phi 40, \phi 50, \phi 63$</p> 	
<ul style="list-style-type: none"> To ensure a permanent path When used for general transfer operations 	Guide integrated type	<p>Series $CY1S$ Size: $\phi 6, \phi 10, \phi 15, \phi 20, \phi 25, \phi 32, \phi 40$</p> 	<ul style="list-style-type: none"> Smooth operation is made possible by using special slide bearings. A load can be carried directly by the guide integrated type. The centralized piping type allows concentration of piping on one side plate. Auto switch capable. Impact at the stroke end is absorbed by inclusion of a shock absorber. Stable operation is possible, even with an eccentric load, by using ball bushings. The use of a linear guide facilitates a large load, large moment and high precision. Mounting freedom is improved by providing T-slots on the mounting surfaces. A top cover mounted over the sliding parts of the cylinder prevents scratches and damage, etc.
<ul style="list-style-type: none"> To ensure a permanent path When smoother operation is required, even with an eccentric load. 		<p>Series $CY1L$ Size: $\phi 6, \phi 10, \phi 15, \phi 20, \phi 25, \phi 32, \phi 40$</p> 	
<ul style="list-style-type: none"> To ensure a permanent path When a large load, large moment or high precision are required. When used for pick-and-place operations, etc. (Application example 2) 		<p>Series $CY1H$ Size: $\phi 10, \phi 15, \phi 20, \phi 25, \phi 32$</p> 	

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



Application example 1

Application example



Application example 2

Series CY3B/CY3R

Improved durability

Improved bearing performance

A 70% longer wear ring length achieving an improvement in bearing performance compared to the CY1B.

Improved lubrication by using a soft wiper

A special resin soft wiper is installed on the dust seal to achieve a ideal lubrication on the external surface of the cylinder tube.

Direct mount type **Series CY3R**



Basic type **Series CY3B**



NPT and G thread are standardized.

Variety of piping port thread expanded to 3 types

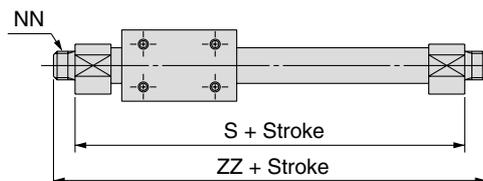
Cylinders with a bore $\varnothing 20$ or larger, are now available with 3 types of piping port threads.

(Refer to "How to Order": Series CY3B Page 8-15-6)
Series CY3R Page 8-15-16)

Bore size (mm)	Thread type
15	M thread
20, 25, 32, 40	Rc thread
	NPT thread
	G thread

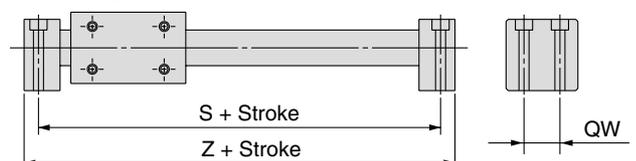
Mounting dimensions are identical with those of Series CY1.

Series CY3B

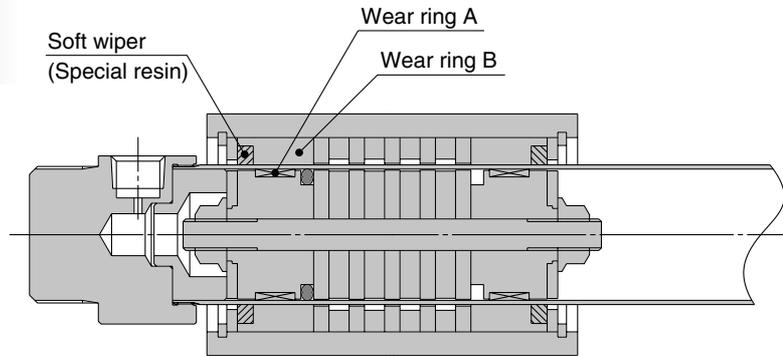


The mounting dimensions (in the drawing on the left) are identical with those of existing Series CY1B/CY1R, allowing easy replacement.

Series CY3R



Upgraded version of saving magnetically rodless cylinder

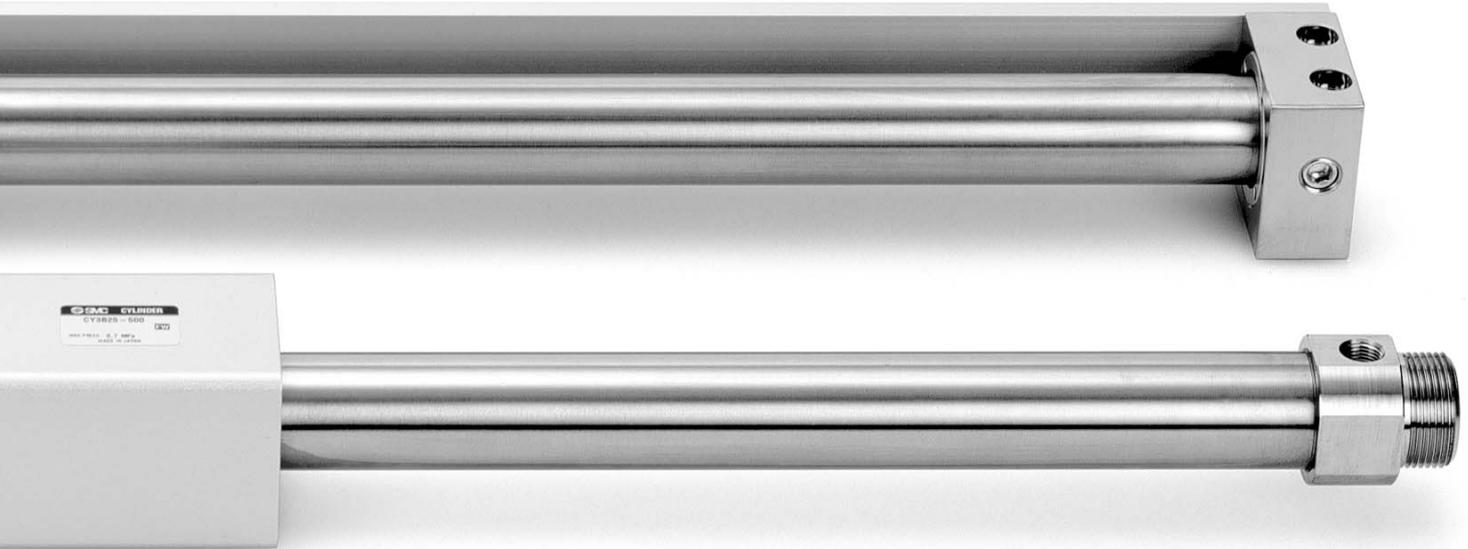


■ Series CY3B ■

Reduction of sliding resistance

Minimum operating pressure reduced by 30%
 By using a soft wiper the minimum operating pressure is reduced by 30%.
 (comparing CY3B40 and CY1B40)

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



Series Variations

Series	Bore size (mm)	Standard stroke (mm)										Individual made to order products						
		50	100	150	200	250	300	350	400	450	500	600	700	800	900	1000		
CY3B	15	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	25	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	32	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	40	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
CY3R	15	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	25	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	32	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	40	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	

Note) The mark ● indicates the available combination of bore size and standard stroke.

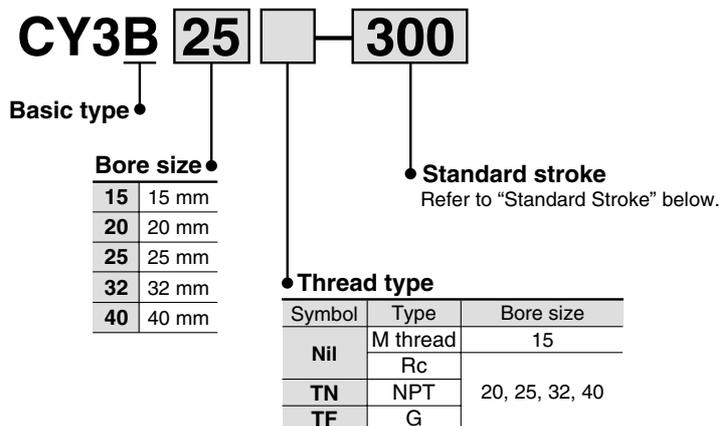
Availability of made to order products varies with the series (CY3B/R) and the bore size. For more information please refer to page 8-31-1.

Magnetically Coupled Rodless Cylinder Basic Type

Series **CY3B**

ø15, ø20, ø25, ø32, ø40

How to Order



Standard Stroke

Bore size (mm)	Standard stroke (mm)	Maximum manufacturable ⁽¹⁾ stroke (mm)
15	50, 100, 150, 200, 250, 300, 350 400, 450, 500	1000
20	100, 150, 200, 250, 300, 350, 400, 450	1500 ⁽²⁾
25, 32	500, 600, 700, 800	3000
40	100, 150, 200, 250, 300, 350, 400, 450 500, 600, 700, 800, 900, 1000	3000

Note 1) Please contact SMC if the maximum stroke will be exceeded.

Note 2) Use Series CY1B if the stroke exceeds 1500 mm with a tube inside diameter of 20 mm.

Magnetic Holding Force

Bore size (mm)	15	20	25	32	40
Holding force (N)	137	231	363	588	922

(N)

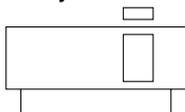
Magnetically Coupled Rodless Cylinder Basic Type Series CY3B

Specifications

Fluid	Air
Proof pressure	1.05 MPa
Max. operating pressure	0.7 MPa
Min. operating pressure	Refer to the minimum operating pressure table.
Ambient and fluid temperature	-10 to 60°C
Piston speed	50 to 400mm/s
Cushion	Rubber bumper on both ends
Lubrication	Non-lube
Stroke length tolerance	0 to 250 st: $+1.0$, 251 to 1000 st: $+1.4$, 1001 st and up: $+1.8$
Mounting orientation	Free
Mounting nut (2 pcs.)	Standard equipment (Accessory)



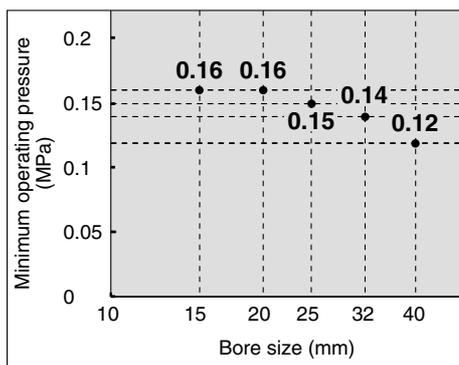
JIS Symbol



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

Symbol	Specifications
-XB11	Long stroke (2001 mm and up)
-XB13	Low speed specifications (7 to 50 mm/s)
-X116	Hydro specifications
-X132	Axial ports
-X160	High speed specifications
-X168	Helical insert thread specifications
-X206	Added mounting tap positions for slider
-X210	Oil-free exterior specifications
-X322	Outside of cylinder tube with hard chrome plating
-X324	Oil-free exterior specifications (with dust seal)
-XC57	With floating joint

Minimum Operating Pressure



Principal Parts Material

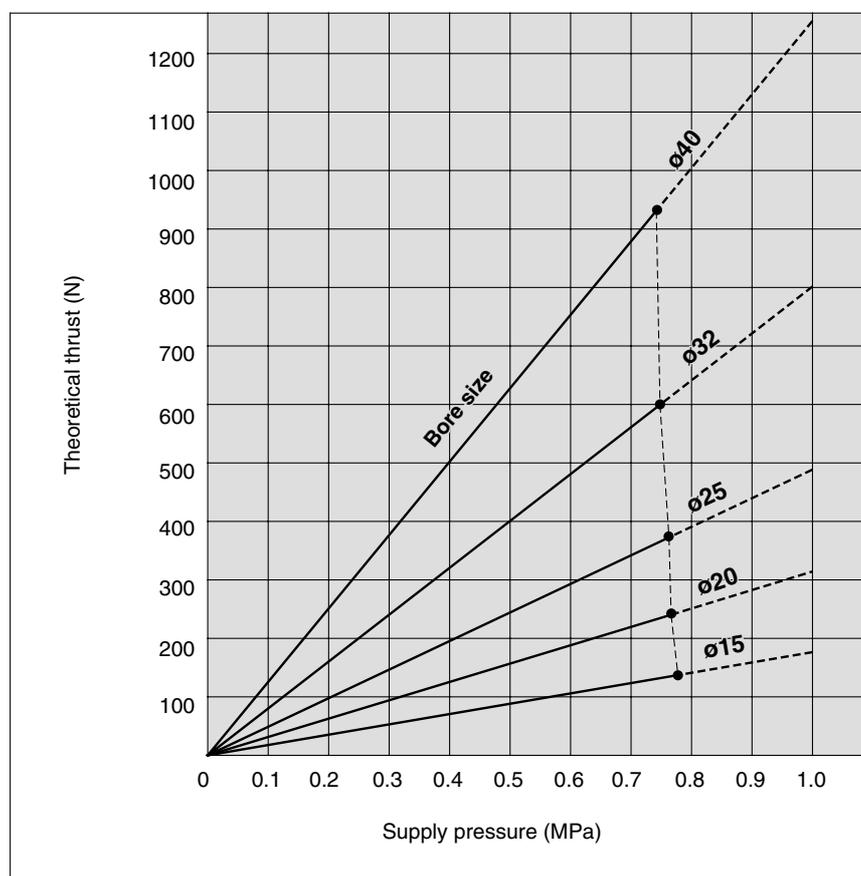
Description	Material	Note
Head cover	Aluminum alloy	Electroless nickel plated
Cylinder tube	Stainless steel	
Body	Aluminum alloy	Hard anodized
Magnet	Rare earth	

Theoretical Cylinder Thrust



Caution

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



Weight

Bore size (mm)	(kg)				
	15	20	25	32	40
Basic weight	0.275	0.351	0.672	1.287	2.070
Additional weight per each 50 mm of stroke	0.015	0.02	0.023	0.033	0.04

Calculation:

(Example) CY3B32-500

Basic weight 1.287 kg

Additional weight 0.033 kg/50 s

Cylinder stroke 500 st

$$1.287 + 0.033 \times 500 \div 50 = 1.617 \text{ kg}$$

MX

MTS

MY

CY

MG

CX

D-

-X

20-

Data

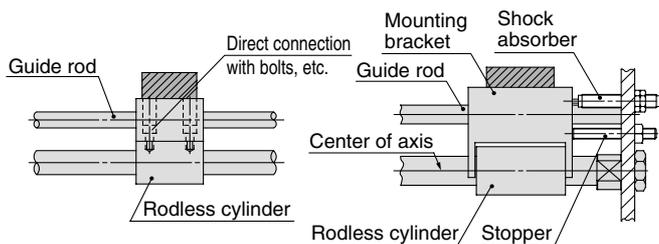
⚠ Precautions

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

Mounting

⚠ Caution

1. **Take care to avoid nicks or other damage on the outside surface of the cylinder tube.**
This can lead to damage of the scraper and wear ring, which in turn can cause malfunction.
2. **Take care regarding rotation of the external slider.**
Rotation should be controlled by connecting it to another shaft (linear guide, etc.).
3. **Do not operate with the magnetic coupling out of position.**
In case the magnetic coupling is out of position, push the external slider back into the correct position by hand at the end of the stroke (or correct the piston slider with air pressure).
4. **The cylinder is mounted with bolts through the mounting holes in the end covers. Be sure they are tightened securely. (CY3R)**
5. **If gaps occur between the mounting surface and the end covers when mounting with bolts, perform shim adjustment using spacers, etc. so that there is no unreasonable stress. (CY3R)**
6. **Be sure that both end covers are secured to the mounting surface before operating the cylinder.**
Avoid operation with the external slider secured to the surface.
7. **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 assimilated, 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 assimilation of 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 assimilated, resulting in malfunction.

Shaft alignment variations are assimilated by providing clearance for 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. (1) Incorrect mounting
Note) The drawing shows CY3B.

Fig. (2) Recommended mounting

Mounting

⚠ Caution

8. **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 8-15-12) 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, contact SMC regarding the operating conditions (pressure, load, speed, stroke, frequency, etc.).

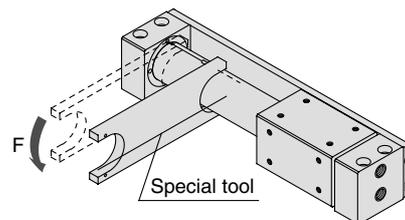
Disassembly and Maintenance

⚠ 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 very strong attractive power.

⚠ Caution

1. **When reattaching the head covers after disassembly, confirm that they are tightened securely. (CY3B)**
When disassembling, hold the wrench flat section of one head cover with a vise, and remove the other cover using a spanner or adjustable angle wrench on its wrench flat section. When retightening, first coat with Loctite® (No. 542 red), and retighten 3 to 5° past the original position prior to removal.
2. **Special tools are necessary for disassembly. (CY3R)**



Special Tool Number List

No.	Applicable bore size (mm)
CYRZ-V	15, 20
CYRZ-W	25, 32, 40

3. **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 while there is no longer any holding force. If they are removed when still magnetically coupled, they will be directly attracted to one another and will not come apart.
4. **Do not disassemble the magnetic components (piston slider, external slider).**
This can cause a loss of holding force and malfunction.
5. **When disassembling to replace the seals and wear ring, refer to the separate disassembly instructions.**

Series CY3B/CY3R

Model Selection 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)

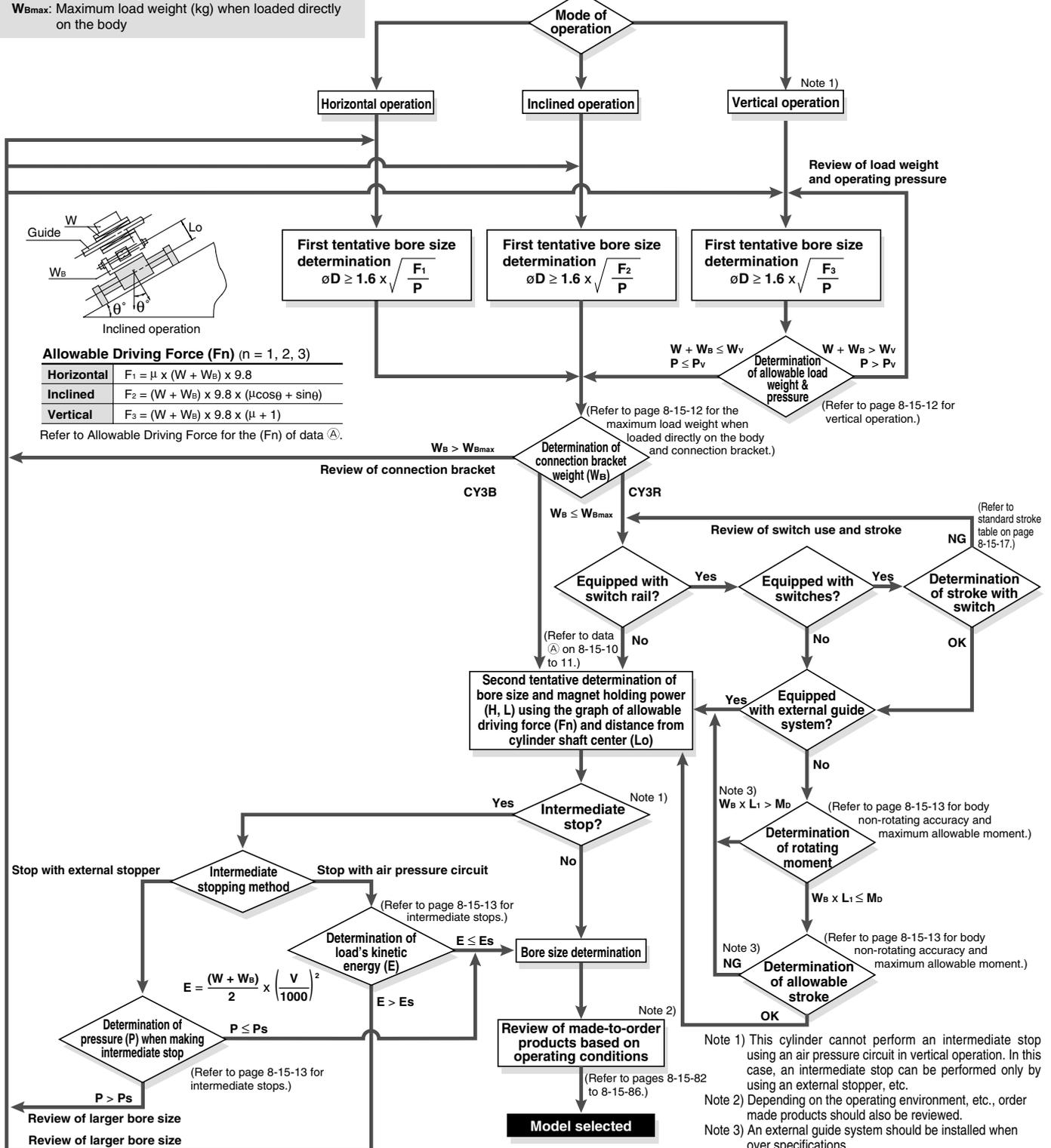
Mb: Maximum allowable moment (N-m) when a connection bracket, etc. is carried directly

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

Pv: Maximum operating pressure for vertical operation (MPa)

Wbmax: Maximum load weight (kg) when loaded directly on the body

Operating Conditions	
· W: Load weight (kg)	· Switches
· Wb: Connection bracket weight (kg)	· P: Operating pressure (MPa)
· μ: Guide's coefficient of friction	· V: Speed (mm/s)
· Lo: Distance from cylinder shaft center to work piece point of application (cm)	· Stroke (mm)
· L1: Distance from cylinder shaft center to connection fitting, etc.	· Mode of operation (horizontal, inclined, vertical)



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

Series CY3B/CY3R

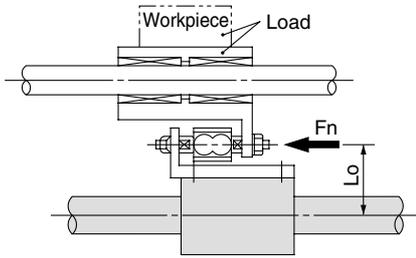
Model Selection 2

Cautions 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).

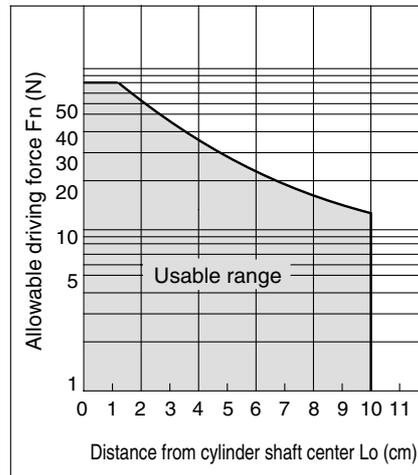


Selection example

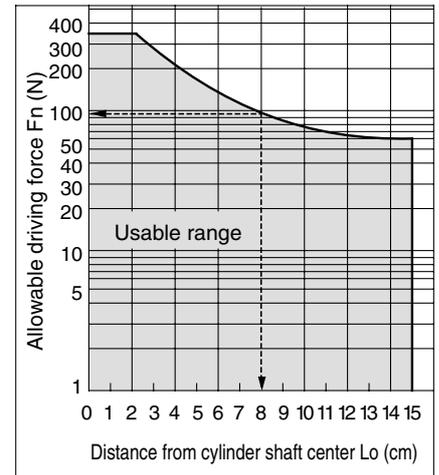
Given a load drive resisting force of $F_n = 100$ (N) and a distance from the cylinder shaft center to the load application point of $L_o = 8$ cm, find the intersection point by extending upward from the horizontal axis of data (A) where the distance from the shaft center is 8 cm, and then extending to the side, find the allowable driving force on the vertical axis. Models suitable to satisfy the requirement of 100 (N) are **CY3□32** or **CY3□40**.

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

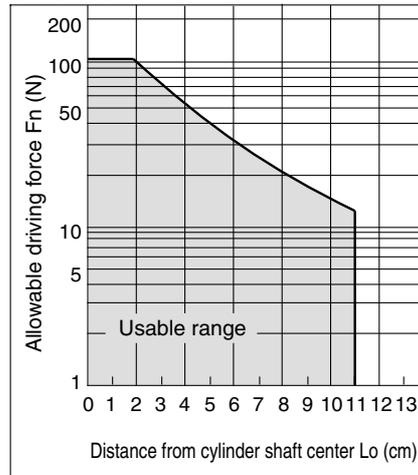
CY3B15



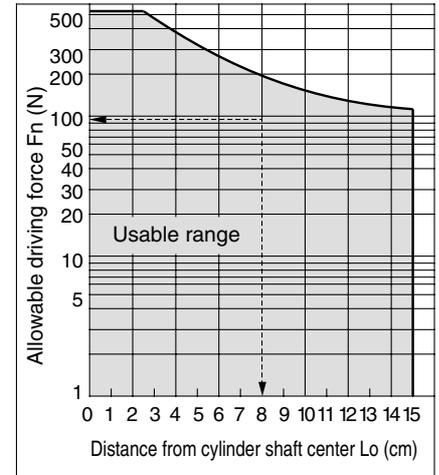
CY3B32



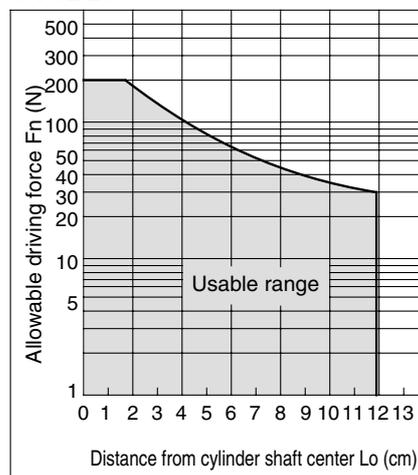
CY3B20



CY3B40



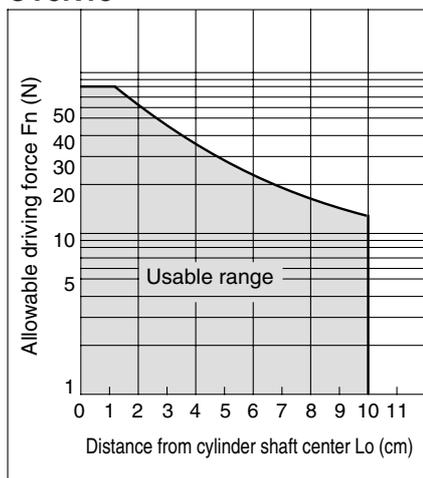
CY3B25



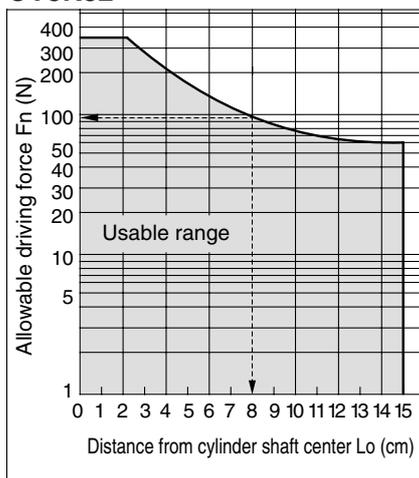
Caution on Design (2)

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

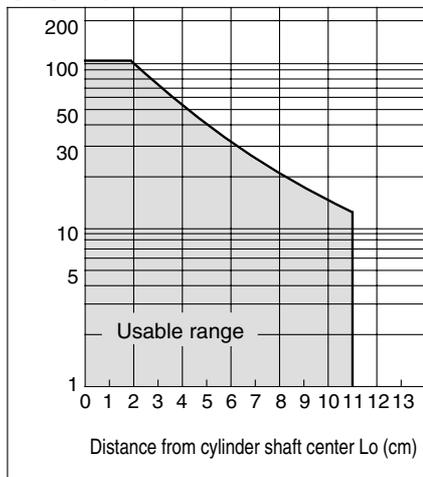
CY3R15



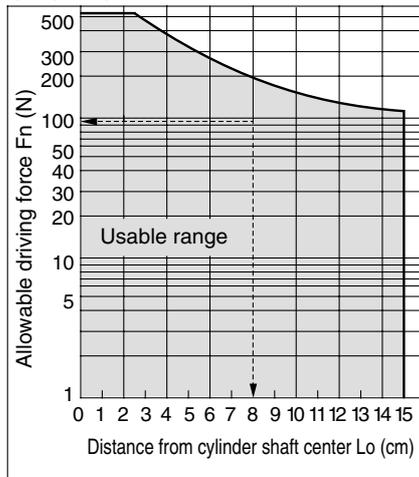
CY3R32



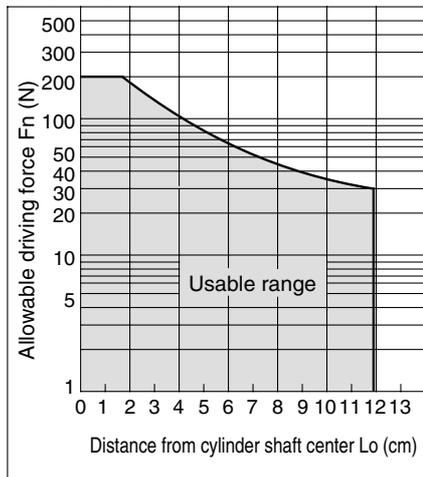
CY3R20



CY3R40



CY3R25



MX

MTS

MY

CY

MG

CX

D-

-X

20-

Data

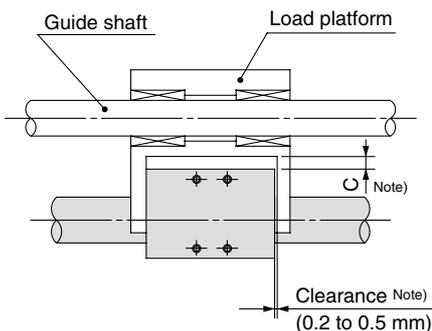
Series CY3B/CY3R

Model Selection 3

Cautions on Design (2)

Cylinder Dead Weight Deflection

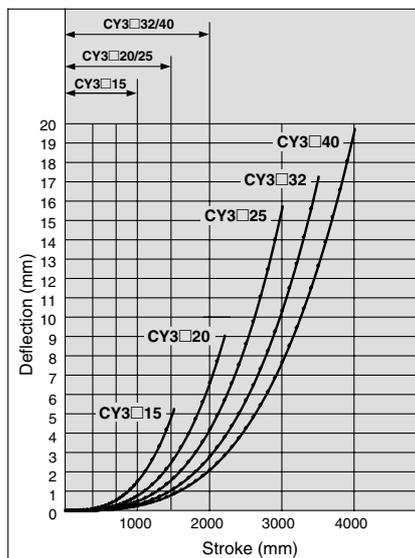
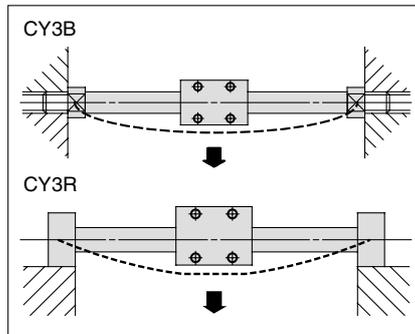
When the cylinder is mounted horizontally, deflection appears due to its own weight as shown in the data, and the longer the stroke is, the greater the amount of variation in the shaft center. Therefore, a connection method should be considered which can assimilate this deflection.



The above clearance amount is a reference value.

Note 1) According to the dead weight deflection in the figure on the right, provide clearance so that the cylinder does not touch the mounting surface or the load, etc., and is able to operate smoothly within the minimum operating pressure range for a full stroke. For more information, refer to instruction manual.

Note 2) In the case of CY3R, install a stay, etc. to eliminate clearance between the body and the switch rail. For more information, refer to CY3R instruction manual.



* The above deflection data represent values at the time when the external sliding part moves to the middle of the stroke.

Max. Weight of Connection Bracket to the Body

Series CY3 is guided by an external axis (such as a linear guide) without directly mounting the load. When designing a metal bracket to connect the load, see to it that its weight will not exceed the value in the table below. Basically, guide the CY3R direct mounting type also with an external axis. (For connection methods, refer to Instruction Manual.)

Model	Max. connection bracket weight (W_{max}) (kg)
CY3□15	1.0
CY3□20	1.1
CY3□25	1.2
CY3□32	1.5
CY3□40	2.0

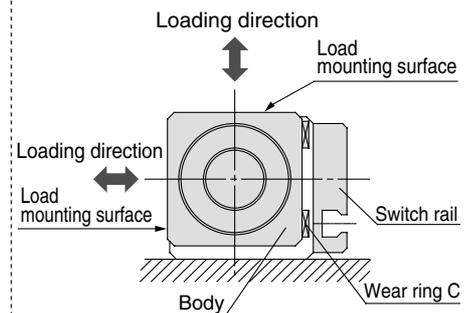
Please consult SMC in the case a bracket with weight exceeding the above value is to be mounted.

<CY3R>

Max. Load Weight when Loaded Directly on Body

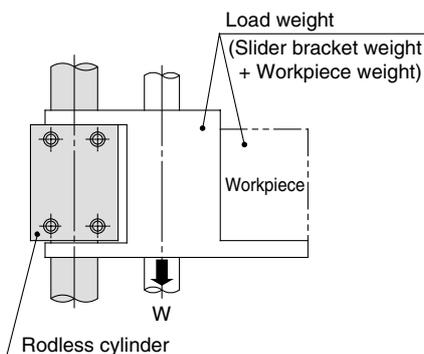
When the load is applied directly to the body, it should be no greater than the maximum values shown in the table below.

Model	Max. load weight (W_{max}) (kg)
CY3R15	1.0
CY3R20	1.1
CY3R25	1.2
CY3R32	1.5
CY3R40	2.0



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 (W_v) (kg)	Max. operating pressure (P_v) (MPa)
15	CY3□15	7.0	0.65
20	CY3□20	11.0	0.65
25	CY3□25	18.5	0.65
32	CY3□32	30.0	0.65
40	CY3□40	47.0	0.65

* Use caution, as there is a danger of breaking the magnetic coupling if operated above the maximum operating pressure.

Precautions on Design (3)

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)
15	CY3□15	0.65
20	CY3□20	0.65
25	CY3□25	0.65
32	CY3□32	0.65
40	CY3□40	0.65

(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 shown in the table below. Use caution, as operation when exceeding the allowable value can result in breaking of the magnetic coupling.

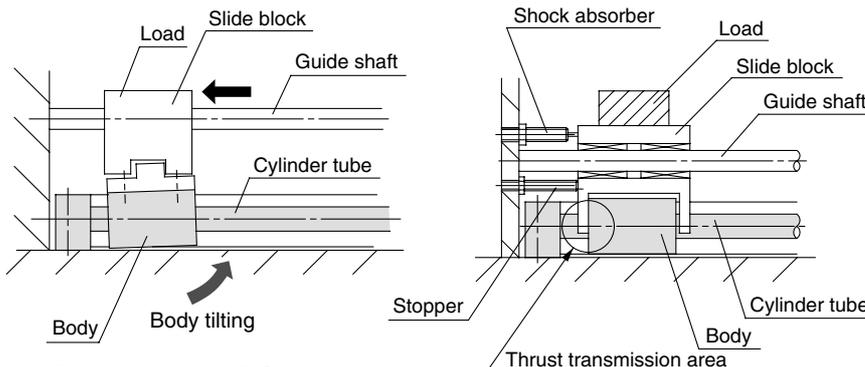
(Reference values)

Bore size (mm)	Model	Allowable kinetic energy for intermediate stop (Es) (J)
15	CY3□15	0.13
20	CY3□20	0.24
25	CY3□25	0.45
32	CY3□32	0.88
40	CY3□40	1.53

Stroke End Stopping Method

When stopping a load having a large inertial force at the stroke end, tilting of the body and damage to the bearings and cylinder tube may occur. (Refer to the left hand drawing below.)

As shown in the right hand drawing below, a shock absorber should be used together with the stopper, and thrust should also be transmitted from the center of the body so that tilting will not occur.



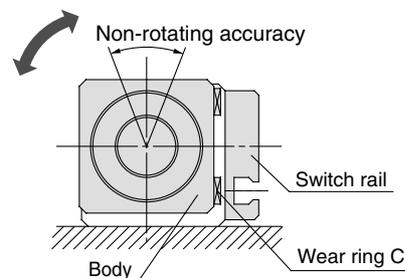
Note) The drawing shows CY3B.

<CY3R>

Body Non-rotating Accuracy and Maximum Allowable Moment (with Switch Rail) (Reference Values)

Reference values for non-rotating accuracy and maximum allowable moment at stroke end are indicated below.

Bore size (mm)	Non-rotating accuracy (°)	Max. allowable moment (Mo) (N·m)	Allowable stroke (2) (mm)
15	4.5	0.15	200
20	3.7	0.20	300
25	3.7	0.25	300
32	3.1	0.40	400
40	2.8	0.62	400



Note 1) Avoid operations where rotational torque (moment) is applied. In such a case, the use of an external guide is recommended.

Note 2) The above reference values will be satisfied within the allowable stroke ranges, but caution is necessary, because as the stroke becomes longer, the inclination (rotation angle) within the stroke can be expected to increase.

Note 3) When a load is applied directly to the body, the loaded weight should be no greater than the allowable load weights on page 8-15-12.

MX□

MTS

MY□

CY□

MG□

CX□

D-

-X

20-

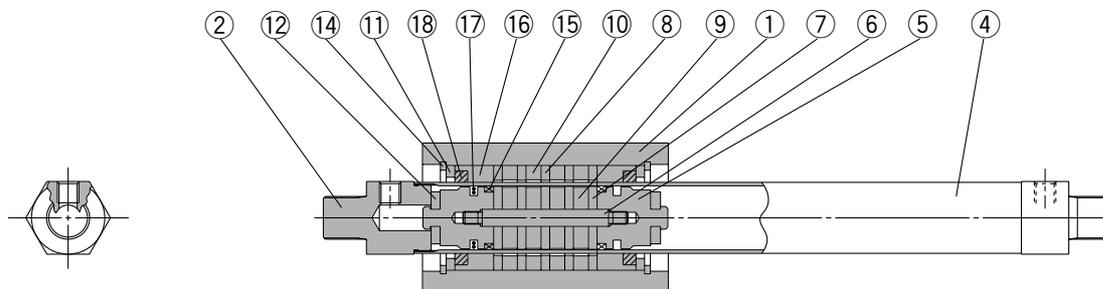
Data

Series CY3B/CY3R

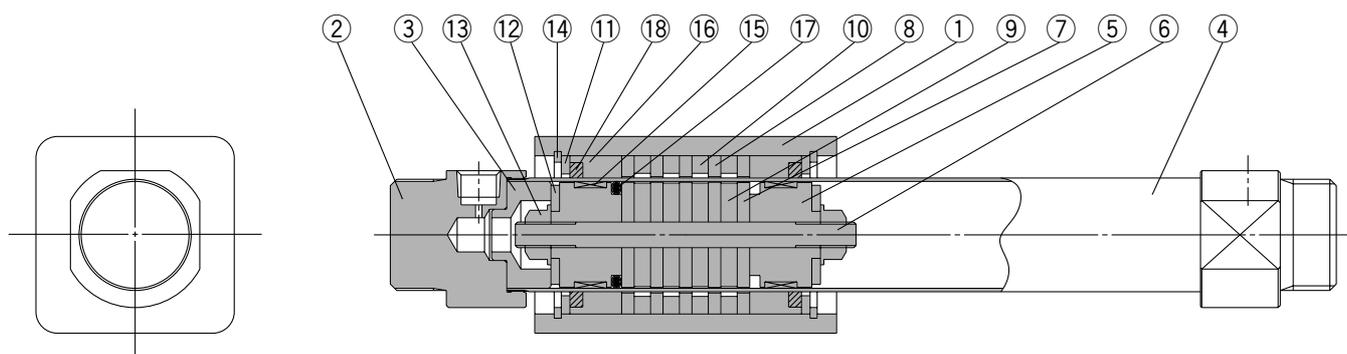
Construction

Basic type

CY3B15



CY3B20 to 40



Component Parts

No.	Description	Material	Note
①	Body	Aluminum alloy	Hard anodized
②	Head cover	Aluminum alloy	Electroless Nickel plated
③	End collar	Aluminum alloy	Chromated (ø15 is not available.)
④	Cylinder tube	Stainless steel	
⑤	Piston	Aluminum alloy	Chromated
⑥	Shaft	Stainless steel	
⑦	Piston side yoke	Rolled steel	Zinc chromated
⑧	External slider side yoke	Rolled steel	Zinc chromated
⑨	Magnet A	Rare earth magnet	
⑩	Magnet B	Rare earth magnet	
⑪	Spacer	Aluminum alloy	Chromated
⑫	Bumper	Urethane rubber	
⑬	Hexagon nut with flange	Carbon steel	Zinc chromated (ø15: not available. ø20: hexagon nut)
⑭	Type C snap ring for hole	Carbon tool steel	Nickel plated
⑮	Wear ring A	Special resin	
⑯	Wear ring B	Special resin	
⑰	Piston seal	NBR	
⑱	Soft wiper	Special resin	

Replacement Parts: Seal Kit

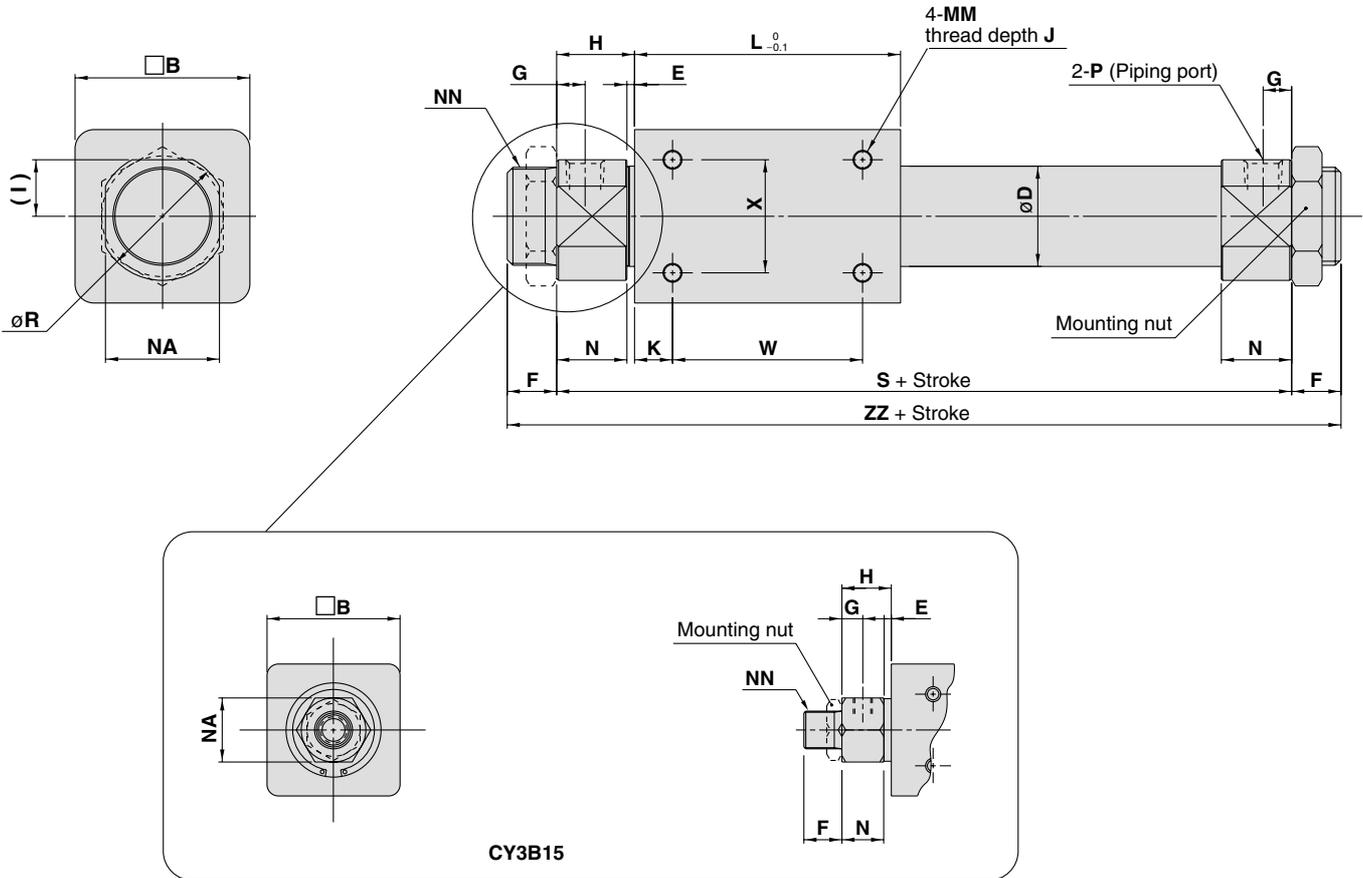
Bore size (mm)	Kit no.
15	CY3B15-PS
20	CY3B20-PS
25	CY3B25-PS
32	CY3B32-PS
40	CY3B40-PS

* Seal kits are sets consisting of numbers ⑮ to ⑱, and may be ordered using the order number to each bore size.

Dimensions

Basic type

CY3B15 to 40

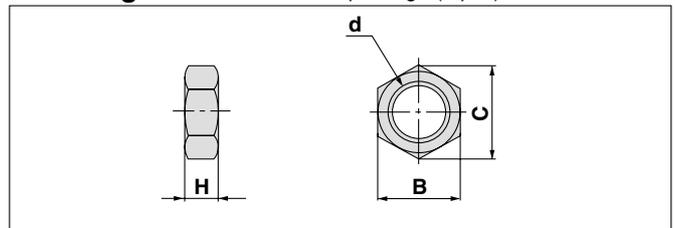


- MX
- MTS
- MY
- CY
- MG
- CX
- D-
- X
- 20-
- Data

Model	B	D	E	F	G	H	I	J	K	L	MM	N	NA	NN	R	S	W	X	ZZ
CY3B15	35	16.6	3	10	5.5	13	—	6	11	57	M4 x 0.7	11	17	M10 x 1	—	83	35	19	103
CY3B20	36	21.6	2	13	7.5	20	12	6	8	66	M4 x 0.7	18	24	M20 x 1.5	28	106	50	25	132
CY3B25	46	26.4	2	13	7.5	20.5	15	8	10	70	M5 x 0.8	18.5	30	M26 x 1.5	34	111	50	30	137
CY3B32	60	33.6	2	16	8	22	18	8	15	80	M6 x 1	20	36	M26 x 1.5	40	124	50	40	156
CY3B40	70	41.6	3	16	11	29	23	10	16	92	M6 x 1	26	46	M32 x 2	50	150	60	40	182

Model	P (Piping port)		
	Nil	TN	TF
CY3B15	M5 x 0.8	—	—
CY3B20	Rc 1/8	NPT 1/8	G 1/8
CY3B25	Rc 1/8	NPT 1/8	G 1/8
CY3B32	Rc 1/8	NPT 1/8	G 1/8
CY3B40	Rc 1/4	NPT 1/4	G 1/4

Mounting Nut/Included in the package (2 pcs).



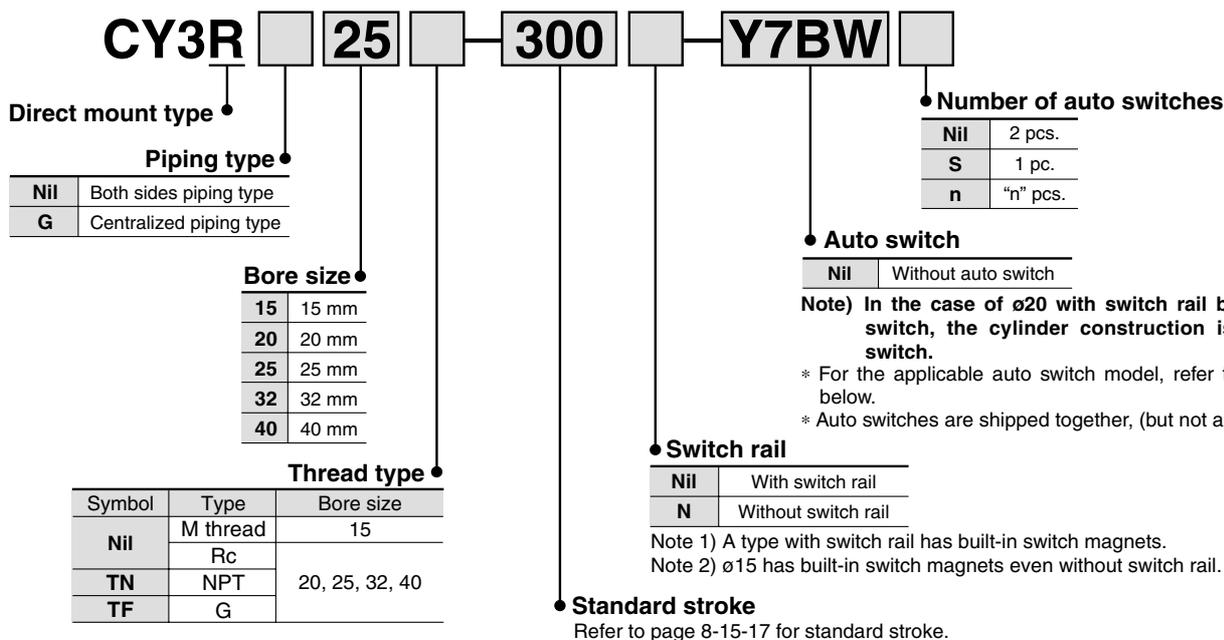
Part no.	Applicable bore size (mm)	d	H	B	C
SNJ-016B	15	M10 x 1.0	4	14	16.2
SN-020B	20	M20 x 1.5	8	26	30
SN-032B	25, 32	M26 x 1.5	8	32	37
SN-040B	40	M32 x 2.0	10	41	47.3

Magnetically Coupled Rodless Cylinder Direct Mount Type

Series **CY3R**

ø15, ø20, ø25, ø32, ø40

How to Order



Applicable Auto Switch/Refer to page 8-30-1 for further information on auto switches.

For ø15, ø20

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model	Lead wire length (m)*			Applicable load		
					DC	AC		0.5 (Nil)	3 (L)	5 (Z)			
Reed switch	—	Grommet	No	2-wire	24 V	5 V, 12 V	100 V or less	A90	●	●	—	IC circuit	Relay, PLC
						12 V	100 V	A93	●	●	—	—	
				3-wire (NPN equiv.)	—	5 V	—	A96	●	●	—	IC circuit	—
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	●	●	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9P	●	●	○	—	
				2-wire				M9B	●	●	○	—	
				3-wire (NPN)				F9NW	●	●	○	IC circuit	
				3-wire (PNP)				F9PW	●	●	○	IC circuit	
				2-wire				F9BW	●	●	○	—	
	Diagnostic indication (2-color indication)	—	—	—	—	—	—	—	—	—	—		

For ø25, ø32, ø40

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model	Lead wire length (m)*			Applicable load		
					DC	AC		0.5 (Nil)	3 (L)	5 (Z)			
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	24 V	5 V	—	Z76	●	●	—	IC circuit	—
				2-wire		12 V	100 V	Z73	●	●	●	—	Relay, PLC
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	Y59A	●	●	○	IC circuit	Relay, PLC
				3-wire (PNP)				Y7P	●	●	○	—	
				2-wire				Y59B	●	●	○	—	
				3-wire (NPN)				Y7NW	●	●	○	IC circuit	
				3-wire (PNP)				Y7PW	●	●	○	IC circuit	
				2-wire				Y7BW	●	●	○	—	
	Diagnostic indication (2-color indication)	—	—	—	—	—	—	—	—	—	—		

* Lead wire length symbols: 0.5 m Nil (Example) Y59B
3 m L (Example) Y59BL
5 m Z (Example) Y59BZ

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

Magnetically Coupled Rodless Cylinder Direct Mount Type Series CY3R



Specifications

Fluid	Air
Proof pressure	1.05 MPa
Max. operating pressure	0.7 MPa
Min. operating pressure	Refer to the minimum operating pressure table.
Ambient and fluid temperature	-10 to 60°C
Piston speed ^{Note)}	50 to 500 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 to : $+1.8_0$
Mounting	Direct mount type

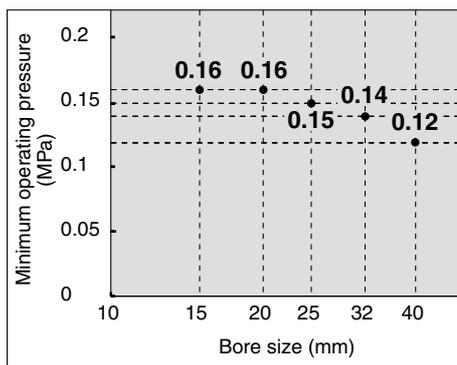
Note) When an auto switch is installed at an intermediate position of a type with auto switch, keep the maximum piston speed at 300 mm/s or below to ensure operation of relays or other devices.



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

Symbol	Specifications
-X116	Hydro specifications
-X160	High speed specifications
-X168	Helical insert thread specifications
-X322	Outside of cylinder tube with hard chrome plating
-XC57	With floating joint

Minimum Operating Pressure



Standard Stroke

Bore size (mm)	Standard stroke (mm)	Max. stroke ⁽¹⁾ without switch (mm)	Max. stroke ⁽¹⁾ with switch (mm)
15	50, 100, 150, 200, 250, 300	1000	750
	350, 400, 450, 500		
20	100, 150, 200, 250, 300, 350	1500	1000
25	400, 450, 500, 600, 700, 800	1500	1200
32	900, 1000	2000	1500
40	100, 150, 200, 250, 300, 350	2000	1500

Note 1) Please contact SMC if the maximum stroke will be exceeded.

Note 2) When installing the cylinder, refer to Selection Method (page 8-15-12) to handle the dead weight deflection.

Magnetic Holding Force

Bore size (mm)	15	20	25	32	40
Holding force (N)	137	231	363	588	922

Weight

Item	Bore size (mm)	(kg)				
		15	20	25	32	40
Basic weight	CY3R	0.272	0.421	0.622	1.217	1.980
	CY3RG (with switch rail)	0.225	0.351	0.542	1.097	1.820
Additional weight per each 50 mm of stroke (with switch rail)		0.04	0.051	0.056	0.076	0.093
Additional weight per each 50 mm of stroke (without switch rail)		0.015	0.02	0.023	0.033	0.04

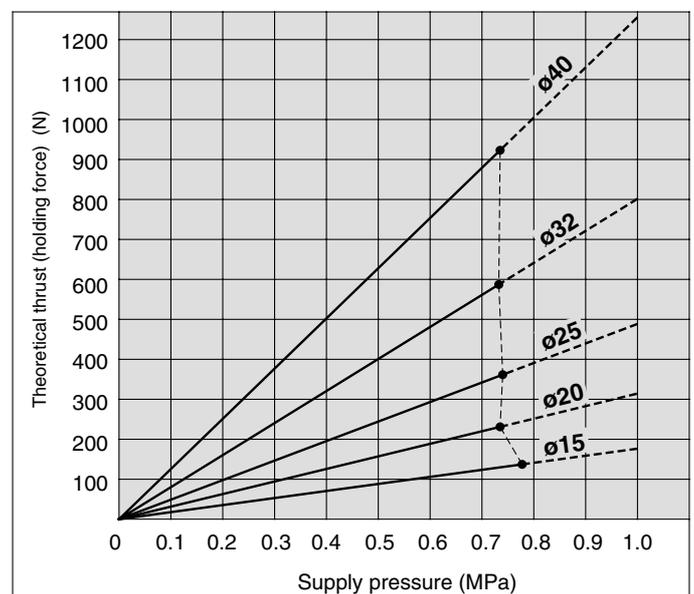
Calculation method

(Example) CY3R25-500 Basic weight 0.622 kg
(with switch rail) Additional weight 0.056 kg/50 s
Cylinder stroke 500 st

$$0.622 + 0.056 \times 500 \div 50 = 1.182 \text{ (kg)}$$

Theoretical Cylinder Thrust

Caution When calculating the actual thrust, design should consider the 12 minimum actuating pressure.



MX

MTS

MY

CY

MG

CX

D-

-X

20-

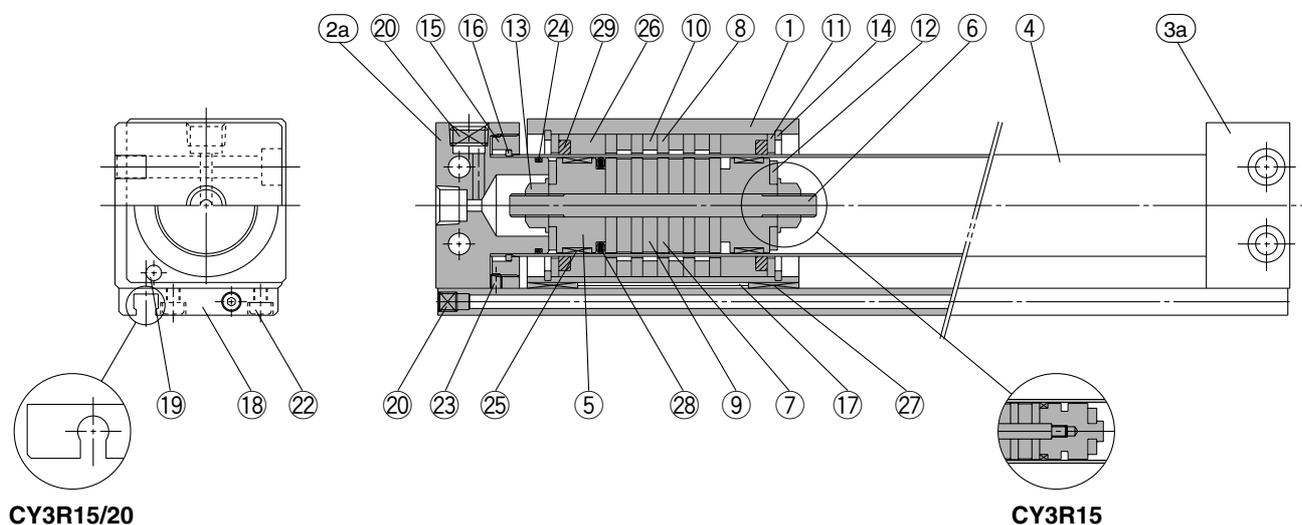
Data

Series CY3R

Construction

Both sides piping type

CY3R15 to 40



CY3R15/20

CY3R15

Component Parts

No.	Description	Material	Note
①	Body	Aluminum alloy	Hard anodized
②a	End cover A	Aluminum alloy	Electroless nickel plated
②b	End cover C	Aluminum alloy	Electroless nickel plated
③a	End cover B	Aluminum alloy	Electroless nickel plated
③b	End cover D	Aluminum alloy	Electroless nickel plated
④	Cylinder tube	Stainless steel	
⑤	Piston	ø15: Brass ø20 to ø40: Aluminum alloy	ø15: Electroless nickel plated ø20 to ø40: Chromated
⑥	Shaft	Stainless steel	
⑦	Piston side yoke	Rolled steel plate	Zinc chromated
⑧	External slider side yoke	Rolled steel plate	Zinc chromated
⑨	Magnet A	Rare earth magnet	
⑩	Magnet B	Rare earth magnet	
⑪	Spacer	Aluminum alloy	Black anodized
⑫	Bumper	Urethane rubber	
⑬	Piston nut	Carbon steel	ø20 to ø40
⑭	Snap ring	Carbon tool steel	Nickel plated
⑮	Attachment ring	Aluminum alloy	Chromated
⑯	Type C snap ring for shaft	Hard steel wire	
⑰	Magnetism shielding plate	Rolled steel plate	Chromated
⑱	Switch rail	Aluminum alloy	Clear anodized
⑲	Magnet	Rare earth magnet	
⑳	Hexagon socket head plug	Chromium steel	Nickel plated

No.	Description	Material	Note
㉑	Steel balls	Chromium steel	ø40: Hexagon socket head plug ø20: None
㉒	Hexagon socket head screw	Chromium steel	Nickel plated
㉓	Hexagon socket head set screw	Chromium steel	Nickel plated
㉔*	Cylinder tube gasket	NBR	
㉕*	Wear ring A	Special resin	
㉖*	Wear ring B	Special resin	
㉗*	Wear ring C	Special resin	
㉘*	Piston seal	NBR	
㉙*	Soft wiper	Special resin	
㉚*	Switch rail gasket	NBR	Both sides piping type: None

* Seal kits are sets consisting of numbers ㉔ to ㉚, and may be ordered using the order number to each bore size.

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
15	CY3R15-PS	Numbers ㉔, ㉕, ㉖, ㉗, ㉘, ㉙, ㉚ above
20	CY3R20-PS	
25	CY3R25-PS	
32	CY3R32-PS	
40	CY3R40-PS	

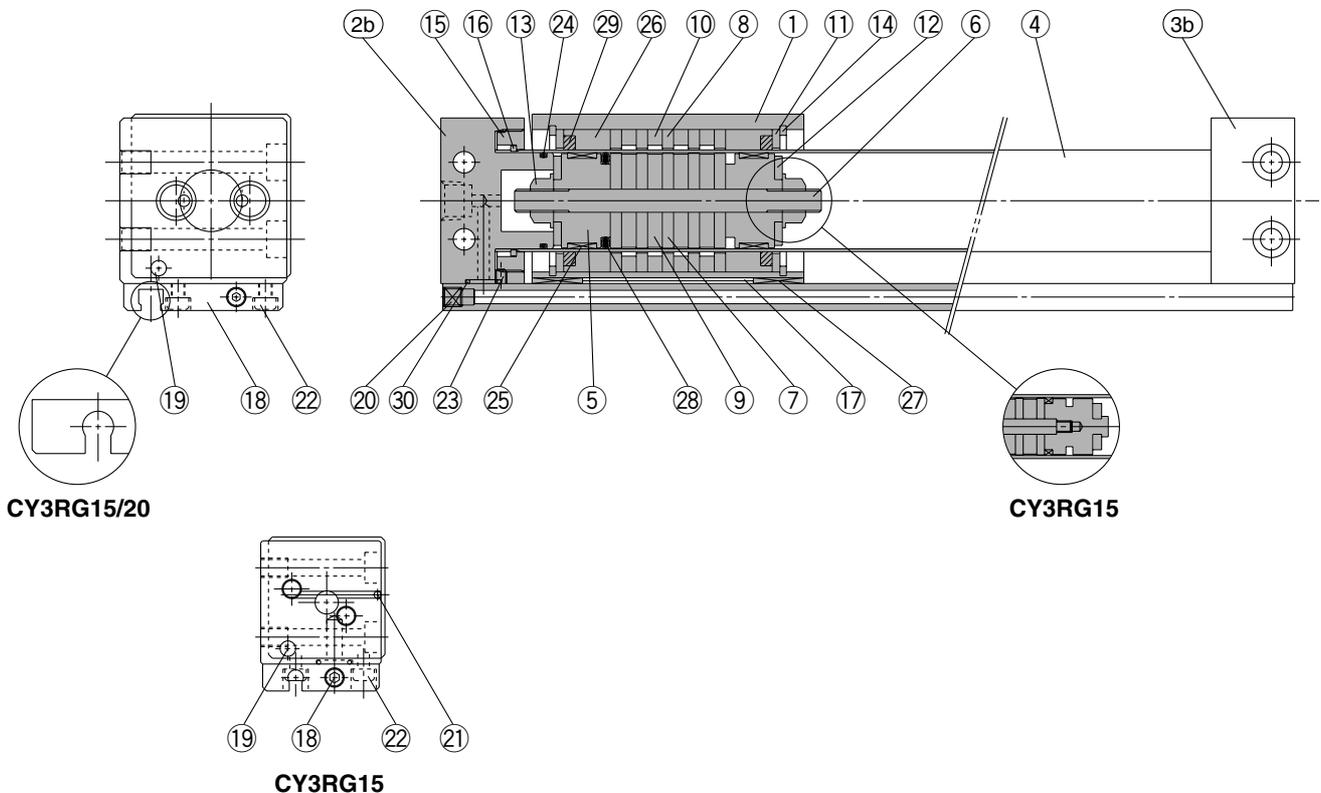
* Seal kits are the same for both the both sides piping type and the centralized piping type.

Magnetically Coupled Rodless Cylinder Direct Mount Type Series **CY3R**

Dimensions

Centralized piping type

CY3RG15 to 40



MX

MTS

MY

CY

MG

CX

D-

-X

20-

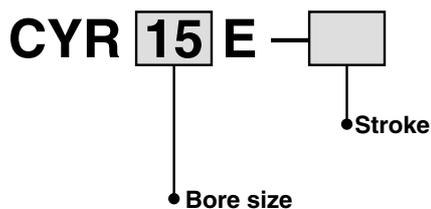
Data

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
15	CY3R15-PS	Numbers 24, 25, 26, 27, 28, 29, 30 at the left
20	CY3R20-PS	
25	CY3R25-PS	
32	CY3R32-PS	
40	CY3R40-PS	

* Seal kits are the same for both the both sides piping type and the centralized piping type.

Switch Rail Accessory



Switch Rail Accessory Kit

Bore size (mm)	Kit no.	Contents
15	CYR15E- <input type="checkbox"/>	Numbers ⁽²⁾ 17, 18, 20, 22, 27 at the left
20	For reed switch CYR20E- <input type="checkbox"/>	Numbers 17, 18, 20, 22, 27 at the left
	For solid state switch CYR20EN- <input type="checkbox"/>	
25	CYR25E- <input type="checkbox"/>	
32	CYR32E- <input type="checkbox"/>	
40	CYR40E- <input type="checkbox"/>	

Note 1) indicates to the stroke.

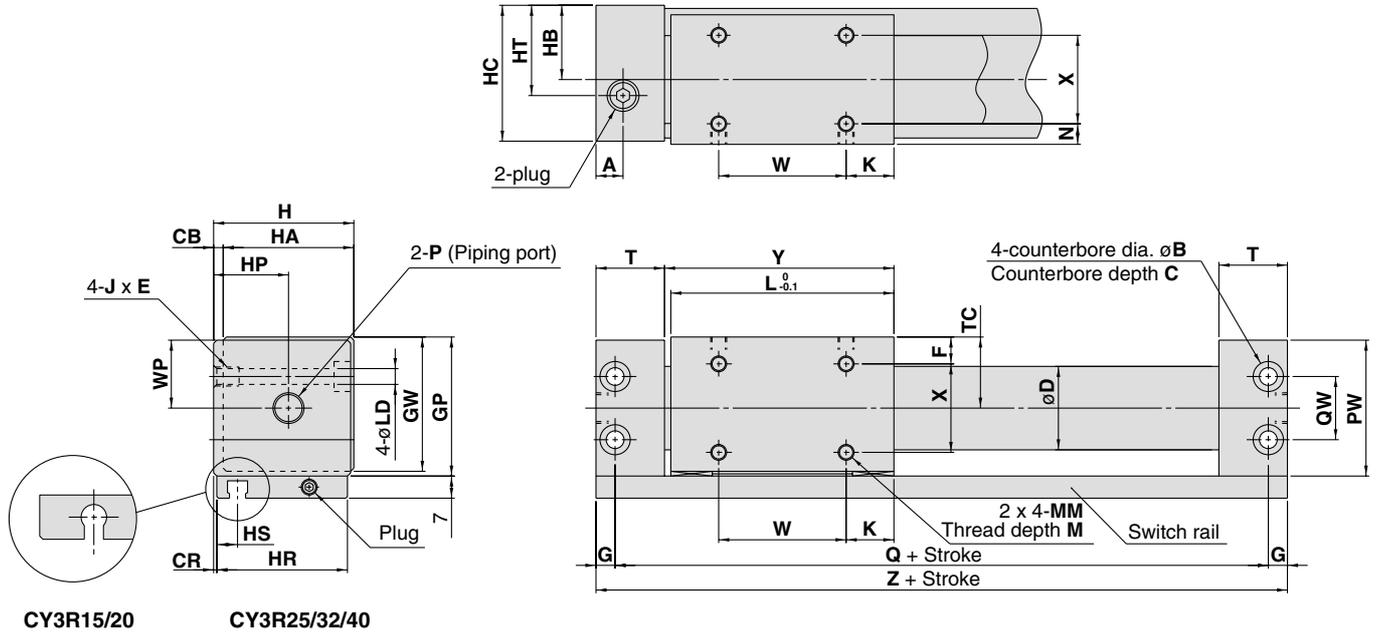
Note 2) A magnet is already built in for ø15.

Series CY3R

Dimensions

Both sides piping type: $\phi 15$ to $\phi 40$

Note) This figure shows types with switch rail (no symbol).



CY3R15/20

CY3R25/32/40

Model	A	B	C	CB	CR	D	F	G	GP	GW	H	HA	HB	HC	HP	HR	HS	HT	J x E	K
CY3R15	10.5	8	4.2	2	0.5	16.6	8	5	33	31.5	32	30	17	31	17	30	8.5	17	M5 x 0.8 x 7	14
CY3R20	9	9.5	5.2	3	1	21.6	9	6	39	37.5	39	36	21	38	24	36	7.5	24	M6 x 1 x 8	11
CY3R25	8.5	9.5	5.2	3	1	26.4	8.5	6	44	42.5	44	41	23.5	43	23.5	41	6.5	23.5	M6 x 1 x 8	15
CY3R32	10.5	11	6.5	3	1.5	33.6	10.5	7	55	53.5	55	52	29	54	29	51	7	29	M8 x 1.25 x 10	13
CY3R40	10	11	6.5	5	2	41.6	13	7	65	63.5	67	62	36	66	36	62	8	36	M8 x 1.25 x 10	15

(mm)

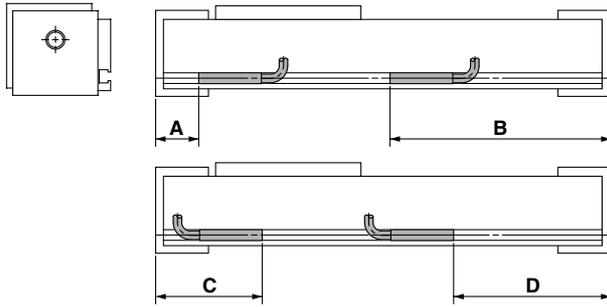
Model	L	LD	M	MM	N	PW	Q	QW	T	TC	W	WP	X	Y	Z
CY3R15	53	4.3	5	M4 x 0.7	6	32	84	18	19	17	25	16	18	54.5	94
CY3R20	62	5.6	5	M4 x 0.7	7	38	95	17	20.5	20	40	19	22	64	107
CY3R25	70	5.6	6	M5 x 0.8	6.5	43	105	20	21.5	22.5	40	21.5	28	72	117
CY3R32	76	7	7	M6 x 1	8.5	54	116	26	24	28	50	27	35	79	130
CY3R40	90	7	8	M6 x 1	11	64	134	34	26	33	60	32	40	93	148

Model	P (Piping port)		
	Nil	TN	TF
CY3R15	M5 x 0.8	—	—
CY3R20	Rc 1/8	NPT 1/8	G 1/8
CY3R25	Rc 1/8	NPT 1/8	G 1/8
CY3R32	Rc 1/8	NPT 1/8	G 1/8
CY3R40	Rc 1/4	NPT 1/4	G 1/4

Series CY3R

Proper Auto Switch Mounting Position (Detection at stroke end)

(Reference dimension)



ø15, ø20 (mm)

Bore size (mm)	Applicable switch model							
	D-A9□				D-M9□, D-F9□W			
	A	B	C	D	A	B	C	D
15	17.5	76.5	—	56.5	21.5	72.5	—	60.5
20	19.5	87.5	39.5	67.5	23.5	83.5	35.5	71.5

Note 1) Auto switches cannot be installed in Area C in the case of ø15.

Note 2) Only non-magnetic material is permitted as the mounting surface of a ø20 cylinder.

ø25, ø32, ø40 (mm)

Bore size (mm)	Applicable switch model			
	D-Z7□/Z80/Y59□/D-Y7P/Y7□W			
	A	B	C	D
25	18	99	43	74
32	21.5	108.5	46.5	83.5
40	23.5	124.5	48.5	99.5

Note 1) 50 mm is the minimum stroke available with 2 auto switches mounted.

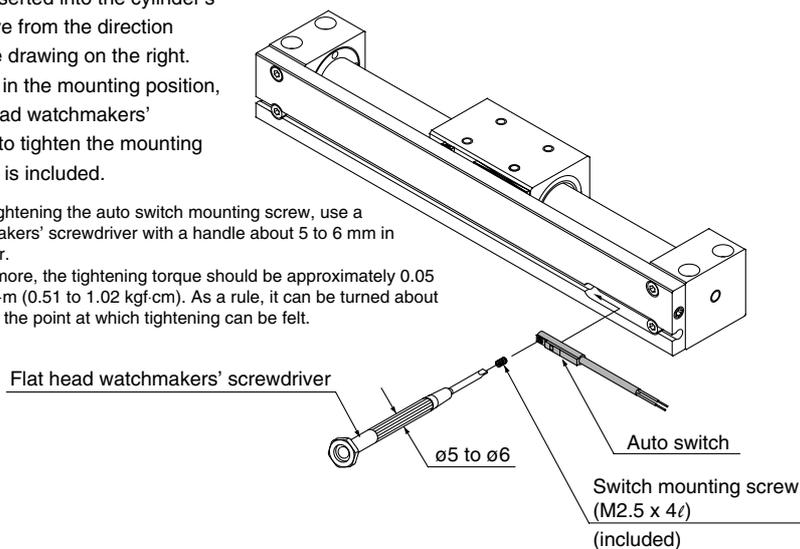
Note 2) The above dimensions are given as reference dimensions. Confirm installation with actual equipment.

Mounting of Auto Switch

When mounting auto switches, they should be inserted into the cylinder's switch groove from the direction shown in the drawing on the right. After setting in the mounting position, use a flat head watchmakers' screwdriver to tighten the mounting screw which is included.

Note) When tightening the auto switch mounting screw, use a watchmakers' screwdriver with a handle about 5 to 6 mm in diameter.

Furthermore, the tightening torque should be approximately 0.05 to 0.1 N·m (0.51 to 1.02 kgf·cm). As a rule, it can be turned about 90° past the point at which tightening can be felt.



Auto Switch Specifications

- (1) Switches (switch rail) can be added to the standard type (without switch rail). The switch rail accessory type is mentioned on page 8-15-19, and can be ordered together with auto switches.
- (2) Refer to the separate disassembly instructions for switch magnet installation procedures.

Operating Range

Auto switch model	Bore size (mm)				
	15	20	25	32	40
D-A9□	8	6	—	—	—
D-M9□/D-F9□W	5	4	—	—	—
D-Z7□/Z80	—	—	9	9	11
D-Y59□/Y7P D-Y7□W	—	—	6	6	6

* Switches cannot be mounted in some cases.
* Operating ranges are standards including hysteresis, and are not guaranteed. (variation on the order of ±30%)
Large variations may occur depending on the surrounding environment.

MX

MTS

MY

CY

MG

CX

D-

-X

20-

Data

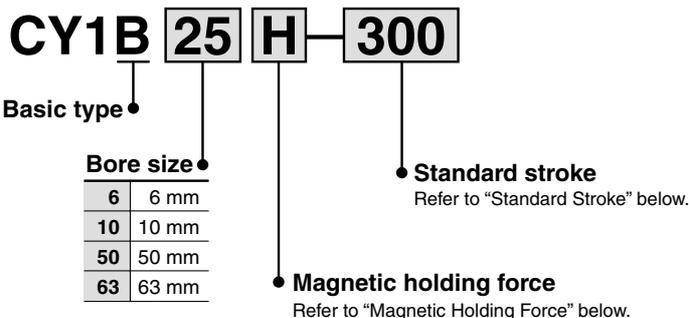
Magnetically Coupled Rodless Cylinder Basic Type



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



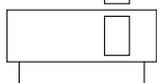
Strong holding force

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)

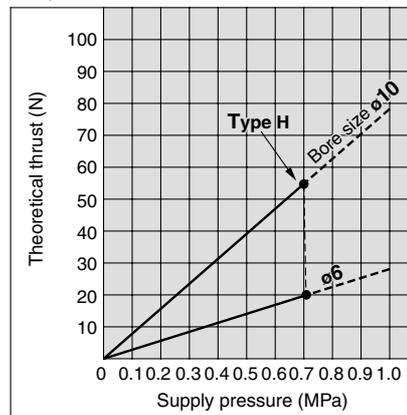
Theoretical Cylinder Thrust



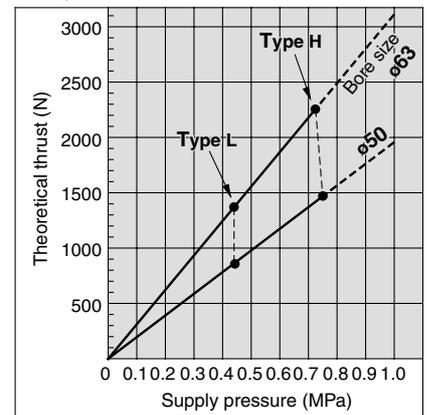
Caution

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

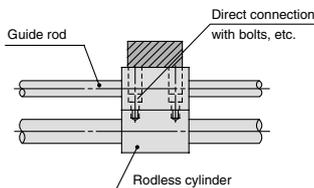
⚠ Precautions

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

Mounting

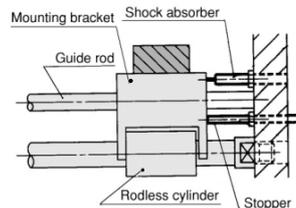
⚠ Caution

1. 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.
2. Use caution to the rotation of the external slider.
Rotation should be controlled by connecting it to another shaft (linear guide, etc.).
3. 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.
4. 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.
5. 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

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. 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.

2. 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.

3. Since it is possible to change the magnetic holding force (for example, from CY1B50L to CY1B50H), please contact SMC if this is necessary.

4. Do not disassemble the magnetic components (piston slider, external slider).

This can cause a loss of holding force and malfunction.

5. When disassembling to replace the seals and wear ring, refer to the separate disassembly instructions.

6. 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.

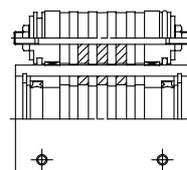


Fig. (3)
Correct position

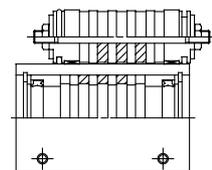


Fig. (4)
Incorrect position

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).

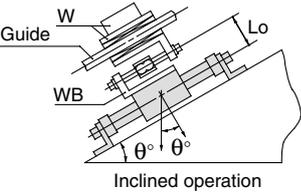
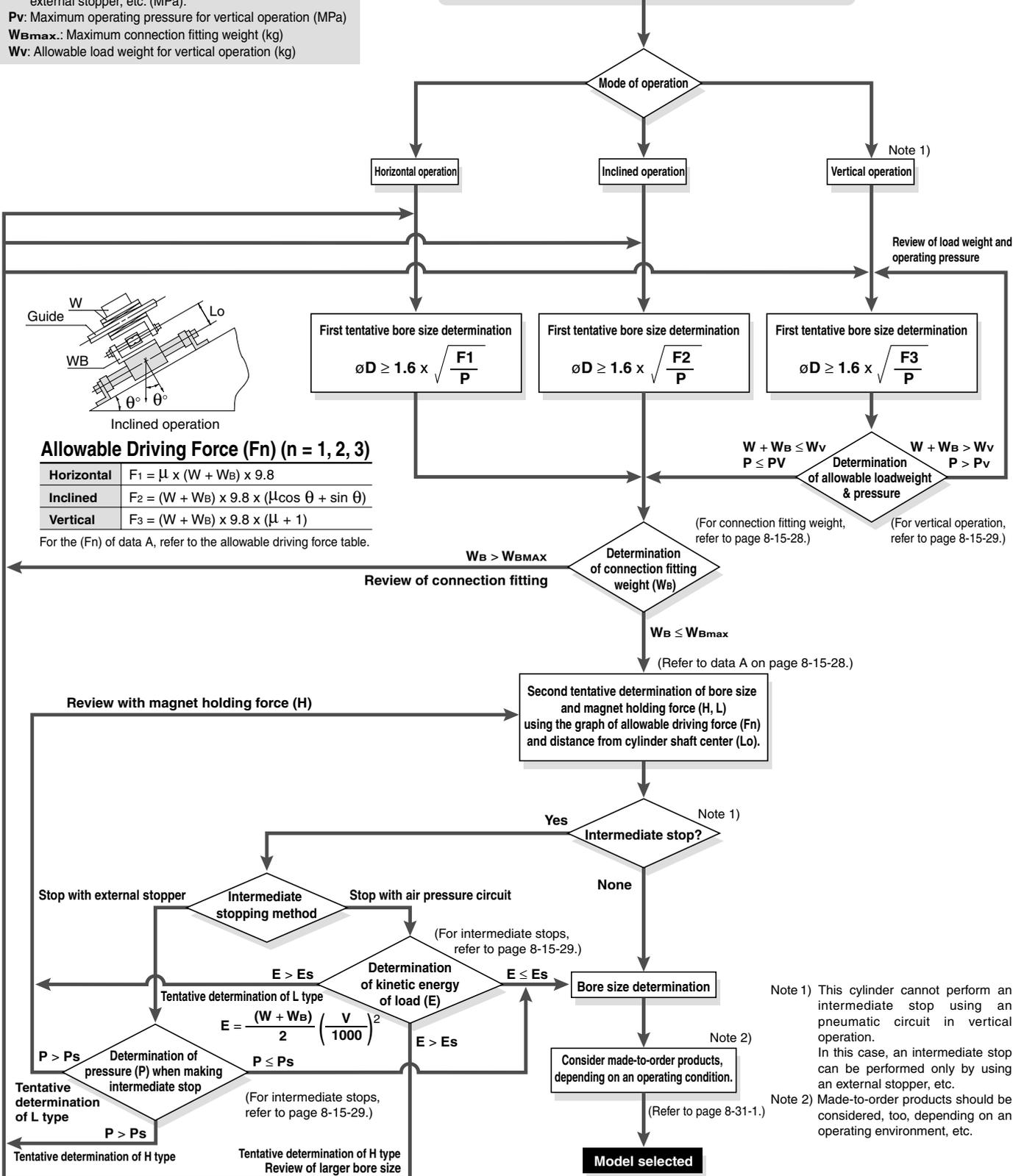
Pv: Maximum operating pressure for vertical operation (MPa)

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)



Allowable Driving Force (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	$F_3 = (W + W_B) \times 9.8 \times (\mu + 1)$

For the (Fn) of data A, refer to the allowable driving force table.

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.

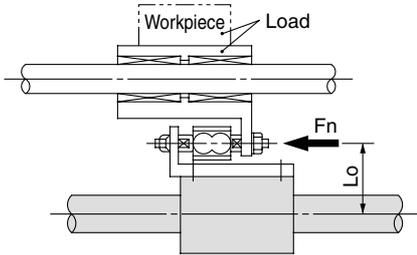
Note 2) Made-to-order products should be considered, too, depending on an operating environment, etc.

Caution on Design (1)

Selection Method

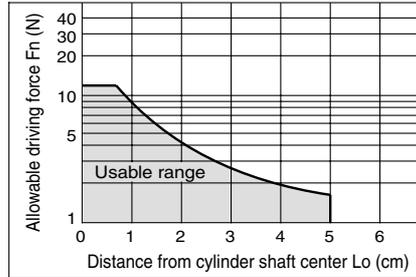
Selection procedure

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).

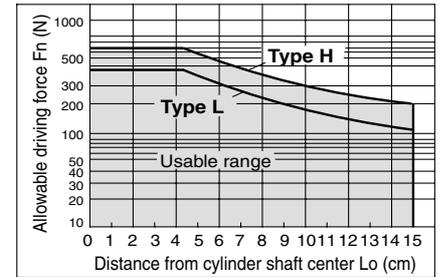


<Data (A): Distance from cylinder shaft center — Allowable driving capacity>

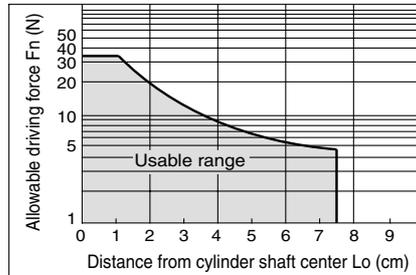
CY1B6



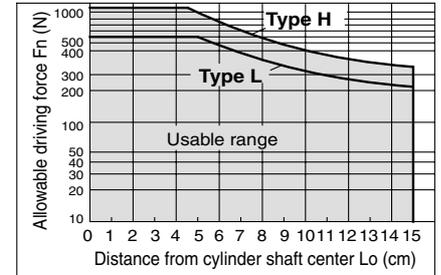
CY1B50



CY1B10



CY1B63

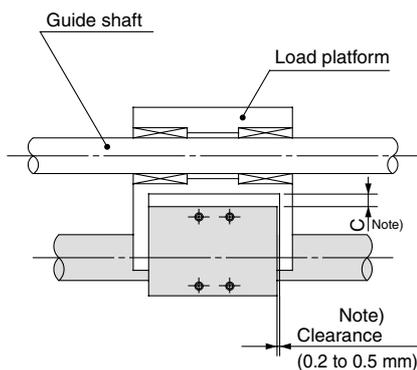


Series CY1B Model Selection 3

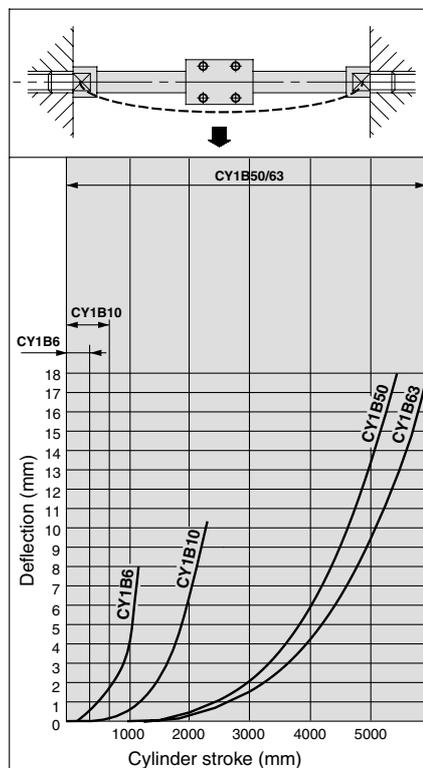
Caution on Design (2)

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.



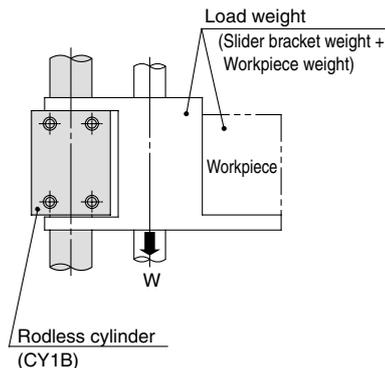
Note) Referring to the self-weight deflection in the graph below, provide clearance so that the cylinder does not touch the mounting surface or the load section, and is able to operate smoothly within the minimum operating pressure range for a full stroke.



* 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 shown in the table below. Use caution, as operation when exceeding the allowable value can result in breaking of the magnetic coupling.

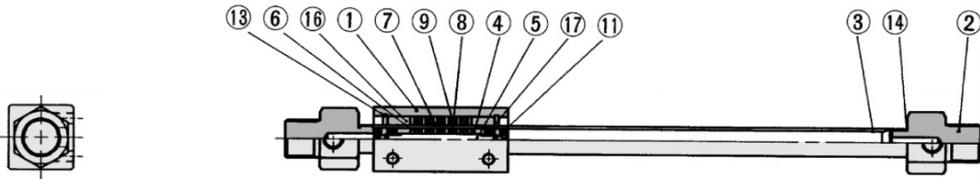
(Reference values)		
Bore size (mm)	Model	Allowable kinetic energy for intermediate stop (Es) (J)
6	CY1B 6H	0.007
10	CY1B10H	0.03
50	CY1B50H	3.12
	CY1B50L	1.83
63	CY1B63H	5.07
	CY1B63L	3.09

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

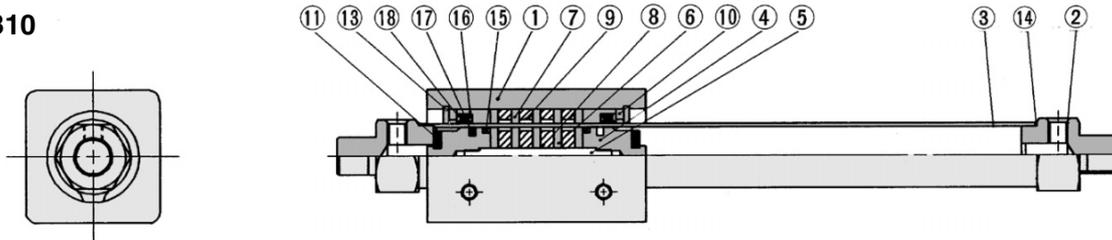
Series CY1B

Construction

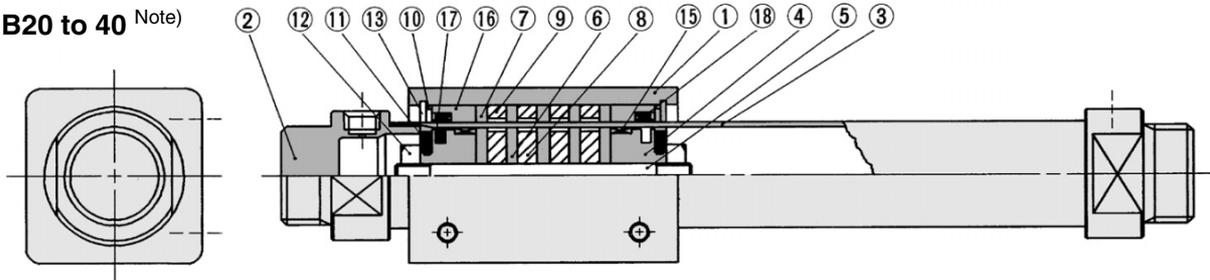
Basic type CY1B6



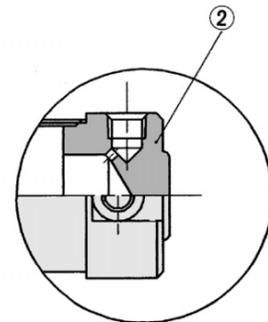
CY1B10



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	

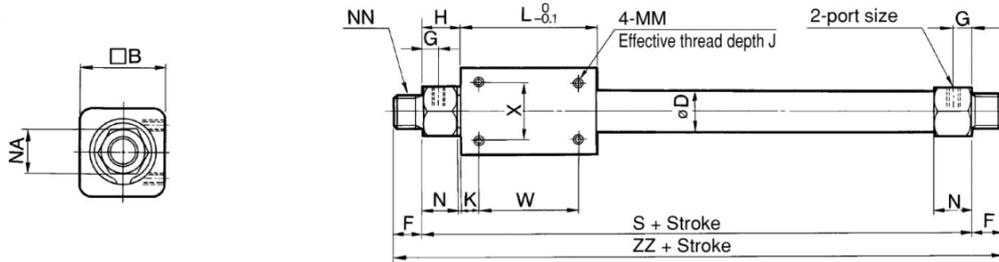
* Seal kit includes ⑭, ⑯, ⑰ for $\phi 6$, $\phi 10$. ⑭ to ⑱ are for $\phi 10$. ⑮ to ⑱ are for $\phi 50$ and $\phi 63$. Order the seal kit, based on each bore size.

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

Dimensions

Basic type

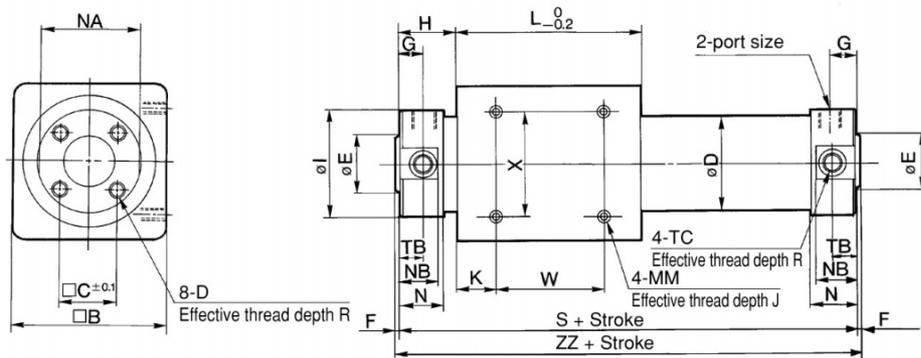
CY1B6/10



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

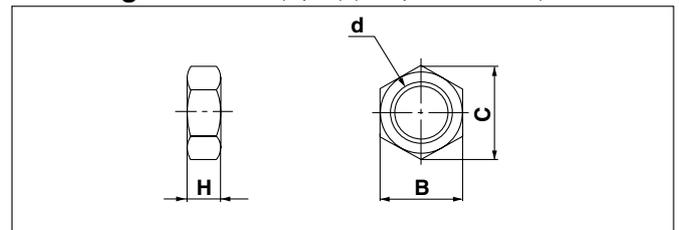


Model	Port size	B	C	D	E	F	G	H	I	K	L	MM x J	N	NA	NB	NN
CY1B50	Rc 1/4	86	32	53	30 ^{-0.007}	2	14	33	58.2	25	110	M8 x 1.25 x 12	25	55	23	—
CY1B63	Rc 1/4	100	38	66	32 ^{-0.007}	2	14	33	72.2	26	122	M8 x 1.25 x 12	25	69	23	—

(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



Magnetically Coupled Rodless Cylinder Direct Mount Type

Series *CY1R*

ø6, ø10, ø50, ø63

How to Order

CY1R **25** **H** **300** **Y7BW**

Direct mount type

Piping

Nil	Standard type
G	Centralized piping type

Note) Type G is not available for ø6.

Bore size

6	6 mm
10	10 mm
50	50 mm
63	63 mm

Magnetic holding force

Holding force type	Applicable bore size (mm)
H	6, 10, 50, 63
L	50, 63

Refer to "Magnetic Holding Force" on page 8-15-33.

Number of auto switches

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

Auto switch

Nil	Without auto switch
-----	---------------------

* Auto switches can be mounted on type H only.
Note) In the case of ø20 with switch rail but without switch, the cylinder construction is for reed switch.
* For the applicable auto switch model, refer to the table below.
* Auto switches are shipped together, (but not assembled).

Switch rail

Nil	With switch rail
N	Without switch rail

Note 1) Symbol N is standard type only.
Note 2) With the switch rail, a built-in switch magnet is also included.

Standard stroke

Refer to "Standard Stroke" on page 8-15-33.

Applicable Auto Switch/Refer to page 8-30-1 for further information on auto switches.

For ø6, ø10

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage			Auto switch model	Lead wire length (m) *			Pre-wire connector	Applicable load	
					DC	AC	AC		0.5 (Nil)	3 (L)	5 (Z)		IC circuit	Relay, PLC
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96	●	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	A93	●	●	—	—	—	Relay, PLC
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9P	●	●	○	○	IC circuit	
				2-wire				M9B	●	●	○	○	—	
				3-wire (NPN)				F9NW	●	●	○	○	IC circuit	
				3-wire (PNP)				F9PW	●	●	○	○	IC circuit	
				2-wire				F9BW	●	●	○	○	—	
Diagnostic indication (2-color indication)	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9P	●	●	○	○	IC circuit	

For ø50, ø63

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage			Auto switch model	Lead wire length (m) *			Pre-wire connector	Applicable load	
					DC	AC	AC		0.5 (Nil)	3 (L)	5 (Z)		IC circuit	Relay, PLC
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	Z76	●	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	Z73	●	●	●	—	—	Relay, PLC
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	Y59A	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				Y7P	●	●	○	○	IC circuit	
				2-wire				Y59B	●	●	○	○	—	
				3-wire (NPN)				Y7NW	●	●	○	○	IC circuit	
				3-wire (PNP)				Y7PW	●	●	○	○	IC circuit	
				2-wire				Y7BW	●	●	○	○	—	
Diagnostic indication (2-color indication)	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	Y59A	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				Y7P	●	●	○	○	IC circuit	

* Lead wire length symbols:

0.5 m Nil (Example) A93
3 m L (Example) Y59BL
5 m Z (Example) F9NWX

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

- Since there are other applicable auto switches than listed, refer to page 8-15-44 for details.
- For details about auto switches with pre-wire connector, refer to page 8-30-52.

Magnetically Coupled Rodless Cylinder Direct Mount Type Series CY1R



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 ^{Note)}	50 to 500 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 to: $^{+1.8}_0$
Mounting	Direct mount type

Note) When an auto switch is placed at an intermediate position, the maximum piston speed should be limited to no more than 300 mm/s due to relays, etc.

Standard Stroke

Bore size (mm)	Standard stroke (mm)	Maximum available ^{Note)} stroke (mm)	Maximum stroke with switch stroke (mm)
6	50, 100, 150, 200	300	300
10	50, 100, 150, 200, 250, 300	500	500
50	100, 150, 200, 250, 300, 350	2000	1500
63	400, 450, 500, 600, 700, 800, 900, 1000		

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



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

Symbol	Specifications
-XC57	With floating joint
-X168	Helical insert thread specifications

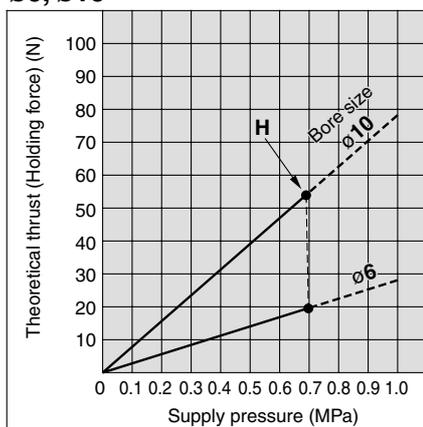
Magnetic Holding Force (N)

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

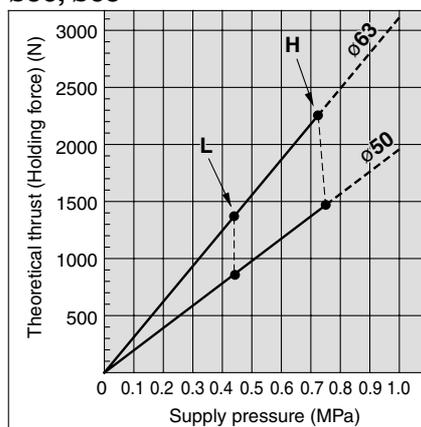
When calculating the actual thrust, design should consider the minimum actuating pressure.

Theoretical Cylinder Thrust **⚠ Caution**

ø6, ø10



ø50, ø63



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

Series CY1R

Weight

(kg)

Item		Bore size (mm)			
		6	10	50	63
Basic weight (For 0 st)	CY1R□H CY1RG□H (With switch rail)	0.092	0.111	3.59	5.45
	CY1R□L CY1RG□L (With switch rail)	—	—	3.29	4.95
	CY1R□H (Without switch rail)	0.075	0.080	3.30	5.10
	CY1R□L (Without switch rail)	—	—	3.00	4.60
Additional weight per each 50mm of stroke (With switch rail)		0.016	0.034	0.177	0.212
Additional weight per each 50mm of stroke (Without switch rail)		0.004	0.014	0.095	0.120

Calculation

(Example) CY1R10H-300 (with switch rail)

Basic weight...0.111 (kg), Additional weight...0.034 (kg/50 st), Cylinder stroke...300 (st)

$0.111 + 0.034 \times 300 \div 50 = 0.315$ kg

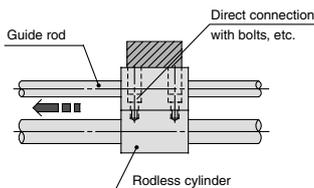
⚠ Precautions

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

Mounting

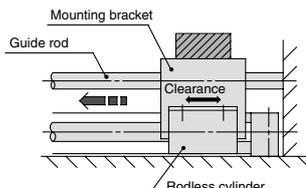
⚠ Caution

- 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.
- The cylinder is mounted with bolts through the mounting holes in the end covers. Be sure they are tightened securely.**
- If gaps occur between the mounting surface and the end covers when mounting with bolts, perform shim adjustment using spacers, etc. so that there is no unreasonable stress.**
- Be sure that both end 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

- 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 8-15-38) 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.).

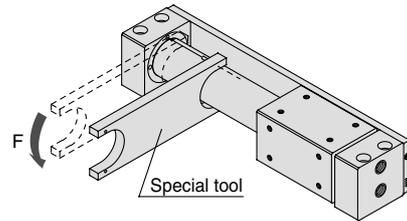
Disassembly and Maintenance

⚠ 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 very strong attractive power.

⚠ Caution

- Special tools are necessary for disassembly.**



Special Tool Part No.

Part no.	Applicable bore size (mm)
CYRZ-V	6, 10
CYRZ-X	50
CYRZ-Y	63

- 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 CY1R50L to CY1R50H), 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.

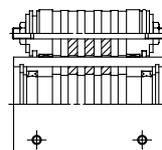


Fig. (3)
Correct position

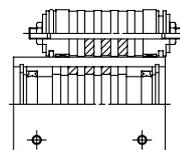


Fig. (4)
Incorrect position

Example of 50 and $\phi 63$ with holding force type L

MX

MTS

MY

CY

MG

CX

D-

-X

20-

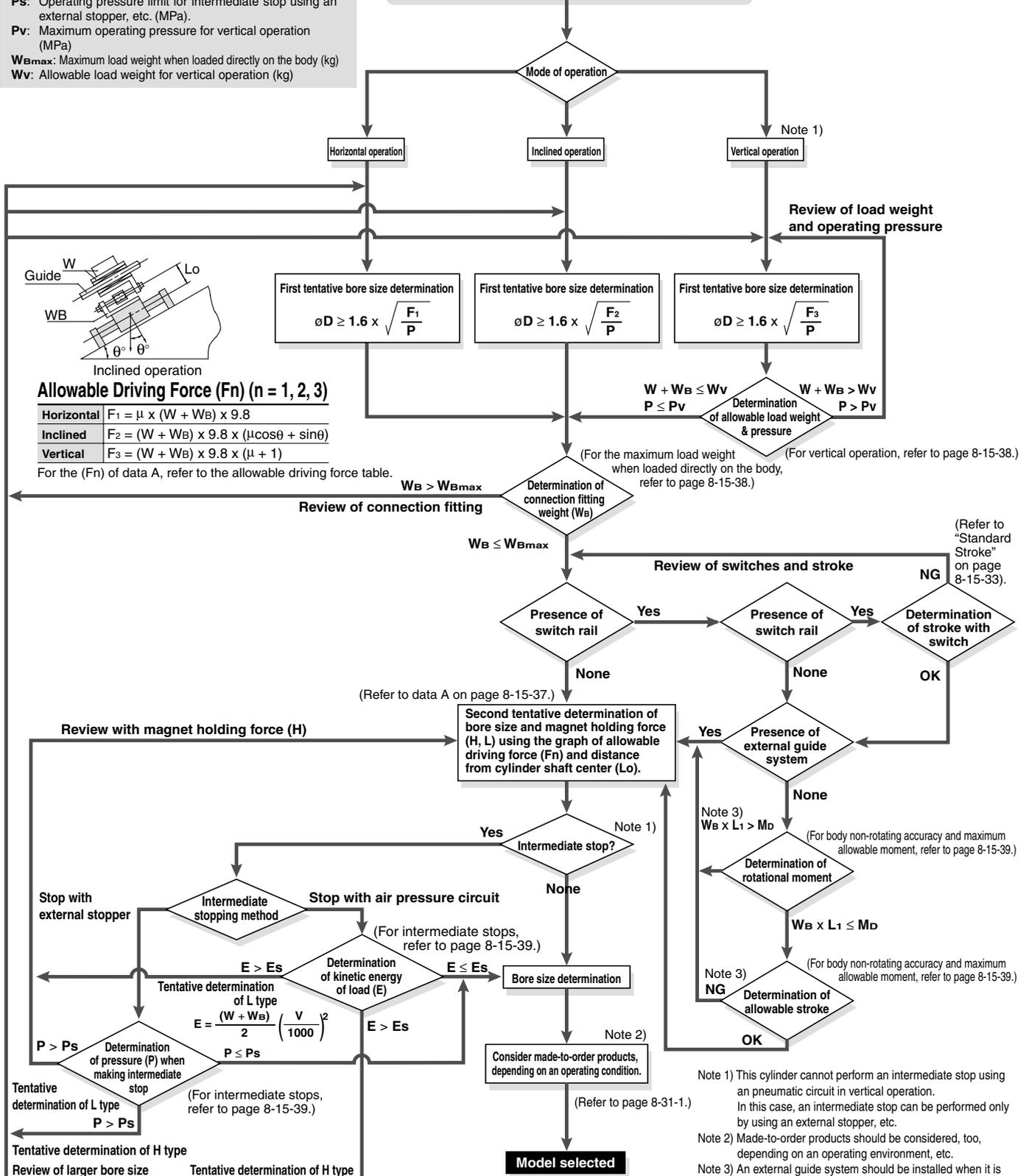
Data

Series CY1R 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)
 Mb: Maximum allowable moment when connection fitting, etc., is directly loaded (N-m)
 Ps: Operating pressure limit for intermediate stop using an external stopper, etc. (MPa).
 Pv: Maximum operating pressure for vertical operation (MPa)
 W_{Bmax}: Maximum load weight when loaded directly on the body (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
 - L_o: Distance from cylinder shaft center to work piece point of application (cm)
 - L₁: Distance from the cylinder shaft center to the center of the gravity of connection fitting, etc. (mm)
 - Presence of switches
 - P: Operating pressure (MPa)
 - V: Speed (mm/s)
 - Stroke (mm)
 - Mode of operation (Horizontal, Inclined, Vertical)



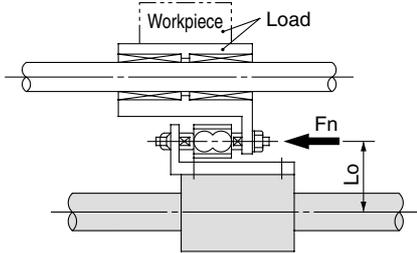
Series CY1R

Model Selection 2

Caution on Design (1)

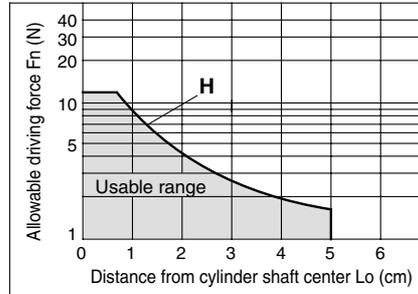
Selection procedure

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).

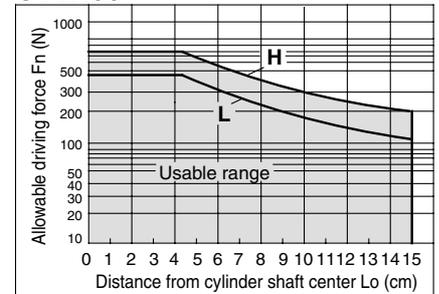


<Data (A) : Distance from cylinder shaft center — Allowable driving capacity>

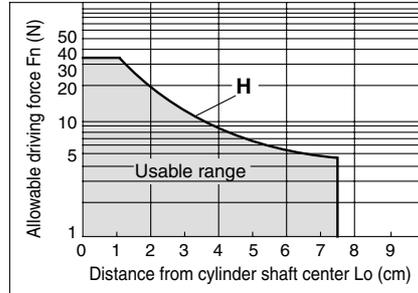
CY1R6



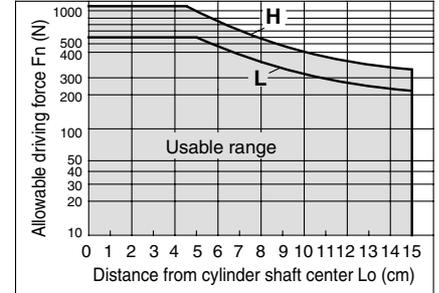
CY1R50



CY1R10



CY1R63



MX

MTS

MY

CY

MG

CX

D-

-X

20-

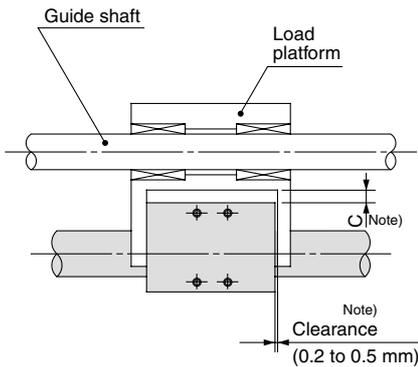
Data

Series CY1R Model Selection 3

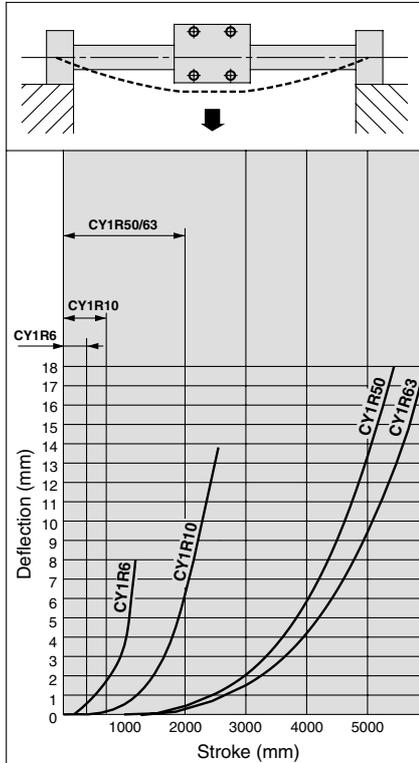
Caution on Design (2)

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, the greater the amount of variation in the shaft centers. Therefore, a connection method should be considered which allows for this variation as shown in the drawing.



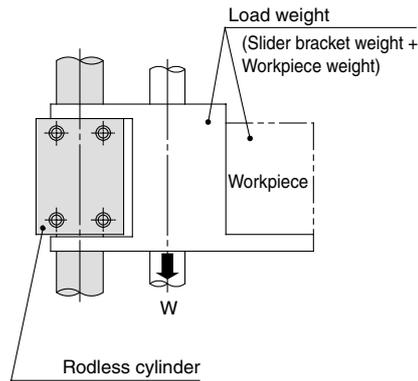
Note) Referring to the self-weight deflection in the graph below, provide clearance so that the cylinder does not touch the mounting surface or the load section, and is able to operate smoothly within the minimum operating pressure range for a full stroke.



* 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 will increase due to the load weight and moment, and this can cause malfunction.



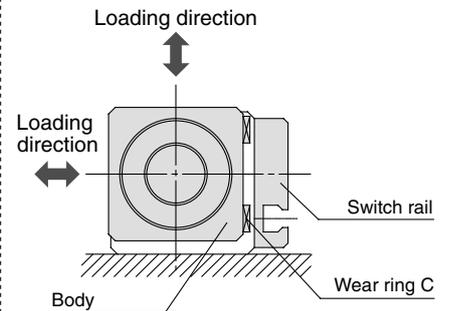
Bore size (mm)	Model	Allowable load weight (Wv) (kg)	Maximum operating pressure (Pv) (MPa)
6	CY1R 6H	1.0	0.55
10	CY1R10H	2.7	0.55
50	CY1R50H	75.0	0.65
	CY1R50L	44.0	0.40
63	CY1R63H	115.0	0.65
	CY1R63L	70.0	0.40

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

Maximum Load Weight when Loaded Directly on Body

When the load is applied directly to the body, it should be no greater than the maximum values shown in the table below.

Model	Maximum load weight (W _{max}) (kg)
CY1R6H	0.2
CY1R10H	0.4
CY1R50□	2.5
CY1R63□	3.0



Series CY1R

Model Selection 4

Caution on Design (3)

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	CY1R6H	0.55
10	CY1R10H	0.55
50	CY1R50H	0.65
	CY1R50L	0.40
63	CY1R63H	0.65
	CY1R63L	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 shown in the table below. Use caution, as operation when exceeding the allowable value can result in breaking of the magnetic coupling.

(Reference values)

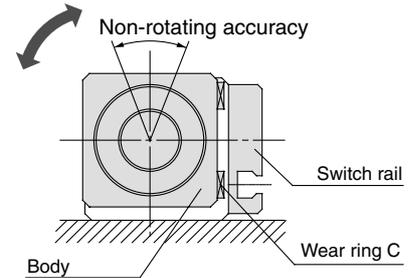
Bore size (mm)	Model	Allowable kinetic energy for intermediate stop (Es) (J)
6	CY1R6H	0.007
10	CY1R10H	0.03
50	CY1R50H	3.12
	CY1R50L	1.83
63	CY1R63H	5.07
	CY1R63L	3.09

Body Non-rotating Accuracy and Maximum Allowable Moment (with Switch Rail)

(Reference Values)

Reference values for non-rotating accuracy and maximum allowable moment at stroke end are indicated below.

Bore size (mm)	Non-rotating accuracy (°)	Maximum allowable moment (M ₀) (N·m)	Allowable stroke (2) (mm)
6	7.3	0.02	100
10	6.0	0.05	100
50	2.4	1.00	500
63	2.2	1.37	500



Note 1) Avoid operations where rotational torque (moment) is applied. In such a case, the use of an external guide is recommended.

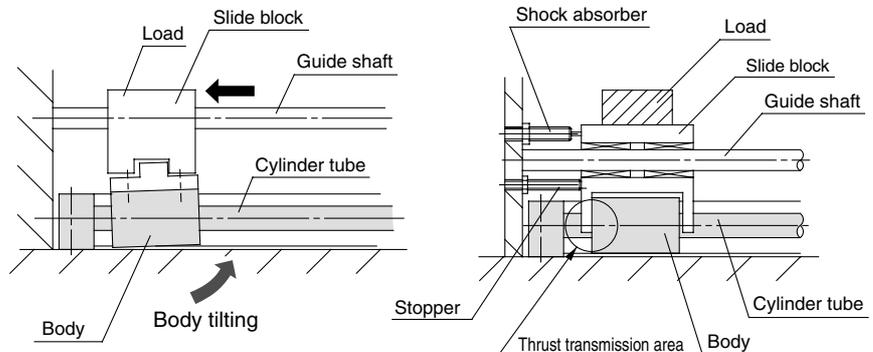
Note 2) The above reference values will be satisfied within the allowable stroke ranges, but caution is necessary, because as the stroke becomes longer, the inclination (rotation angle) within the stroke can be expected to increase.

Note 3) When a load is applied directly to the body, the loaded weight should be no greater than the allowable load weights on page 8-15-38.

Stroke End Stopping Method

When stopping a load having a large inertial force at the stroke end, tilting of the body and damage to the bearings and cylinder tube may occur. (Refer to the left hand figure below.)

As shown in the right hand figure below, a shock absorber should be used together with the stopper, and thrust should also be transmitted from the center of the body so that tilting will not occur.



MX

MTS

MY

CY

MG

CX

D-

-X

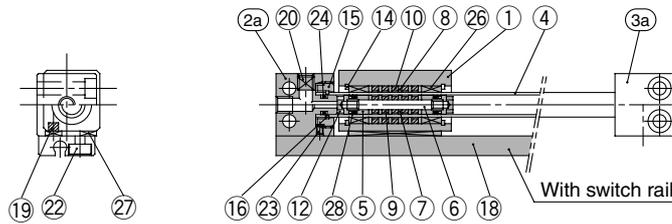
20-

Data

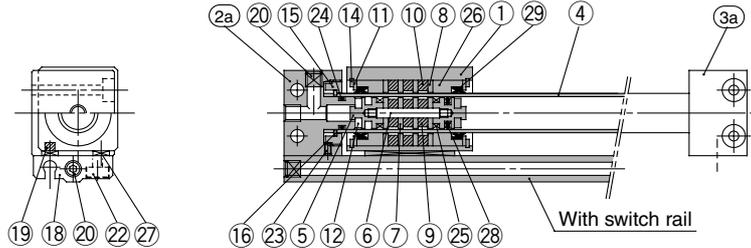
Series CY1R

Construction: Standard Type

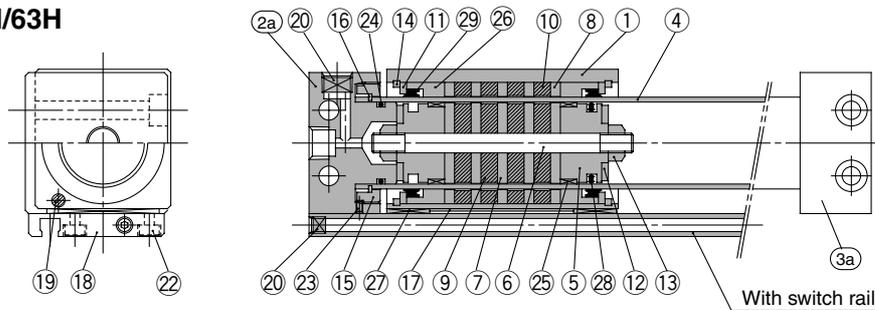
CY1R6H



CY1R10H



CY1R50H/63H



Component Parts

No.	Description	Material	Note
①	Body	Aluminum alloy	Hard anodized
②a	End cover A	Aluminum alloy	Hard anodized
②b	End cover C	Aluminum alloy	Hard anodized
③a	End cover B	Aluminum alloy	Hard anodized
③b	End cover D	Aluminum alloy	Hard anodized
④	Cylinder tube	Stainless steel	
⑤	Piston	ø6, ø10: Brass ø50, ø63: Aluminum alloy	ø6, ø10: Electroless nickel plated ø50, ø63: Chromated
⑥	Shaft	Stainless steel	
⑦	Piston side yoke	Rolled steel plate	Zinc chromated
⑧	External slider side yoke	Rolled steel plate	Zinc chromated
⑨	Magnet A	Rare earth magnet	
⑩	Magnet B	Rare earth magnet	
⑪	Spacer	Rolled steel plate	Nickel plated
⑫	Bumper	Urethane rubber	
⑬	Piston nut	Carbon steel	ø50, ø63
⑭	Snap ring	Carbon tool steel	Nickel plated
⑮	Attachment ring	Aluminum alloy	Hard anodized
⑯	Type C snap ring for axis	ø10: Stainless steel ø6, ø50, ø63: Hard steel wire	
⑰	Magnetic shielding plate	Rolled steel plate	Chromated
⑱	Switch rail	Aluminum alloy	Clear anodized
⑳	Hexagon socket head plug	Chromium steel	Nickel plated

No.	Description	Material	Note
㉑	Steel ball	Chromium steel	ø50, ø63: W/o Hexagon socket head plug
㉒	Hexagon socket head cap screw	Chromium steel	Nickel plated
㉓	Hexagon socket head set screw	Chromium steel	Nickel plated
㉔*	Cylinder tube gasket	NBR	
㉕*	Wear ring A	Special resin	
㉖*	Wear ring B	Special resin	
㉗*	Wear ring C	Special resin	
㉘*	Piston seal	NBR	
㉙*	Scraper	NBR	
㉚*	Switch rail gasket	NBR	

Replacement Parts: Seal Kit

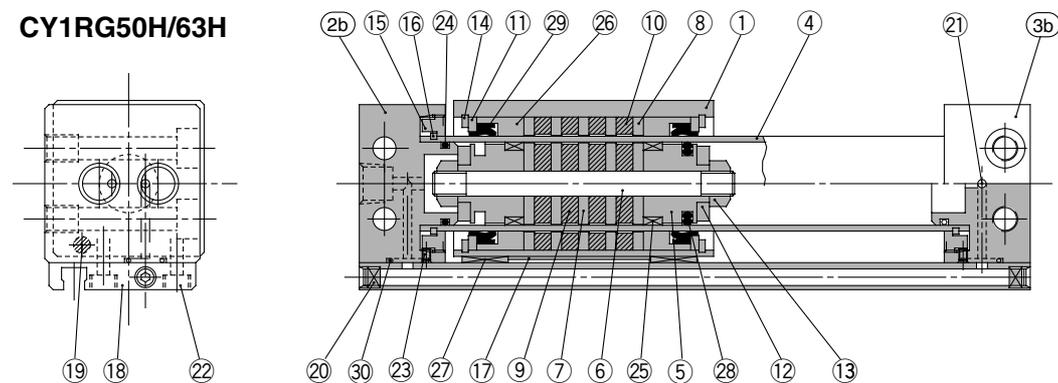
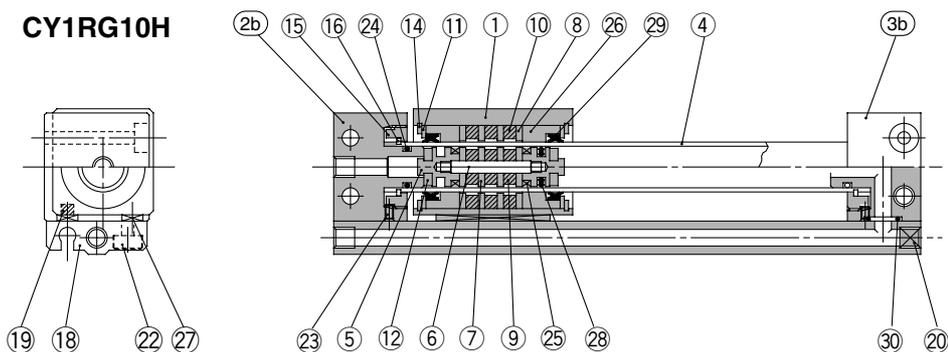
Bore size (mm)	Kit no.	Contents
6	CY1R6-PS	Set of nos. above ㉔, ㉕, ㉖, ㉗, ㉘
10	CY1R10-PS	Set of nos. above ㉔, ㉕, ㉖, ㉗, ㉘, ㉙, ㉚
50	CY1R50-PS	
63	CY1R63-PS	

* Seal kit includes ㉔, ㉕, ㉖, ㉗, ㉘ for ø6. ㉔ to ㉚ are for ø50 and ø63. Order the seal kit, based on each bore size.

Magnetically Coupled Rodless Cylinder Direct Mount Type Series CY1R

Construction: Centralized Piping Type

Note) Centralized piping is not available for $\phi 6$.



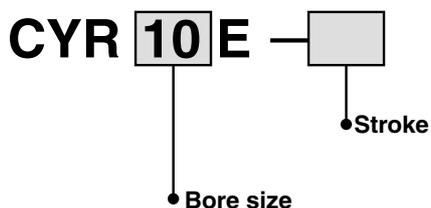
- MX
- MTS
- MY
- CY**
- MG
- CX
- D-
- X
- 20-
- Data

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
10	CY1R10-PS	Set of nos. at left ②4, ②5, ②6, ②7, ②8, ②9, ③0
50	CY1R50-PS	
63	CY1R63-PS	

* Seal kit includes ②4 to ③0.
Order the seal kit, based on each bore size.

Switch Rail Accessory Kit



Switch Rail Accessory Kit

Bore size (mm)	Kit no.	Contents
6	CYR6E-□	Nos. at left ⑱, ⑲, ⑳, ㉑
10	CYR10E-□	Nos. at left ⑱, ⑲, ⑳, ㉑, ㉒
50	CYR50E-□	Nos. at left
63	CYR63E-□	⑰, ⑱, ⑲, ⑳, ㉑, ㉒

Note) □ indicates the stroke.

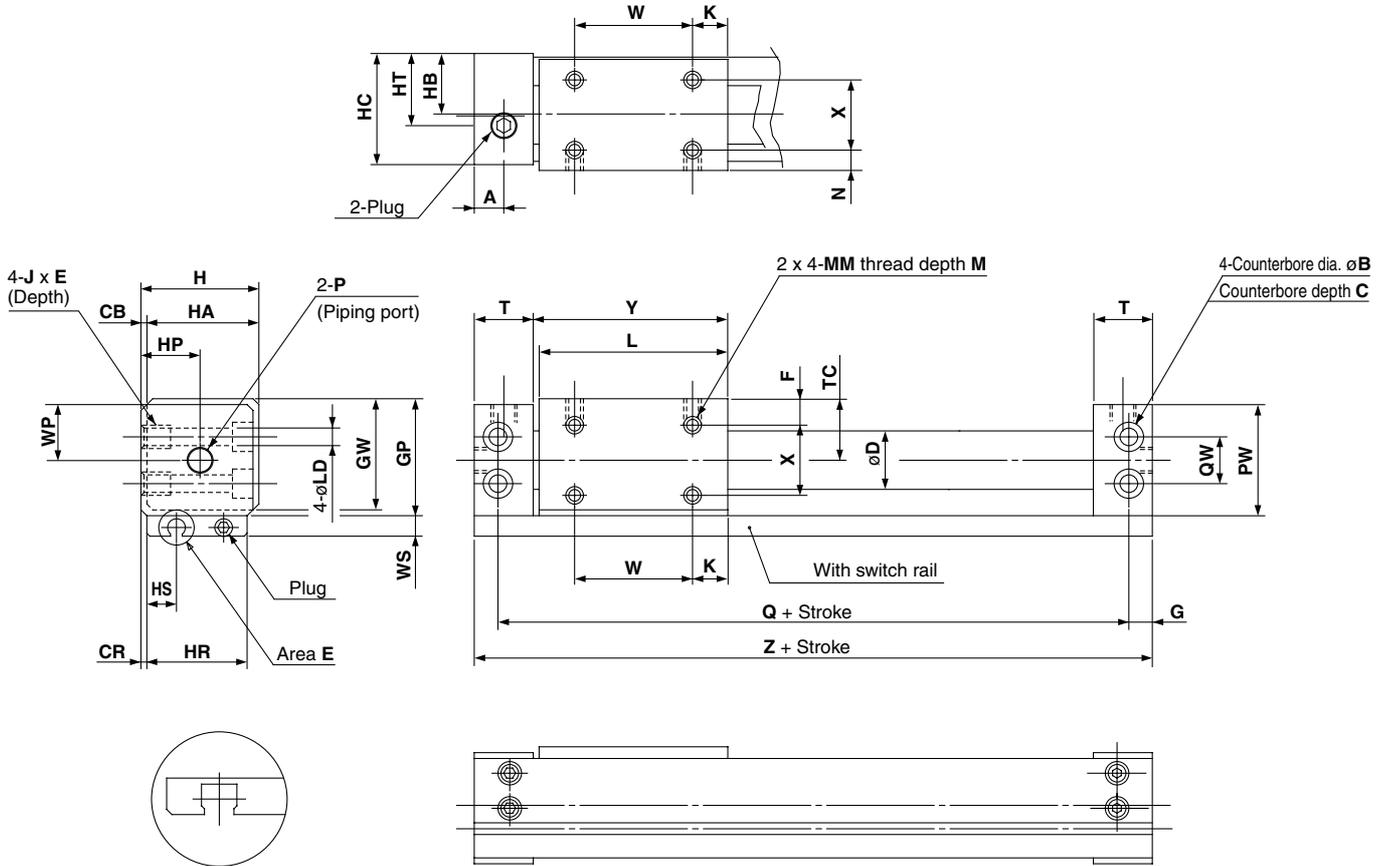
Series CY1R

Standard Type: $\phi 6$, $\phi 10$, $\phi 50$, $\phi 63$

CY1R Bore size $\frac{H}{L}$ - Stroke Nil
N

Note 1) Type L is not available for $\phi 6$ through $\phi 10$.

Note 2) The dimensions shows the one with switch rail (Nil).



(Area E) CY1R50/63

(mm)

Model	A	B	C	CB	CR	D	F	G	GP	GW	H	HA	HB	HC	HP	HR	HS	HT	J x E
CY1R 6	9	6.5	3.2	2	0.5	7.6	5.5	4	20	18.5	19	17	10.5	18	9	17	6	7	M4 x 0.7 x 6
CY1R10	9	6.5	3.2	2	0.5	12	6.5	4	27	25.5	26	24	14	25	14	24	5	14	M4 x 0.7 x 6
CY1R50	14	14	8.2	5	2	53	17	8.5	83	81.5	85	80	45	84	45	80	9	45	M10 x 1.5 x 15
CY1R63	15	14	8.2	5	3	66	18	8.5	95	93.5	97	92	51	96	51	90	9.5	51	M10 x 1.5 x 15

Model	K	L	LD	M	MM	N	P	PW	Q	QW	T	TC	W	WP	WS	X	Y	Z
CY1R 6	7	34	3.5	3.5	M3 x 0.5	3.5	M5 x 0.8	19	64	10	17.5	10.5	20	9.5	6	10	35.5	72
CY1R10	9	38	3.5	4	M3 x 0.5	4.5	M5 x 0.8	26	68	14	17.5	14	20	13	8	15	39.5	76
CY1R50	25	110	8.6	10	M8 x 1.25	15	Rc 1/4	82	159	48	30	42	60	41	10	50	113	176
CY1R63	24	118	8.6	10	M8 x 1.25	16	Rc 1/4	94	171	60	32	48	70	47	10	60	121	188

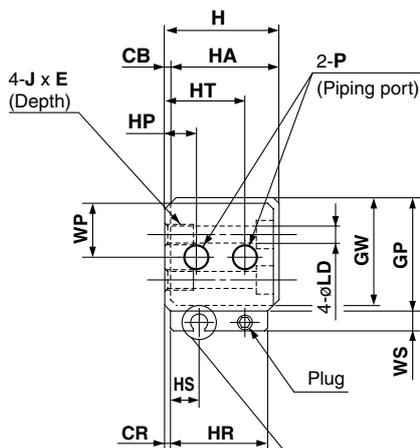
Magnetically Coupled Rodless Cylinder Direct Mount Type **Series CY1R**

Centralized Piping Type: $\phi 10$, $\phi 50$, $\phi 63$

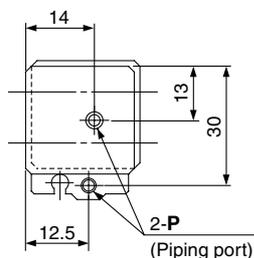
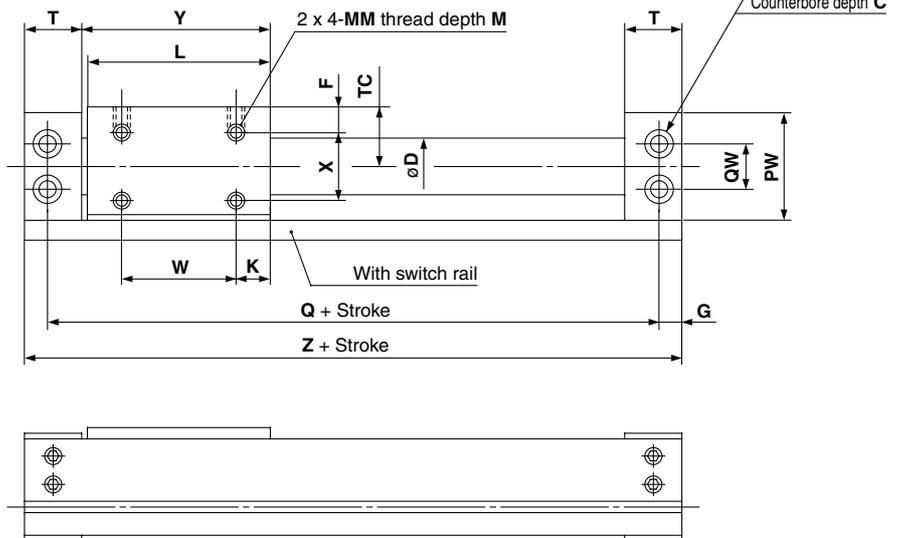
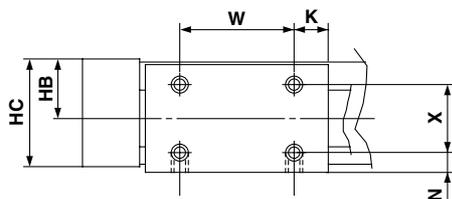
CY1RG Bore size $\frac{H}{L}$ Stroke

Note) Type L is not available for $\phi 10$.

CY1RG50/63



(Area E) CY1RG50/63



CY1RG10

(mm)

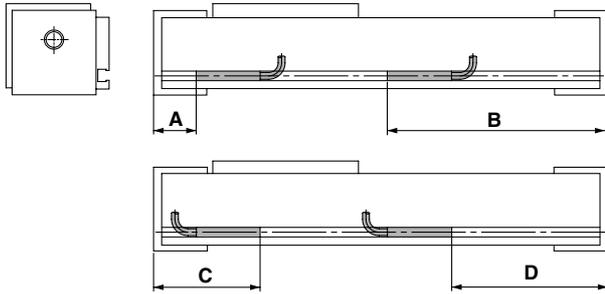
Model	B	C	CB	CR	D	F	G	GP	GW	H	HA	HB	HC	HP	HR	HS	HT	J x E	K
CY1RG10	6.5	3.2	2	0.5	12	6.5	4	27	25.5	26	24	14	25	—	24	5	—	M4 x 0.7 x 6	9
CY1RG50	14	8.2	5	2	53	17	8.5	83	81.5	85	80	45	84	32	80	9	56	M10 x 1.5 x 15	25
CY1RG63	14	8.2	5	3	66	18	8.5	95	93.5	97	92	51	96	35	90	9.5	63.5	M10 x 1.5 x 15	24

Model	L	LD	M	MM	N	P	PW	Q	QW	T	TC	W	WP	WS	X	Y	Z
CY1RG10	38	3.5	4	M3 x 0.5	4.5	M5 x 0.8	26	68	14	17.5	14	20	13	8	15	39.5	76
CY1RG50	110	8.6	10	M8 x 1.25	15	Rc 1/4	82	159	48	30	42	60	41	10	50	113	176
CY1RG63	118	8.6	10	M8 x 1.25	16	Rc 1/4	94	171	60	32	48	70	47	10	60	121	188

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

Series CY1R

Proper Auto Switch Mounting Position (Detection at stroke end)



ø6, ø10

Bore size (mm)	Applicable auto switch							
	D-A9□				D-M9□/F9□W			
	A	B	C	D	A	B	C	D
6	26	46	46	26	30	42	42	30
10	28	48	48	28	32	44	44	32

ø50, ø63

Bore size (mm)	Applicable auto switch			
	D-Z7□/Z80/Y59□/Y69□ D-Y7P/Y7PV/Y7□W/Y7□WV			
	A	B	C	D
50	27.5	148.5	52.5	123.5
63	29.5	158.5	54.5	133.5

* 50 mm is the minimum stroke available with 2 auto switches mounted.

Operating Range

Auto switch model	Bore size (mm)								
	6	10	15	20	25	32	40	50	63
D-A9□	9	13	8	6	—	—	—	—	—
D-M9□, D-F9□W	5 (2.5)	7 (4)	5	4	—	—	—	—	—
D-Z7□/Z80	—	—	—	—	9	9	11	11	11
D-Y59□/Y69□/Y7P/Y7PV D-Y7□W/Y7□WV	—	—	—	—	7	6	6	7	6

* Some switches cannot be mounted.

* 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.

Note) Figures in parentheses are the cases for D-M9□ switch type.

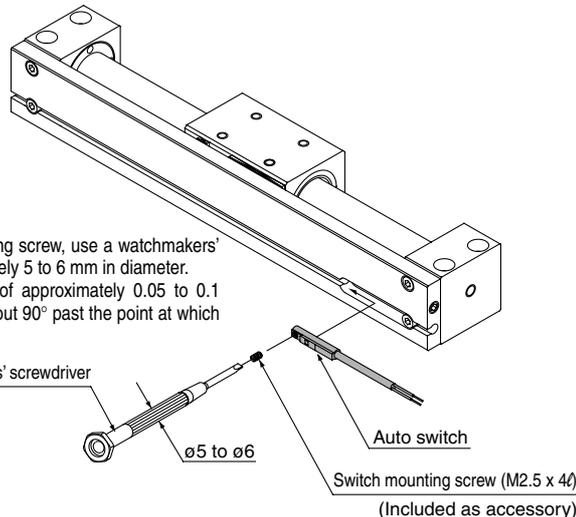
Other than the models listed in "How to Order", the following auto switches are applicable. For detailed specifications, refer to page 8-30-1.

Type	Model	Electrical entry (Fetching direction)	Features
Reed switch	D-A90	Grommet (In-line)	Without indicator light
	D-Z80		
Solid state switch	D-Y69A	Grommet (Perpendicular)	Diagnostic indication (2-color indication)
	D-Y69B		
	D-Y7PV		
	D-Y7NWV		
	D-Y7PWV		
	D-Y7BWV		

* Normally closed (NC = b contact), solid state switch (D-F9G/F9H/Y7G/Y7H type) are also available. For details, refer to page 8-30-31.

Mounting of Auto Switch

When mounting auto switches, they should be inserted into the cylinder's switch groove from the direction shown in the drawing on the right. After setting in the mounting position, use a flat head watchmakers' screwdriver to tighten the mounting screw which is included.



Note) When tightening an auto switch mounting screw, use a watchmakers' screwdriver with a handle of approximately 5 to 6 mm in diameter.

Furthermore, use a tightening torque of approximately 0.05 to 0.1 N·m. As a guide, it should be turned about 90° past the point at which tightening can be felt.

Auto Switch Specifications

- Switches (switch rail) can be added to the standard type (without switch rail). Model no. of switch rail accessory is listed on pages 8-15-32 and 8-15-41. Order them along with auto switch.
- For switch magnet installation procedures, refer to the separate disassembly steps.

MX

MTS

MY

CY

MG

CX

D-

-X

20-

Data



Magnetically Coupled Rodless Cylinder Slider Type: Slide Bearing

Series **CY1S**

ø6, ø10, ø15, ø20, ø25, ø32, ø40

How to Order

Without auto switch

CY1S 25 H — 300

With auto switch

CDY1S 25 H — 300 — J79W

Number of auto switches

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

Auto switch

Nil	Without auto switch
-----	---------------------

* For the applicable auto switch model, refer to the table below.
* Auto switches are shipped together, (but not assembled).

Bore size

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

Magnetic holding force
Refer to "Magnetic Holding Force" on page 8-15-47.

Standard stroke
Refer to "Standard Stroke" on page 8-15-47.

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.

Applicable Auto Switch/Refer to page 8-30-1 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-wire connector	Applicable load		
					DC	AC	Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)	None (N)		IC circuit	Relay, PLC	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A76H	●	●	—	—	—	—	—	—
					—	—	200V	A72	A72H	●	●	—	—	—	—	—
	Diagnostic indication (2-color indication)	Connector	Yes	2-wire	24 V	12 V	100 V	A73	A73H	●	●	—	—	—	—	—
						—	—	A73C	—	●	●	●	●	—	—	—
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	●	●	○	—	○	—	IC circuit
								F7PV	F7P	●	●	○	—	○	—	—
	Diagnostic indication (2-color indication)	Connector	Yes	2-wire	24 V	5 V, 12 V	—	F7BV	J79	●	●	○	—	○	—	—
								J79C	—	●	●	●	●	—	—	—
	Water resistant (2-color indication)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NWV	F79W	●	●	○	—	○	—	IC circuit
								—	F7PW	●	●	○	—	○	—	—
	With diagnostic output (2-color indication)	Grommet	Yes	2-wire	24 V	12 V	—	F7BWV	J79W	●	●	○	—	○	—	—
								—	F7BA	—	●	○	—	○	—	—
	With diagnostic output (2-color indication)	Grommet	Yes	4-wire (NPN)	24 V	5 V, 12 V	—	F7BAV	—	—	●	○	—	—	—	—
								—	F79F	●	●	○	—	○	—	—

* Lead wire length symbols: 0.5 m..... Nil (Example) A73C
 3 m..... L (Example) A73CL
 5 m..... Z (Example) A73CZ
 None..... N (Example) A73CN

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

• Since there are other applicable auto switches than listed, refer to page 8-15-56 for details.
 • For details about auto switches with pre-wire connector, refer to page 8-30-52.

Magnetically Coupled Rodless Cylinder Slider Type: Slide Bearing Series CY1S



Load can be directly mounted
Strokes available up to 1500 mm
Long life with no external leakage
With auto switches and shock absorbers



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

Symbol	Specifications
-XB9	Low speed cylinder (10 to 50 mm/s)
-XB13	Low speed cylinder (5 to 50 mm/s)
-XC18	NPT finish piping port
-X116	Hydro specifications rodless cylinder
-X168	Helical insert thread specifications
-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)
-X431	Auto switch rails on both side faces (with 2 pcs.)

Principal Parts Material

Description	Material	Note
Plate A, B	Aluminum alloy	Hard anodized
Cylinder tube	Stainless steel	—
Guide shaft A, B	Carbon steel	Hard chrome plated
Magnet	Rare earth magnet	—
Slide block	Aluminum alloy	Hard anodized

Amount of Adjustment for Adjusting Bolt and Shock Absorber

Bore size (mm)	Amount of adjustment (both ends) by adjusting bolt (mm)	Amount of adjustment by shock absorber (mm)	
		Plate A side	Plate B side
6	12	17	11
10	11	14	6
15	7	14	4
20	11	36	27
25	10	12	3
32	11	33	23
40	9	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.

Model

Type	Bearing type	Model	Bore size (mm)	Auto switch model	Adjustment type
Slider type	Slide bearing	CY1S	6, 10, 15, 20, 25, 32, 40	D-A7/A8 D-F7/J7	With adjusting bolt With shock absorber

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

* 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	100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	1500
40		

Magnetic Holding Force (N)

Bore size (mm)	Type H	6	10	15	20	25	32	40
		19.6	53.9	137	231	363	588	922
Holding force	Type L	—	—	81.4	154	221	358	569

Weight

Bore size (mm)	Number of magnets	Weight (kg)						
		6	10	15	20	25	32	40
Basic weight	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 weight 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 weight 3.63 kg
- Additional weight 0.267/50 st
- Cylinder stroke 500 st $3.63 + 0.267 \times 500 \div 50 = 6.3$ kg

With shock absorber

For details regarding Series CY1S with shock absorber, refer to page 8-15-55.

⚠ Precautions

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

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. Perform mounting so that the external slider will operate through the entire stroke at the minimum operating pressure.
If the mounting surface is not flat, the guides will be warped, increasing the minimum operating pressure and causing premature wear of the bearings. Therefore, mounting should be performed so that the external slider will operate through the entire stroke at the minimum operating pressure. A mounting surface with a high degree of flatness is desirable, but in cases where this is not possible, adjust with shims, etc.

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.

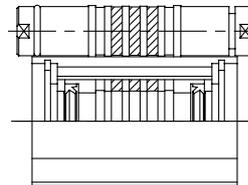


Fig. (1) Correct position

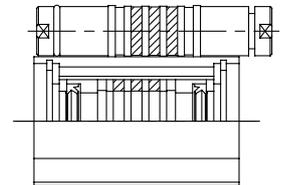


Fig. (2) Incorrect position

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

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 weight based on these operating conditions (kg)

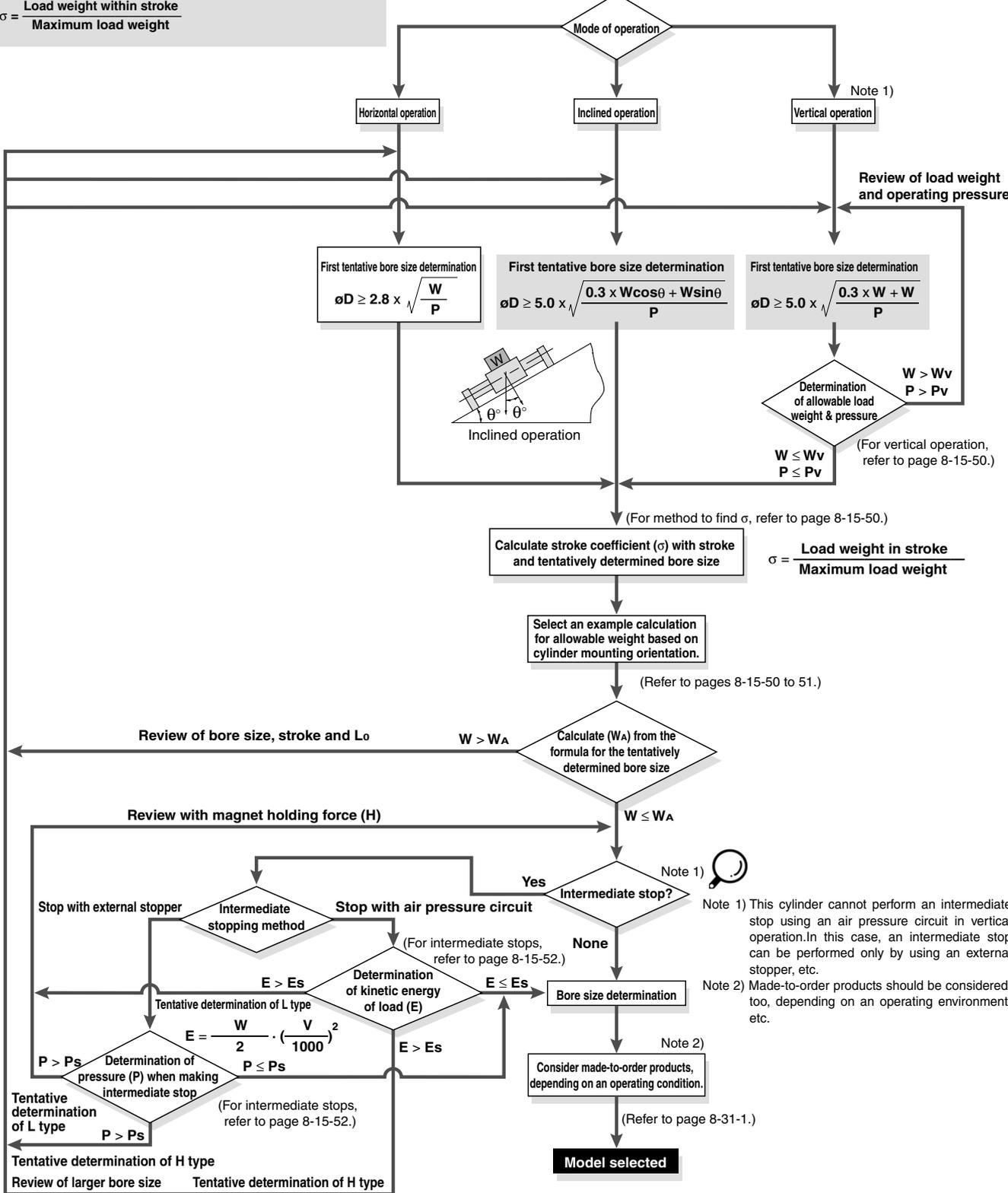
Wv: Allowable load weight for vertical operation (kg)

σ: Stroke coefficient

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

Operating Conditions

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



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

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

Series CY1S

Model Selection 2

Caution on Design (1)

How to Find σ when Selecting the Allowable Load Weight

Since the maximum load weight 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

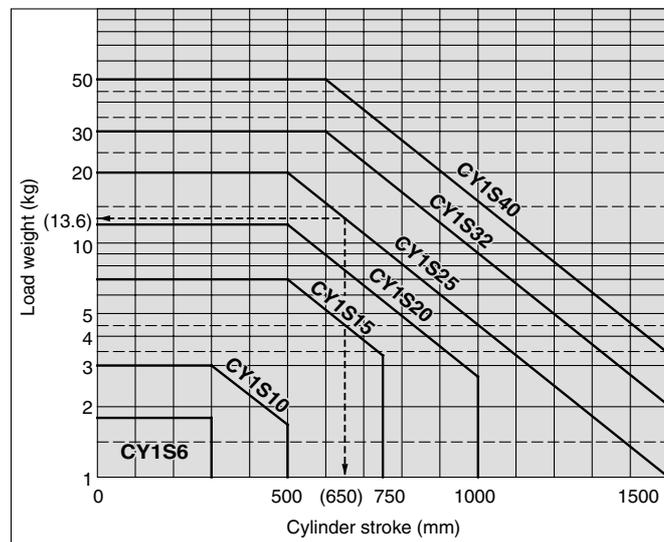
- (1) Maximum load weight = 20 kg
- (2) Load weight for 650 st = 13.6 kg
- (3) $\sigma = \frac{13.6}{20} = 0.68$ is the result.

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

ST: Stroke (mm)

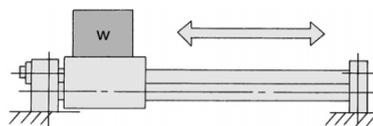
Model	CY1S6	CY1S10	CY1S15
$\sigma =$	1	$\frac{10^{(0.86 - 1.3 \times 10^{-3} \times ST)}}{3}$	$\frac{10^{(1.5 - 1.3 \times 10^{-3} \times ST)}}{7}$
Model	CY1S20	CY1S25	CY1S32
$\sigma =$	$\frac{10^{(1.71 - 1.3 \times 10^{-3} \times ST)}}{12}$	$\frac{10^{(1.98 - 1.3 \times 10^{-3} \times ST)}}{20}$	$\frac{10^{(2.26 - 1.3 \times 10^{-3} \times ST)}}{30}$
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 Weight Calculation Based on Cylinder Mounting Orientation

1. Horizontal Operation (Floor mounting)

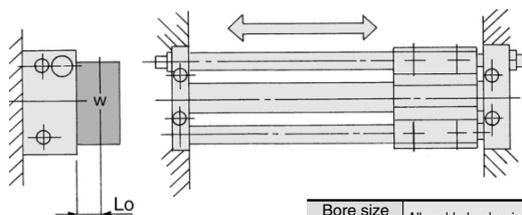


Maximum Load Weight (Center of slide block) (kg)

Bore size (mm)	6	10	15	20	25	32	40
Max. load weight (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 weight 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 weight may be different from the maximum load weight.

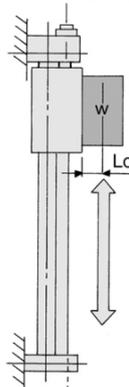
2. Horizontal Operation (Wall mounting)



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

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

3. Vertical Operation



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

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

Note) A safety factor for drop prevention has been taken into account.

Note) Operating pressure should be equal to or less than the maximum operating pressure in the article, "Vertical Operation" listed on page 8-15-52.

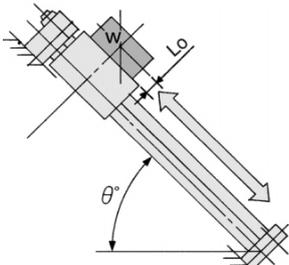
Series CY1S

Model Selection 3

Caution on Design (2)

Example of Allowable Load Weight Calculation Based on Cylinder Mounting Orientation

4. Inclined Operation (In operating direction)



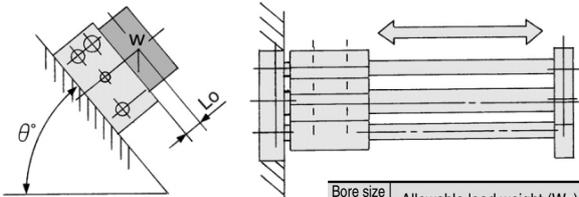
Angle	to 45°	to 60°	to 75°	to 90°
k	1	0.9	0.8	0.7

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

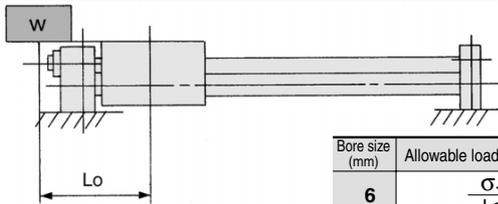
5. Inclined Operation (At a right angle to operating direction)



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

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

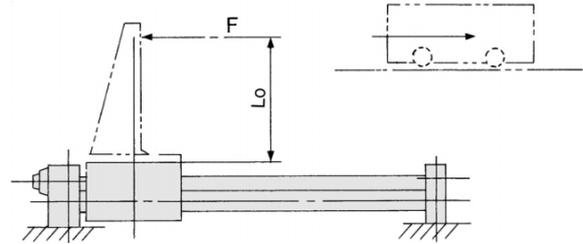
6. Load Center Offset in Operating Direction (Lo)



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

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

7. Horizontal Operation (Pushing load, Pusher)

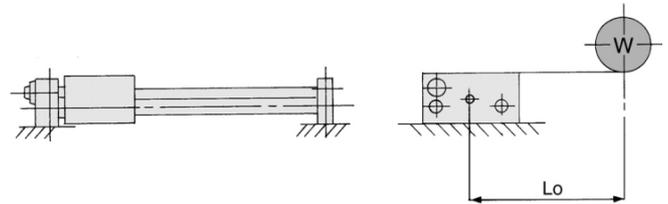


F: Drive (from slide block to position Lo) resistance force (kg)

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

Bore size (mm)	6	10	15	20
Allowable load weight (WA) (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 load weight (WA) (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 weight (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 weight (WA) (kg)	$\frac{\sigma \cdot 98}{7.0 + Lo}$	$\frac{\sigma \cdot 180}{8.6 + Lo}$	$\frac{\sigma \cdot 364}{10.4 + Lo}$	

MX

MTS

MY

CY

MG

CX

D-

-X

20-

Data

Caution on Design (3)

Vertical Operation

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

Bore size (mm)	Model	Allowable load weight (Wv) (kg)	Maximum operating pressure (Pv) (MPa)
6	CY1S6H	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) Use caution, since the magnetic coupling may be dislocated if it is used over the maximum operating pressure.

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	CY1S6H	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)

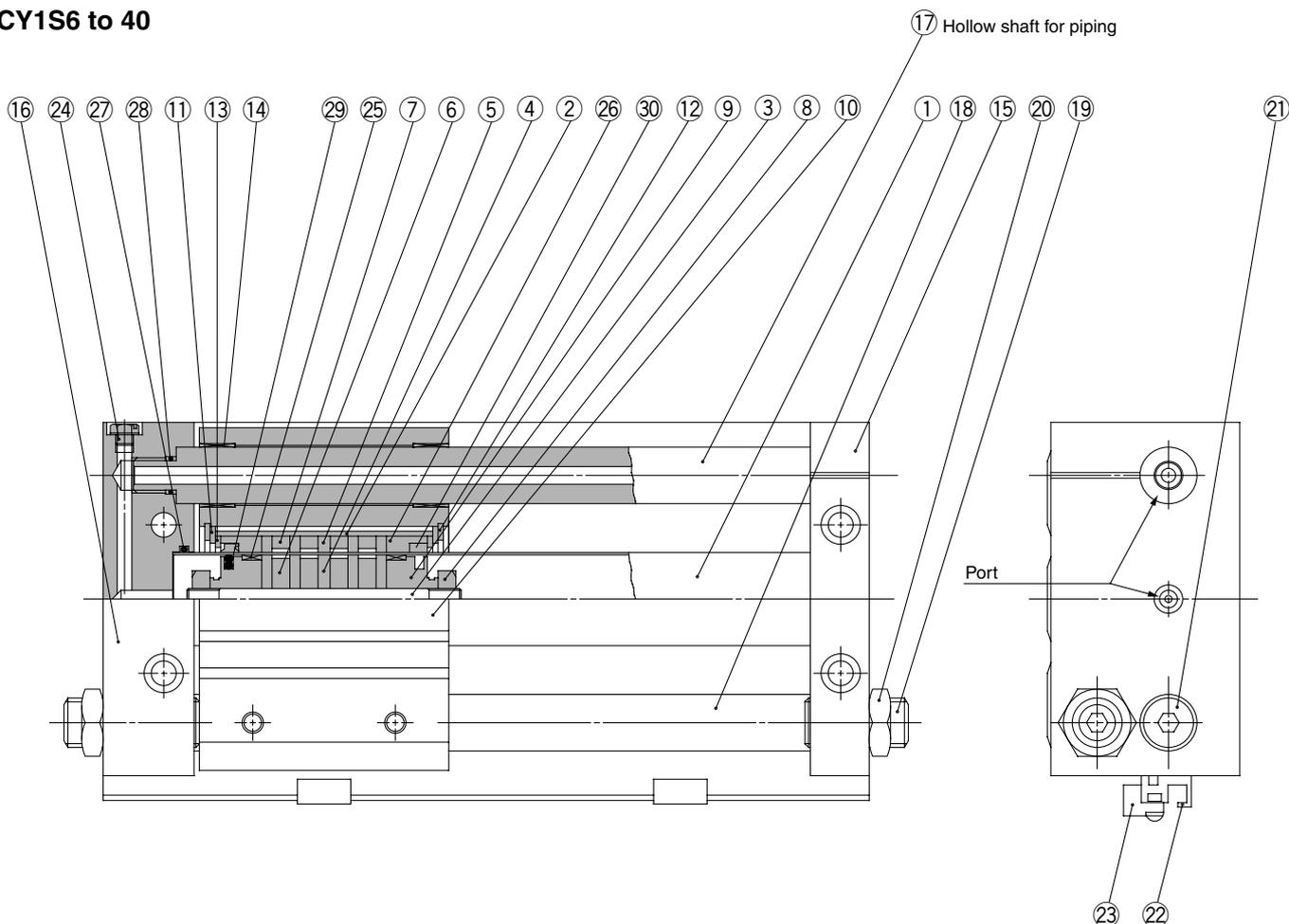
Bore size (mm)	Model	Allowable kinetic energy for intermediate stop (Es) (J)
6	CY1S6H	0.007
10	CY1S10H	0.03
15	CY1S15H	0.13
	CY1S15L	0.076
20	CY1S20H	0.24
	CY1S20L	0.16
25	CY1S25H	0.45
	CY1S25L	0.27
32	CY1S32H	0.88
	CY1S32L	0.53
40	CY1S40H	1.53
	CY1S40L	0.95

Magnetically Coupled Rodless Cylinder Slider Type: Slide Bearing Series CY1S

Construction

Slider type/Slide bearing

CY1S6 to 40



MX

MTS

MY

CY

MG

CX

D-

-X

20-

Data

Component Parts

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

Note) Brass for $\phi 6$, $\phi 10$ and $\phi 15$

No.	Description	Material	Note
㉓	Auto switch	—	
㉔	Plug	Brass	
㉕*	Wear ring A	Special resin	
㉖*	Wear ring B	Special resin	
㉗*	Cylinder tube gasket	NBR	
㉘*	Guide shaft gasket	NBR	
㉙*	Piston seal	NBR	
㉚*	Scraper	NBR	

Replacement Parts: Seal Kit

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

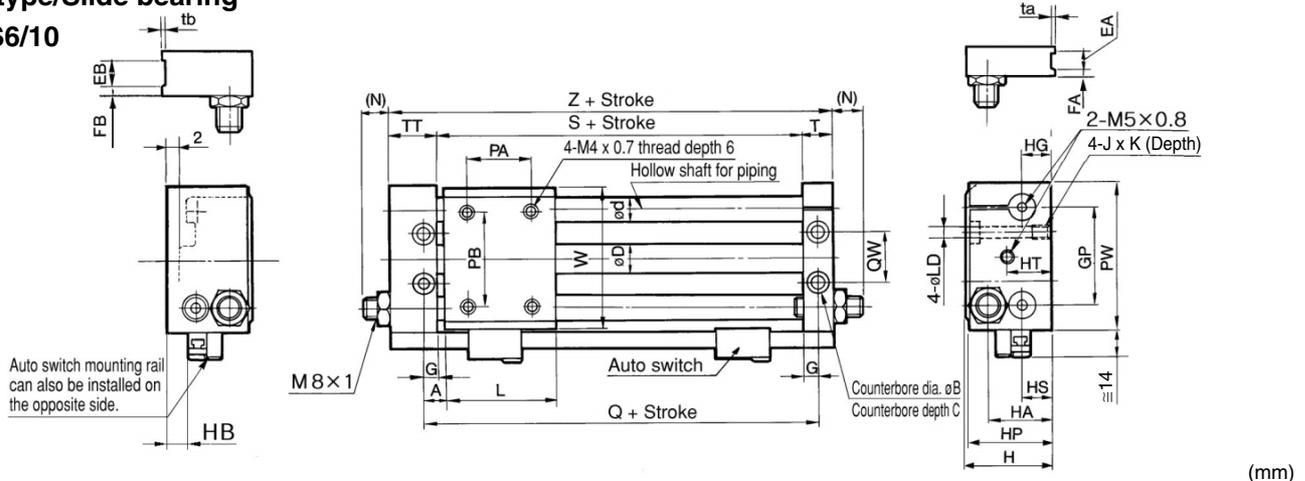
* Seal kit includes ㉖ to ㉙ for $\phi 6$. ㉕ to ㉚ are for $\phi 10$ to $\phi 40$. Order the seal kit, based on each bore size.

Series CY1S

Dimensions

Slider type/Slide bearing

C□Y1S6/10

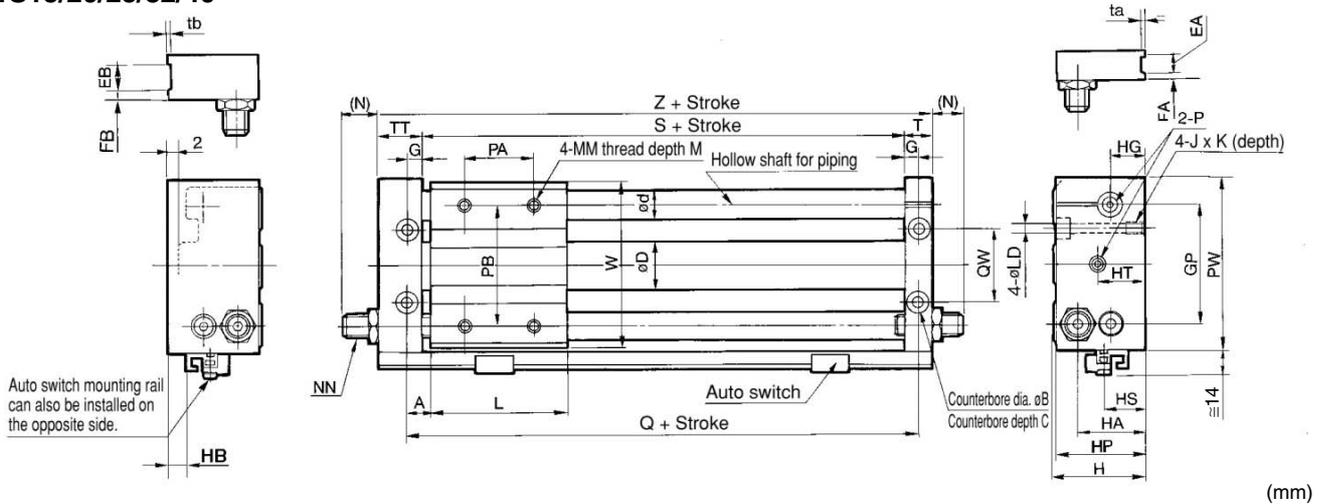


Model	A	B	C	D	d	EA	EB	FA	FB	G	GP	H	HA	HB*	HG	HP	HS	HT
CY1S6 CDY1S6	6	6.5	3	7.6	8	—	—	—	—	5	32	27	19	4	8	26	8	17
CY1S10 CDY1S10	7.5	8	4	12	10	6	12	3	5	6.5	40	34	25.5	10	12	33	14	18

Model	J x K	L	LD	(N)	PA*	PB	PW	Q	QW	S	T	TT	ta	tb	W	Z
CY1S6 CDY1S6	M4 x 0.7 x 6.5	40	3.5	10	25	25	50	52	16	42	10	16	—	—	46	68
CY1S10 CDY1S10	M5 x 0.8 x 9.5	45	4.3	9.5	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□Y1S15/20/25/32/40



Model	A	B	C	D	d	EA	EB	FA	FB	G	GP	H	HA	HB*	HG	HP	HS	HT	J x K	L
CY1S15 CDY1S15	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
CY1S20 CDY1S20	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
CY1S25 CDY1S25	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
CY1S32 CDY1S32	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
CY1S40 CDY1S40	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

Model	LD	M	MM	(N)	NN	P	PA*	PB	PW	Q	QW	S	T	TT	ta	tb	W	Z
CY1S15 CDY1S15	5.6	8	M5 x 0.8	7.5	M8 x 1.0	M5 x 0.8	30	50	75	75	30	62	12.5	22.5	0.5	1	72	97
CY1S20 CDY1S20	5.6	10	M6 x 1.0	9.5	M10 x 1	Rc 1/8	40	70	90	90	38	73	16.5	25.5	—	—	87	115
CY1S25 CDY1S25	7	10	M6 x 1.0	11	M14 x 1.5	Rc 1/8	40	70	100	90	42	73	16.5	25.5	0.5	1	97	115
CY1S32 CDY1S32	8.7	12	M8 x 1.25	11.5	M20 x 1.5	Rc 1/8	40	75	122	110	50	91	18.5	28.5	0.5	1	119	138
CY1S40 CDY1S40	8.7	12	M8 x 1.25	10.5	M20 x 1.5	Rc 1/4	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.

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

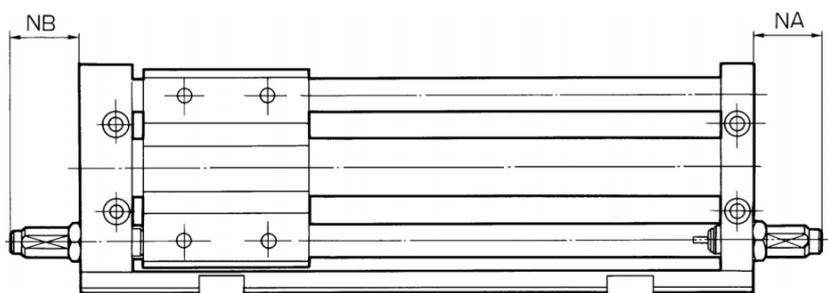
Shock Absorber Specifications/Series RB

For detailed specifications about shock absorber, refer to "Series RB" of Best Pneumatics Vol. 10.

Applicable rodless cylinder	6 CY1S10 15	CY1S20	CY1S25	CY1S32 40	
Shock absorber model	RB0805	RB1006	RB1411	RB2015	
Maximum energy absorption: (J)	0.98	3.92	14.7	58.8	
Weight equivalent to impact object	* Select a model from data D of Shock Absorber (RB series) of Best Pneumatics Vol. 10.				
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	8.34
	Retracted	3.83	6.18	15.3	20.50

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

Dimensions: With Shock Absorber



(mm)

Model	Applicable shock absorber	NA	NB
CY1S6	RB0805	30	24
CY1S10		27	19
CY1S15		27	17
CY1S20	RB1006	29	20
CY1S25	RB1411	49	40
CY1S32	RB2015	52	42
CY1S40		51	36

MX

MTS

MY

CY

MG

CX

D-

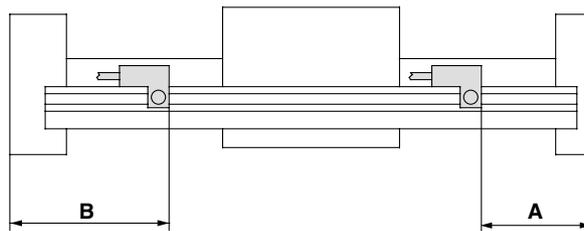
-X

20-

Data

Series CY1S

Proper Auto Switch Mounting Position (Detection at stroke end)



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

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 $\pm 30\%$ 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 8-30-1.

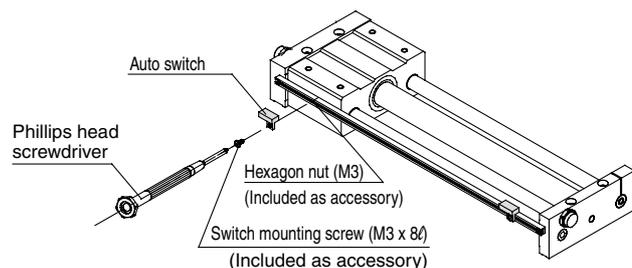
Type	Model	Electrical entry (Fetching direction)	Features
Reed switch	D-A80	Grommet (Perpendicular)	Without indicator light
	D-A80H	Grommet (In-line)	
	D-A80C	Connector (Perpendicular)	
Solid state switch	D-F7NTL	Grommet (In-line)	With timer

* With pre-wire connector is available for D-F7NTL type, too.
For details, refer to page 8-30-52.

Mounting of Auto Switch

When mounting an auto switch, the switch mounting screw should be screwed into a hexagon nut (M3 x 0.5) which has been inserted into the groove of the switch rail.

(Use a tightening torque of approximately 0.5 to 0.7 N·m.)



MX□

MTS

MY□

CY□

MG□

CX□

D-

-X

20-

Data



Magnetically Coupled Rodless Cylinder Slider Type: Ball Bushing Bearing

Series **CY1L**

ø6, ø10, ø15, ø20, ø25, ø32, ø40

How to Order

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		

Magnetic holding force
Refer to "Magnetic Holding Force" on page 8-15-59.

Standard stroke
Refer to "Standard Stroke" on page 8-15-59.

Auto switch

Nil	Without auto switch
-----	---------------------

* For the applicable auto switch model, refer to the table below.
* Auto switches are shipped together, (but not assembled).

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.

Applicable Auto Switch/Refer to page 8-30-1 for further information on auto switches.

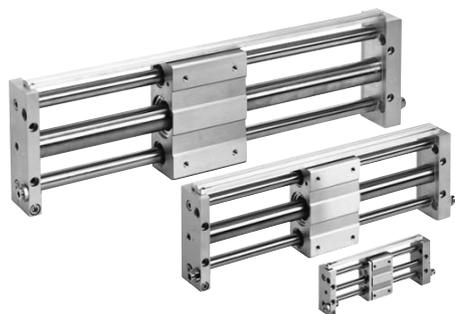
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m) *				Pre-wire connector	Applicable load		
					DC	AC	Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)	None (N)		IC circuit	Relay, PLC	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A76H	●	●	—	—	—	IC circuit	—	
				—	—	200V	A72	A72H	●	●	—	—	—	Relay, PLC		
	Diagnostic indication (2-color indication)	Connector		2-wire	24 V	12 V	100 V	A73	A73H	●	●	●	—		—	—
						—	—	A73C	—	●	●	●	●	—	—	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				F7PV	F7P	●	●	○	—	○		
		2-wire		F7BV				J79	●	●	○	—	○			
				J79C				—	●	●	●	●	—	—		
	Diagnostic indication (2-color indication)	Connector		3-wire (NPN)	5 V, 12 V	F7NWV	F79W	●	●	○	—	○	IC circuit			
				3-wire (PNP)		—	F7PW	●	●	○	—	○				
	Water resistant (2-color indication)	Grommet		2-wire	12 V	—	F7BA	—	●	○	—	○	—			
						F7BAV	—	—	●	○	—	○				
	With diagnostic output (2-color indication)	Grommet		4-wire (NPN)	5 V, 12 V	—	F79F	●	●	○	—	○	IC circuit			

* Lead wire length symbols: 0.5 m Nil (Example) A73C
 3 m L (Example) A73CL
 5 m Z (Example) A73CZ
 None N (Example) A73CN

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

- Since there are other applicable auto switches than listed, refer to page 8-15-67 for details.
- For details about auto switches with pre-wire connector, refer to page 8-30-52.

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



Long service life design

Ball bushings having excellent trafficability are used in the guides.

Ball bushing: With grease cup

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 page 8-31-1.)

Symbol	Specifications
-XB13	Low speed cylinder (5 to 50 mm/s)
-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

Bore size (mm)	Amount of adjustment (both ends) by adjusting bolt (mm)
6	12
10	11
15	7
20	11
25	10
32	11
40	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.

Principal Parts Material

Description	Material	Note
Cylinder tube	Stainless steel	—
Magnet	Rare earth magnet	—
Slide block	Aluminum alloy	Hard anodized

Model

Type	Bearing type	Model	Bore size (mm)	With auto switch	Adjustment type
Slider type	Ball bushing bearing	CY1L	6, 10, 15, 20, 25, 32, 40	D-A7/A8 D-F7/J7	With adjusting bolt With shock absorber

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 1000 mm/s
Cushion	Shock absorber/Rubber bumper
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
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.) the maximum detectable piston speed is controlled by the response time of the 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

Magnetic Holding Force (N)

Bore size (mm)		6	10	15	20	25	32	40
Holding force	Type H	19.6	53.9	137	231	363	588	922
	Type L	—	—	81.4	154	221	358	569

Weight

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

Calculation

(Example) CY1L32H-500

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

⚠ Precautions

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

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. Perform mounting so that the external slider will operate through the entire stroke at the minimum operating pressure.
If the mounting surface is not flat, the guides will be warped, increasing the minimum operating pressure and causing premature wear of the bearings. Therefore, mounting should be performed so that the external slider will operate through the entire stroke at the minimum operating pressure. A mounting surface with a high degree of flatness is desirable, but in cases where this is not possible, adjust with shims, etc.

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 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.

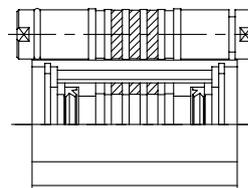


Fig. (1) Correct position

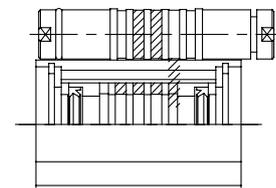


Fig. (2) Incorrect position

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

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 weight based on these operating conditions (kg)

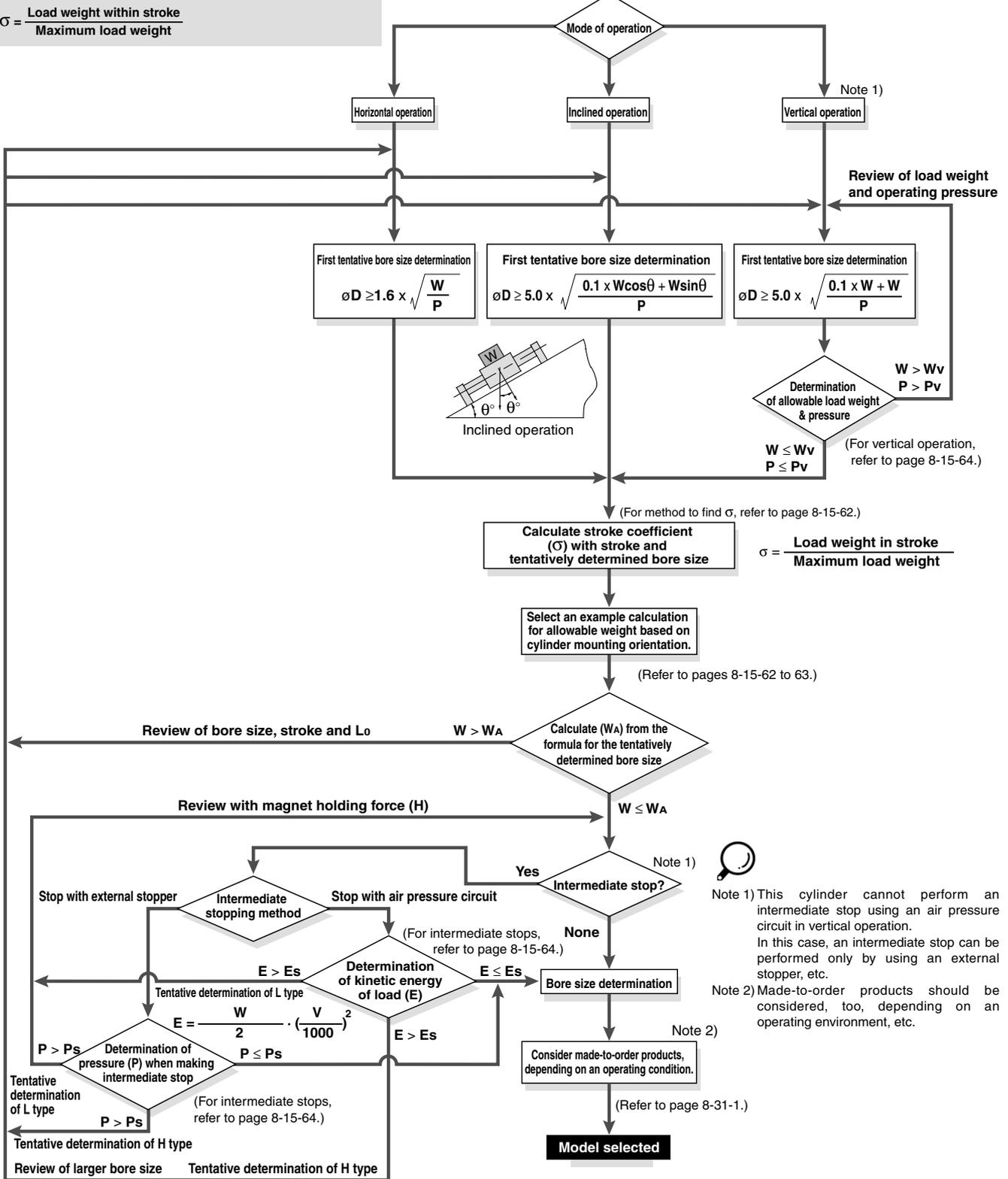
Wv: Allowable load weight for vertical operation (kg)

σ: Stroke coefficient

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

Operating Conditions

- W: Load weight (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)



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

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

Series CY1L

Model Selection 2

Caution on Design (1)

How to Find σ when Selecting the Allowable Load Weight

Since the maximum load weight 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.

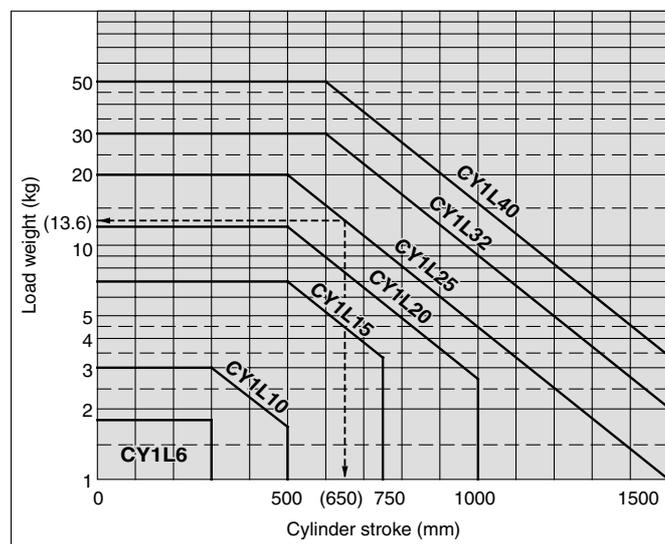
Example) CY1L25□-650

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

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

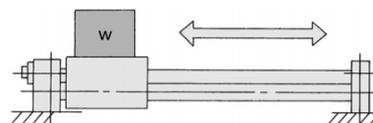
Model	CY1L6	CY1L10	CY1L15
$\sigma =$	1	$\frac{10^{(0.86 - 1.3 \times 10^{-3} \times \text{ST})}}{3}$	$\frac{10^{(1.5 - 1.3 \times 10^{-3} \times \text{ST})}}{7}$
Model	CY1L20	CY1L25	CY1L32
$\sigma =$	$\frac{10^{(1.71 - 1.3 \times 10^{-3} \times \text{ST})}}{12}$	$\frac{10^{(1.98 - 1.3 \times 10^{-3} \times \text{ST})}}{20}$	$\frac{10^{(2.26 - 1.3 \times 10^{-3} \times \text{ST})}}{30}$
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 $\phi 40 - 600$ ST.



Examples of Allowable Load Weight Calculation Based on Cylinder Mounting Orientation

1. Horizontal Operation (Floor mounting)



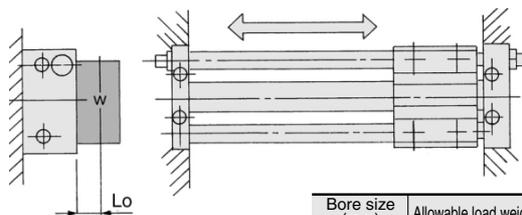
Maximum Load Weight (Center of slide block) (kg)

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

The above maximum load weight 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 weight may be different

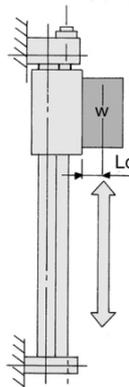
2. Horizontal Operation (Wall mounting)



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

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

3. Vertical Operation



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

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

Note) A safety factor for drop prevention has been taken into account.

Note) Operating pressure should be equal to or less than the maximum operating pressure in the article, "Vertical Operation" listed on page 8-15-64.

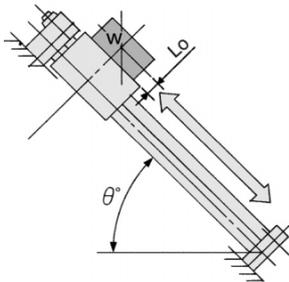
Series CY1L

Model Selection 3

Caution on Design (2)

Example of Allowable Load Weight Calculation Based on Cylinder Mounting Orientation

4. Inclined Operation (In operating direction)



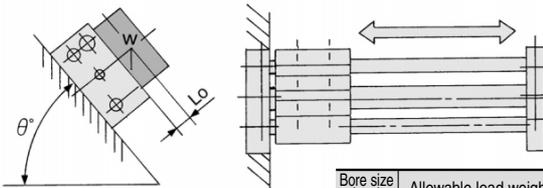
Bore size (mm)	Allowable load weight (WA) (kg)
6	$\sigma \cdot 4.05 K$
	$1.7 \cos \theta + 2 (1.6 + Lo) \sin \theta$
10	$\sigma \cdot 10.2 K$
	$2.8 \cos \theta + 2 (1.95 + Lo) \sin \theta$
15	$\sigma \cdot 31.1 K$
	$2.9 \cos \theta + 2 (2.4 + Lo) \sin \theta$
20	$\sigma \cdot 86.4 K$
	$6 \cos \theta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

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)

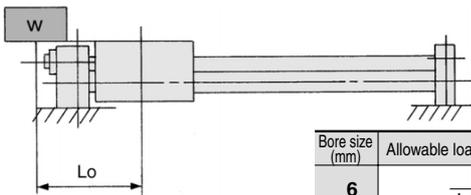
5. Inclined Operation (At a right angle to operating direction)



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

Bore size (mm)	Allowable load weight (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	$\sigma \cdot 624$
	$13 + 2 (4.75 + Lo) \sin \theta$

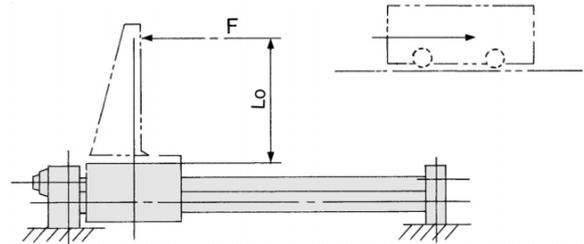
6. Load Center Offset in Operating Direction (Lo)



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

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

7. Horizontal Operation (Pushing load, Pusher)

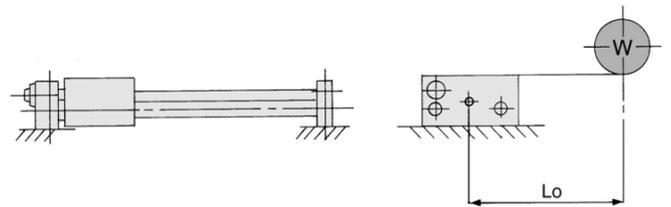


F: Drive (from slide block to position Lo) resistance force (kg)

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

Bore size (mm)	6	10	15	20
Allowable load weight (WA) (kg)	$\frac{\sigma \cdot 2.72}{1.6 + Lo}$	$\frac{\sigma \cdot 5.55}{1.95 + Lo}$	$\frac{\sigma \cdot 15.96}{2.4 + Lo}$	$\frac{\sigma \cdot 41.7}{2.8 + Lo}$
	25	32	40	
Allowable load weight (WA) (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 weight (WA) (kg)	$\frac{\sigma \cdot 6.48}{3.6 + Lo}$	$\frac{\sigma \cdot 15}{5 + Lo}$	$\frac{\sigma \cdot 45.5}{6.5 + Lo}$	$\frac{\sigma \cdot 80.7}{8 + Lo}$
	25	32	40	
Allowable load weight (WA) (kg)	$\frac{\sigma \cdot 144}{9 + Lo}$	$\frac{\sigma \cdot 275}{11 + Lo}$	$\frac{\sigma \cdot 520}{13 + Lo}$	

MX

MTS

MY

CY

MG

CX

D-

-X

20-

Data

Caution on Design (3)

Vertical Operation

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

Bore size (mm)	Model	Allowable load weight (Wv) (kg)	Maximum operating pressure (Pv) (MPa)
6	CY1L6H	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) Use caution, since the magnetic coupling may be dislocated if it is used over the maximum operating pressure.

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	CY1L6H	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)

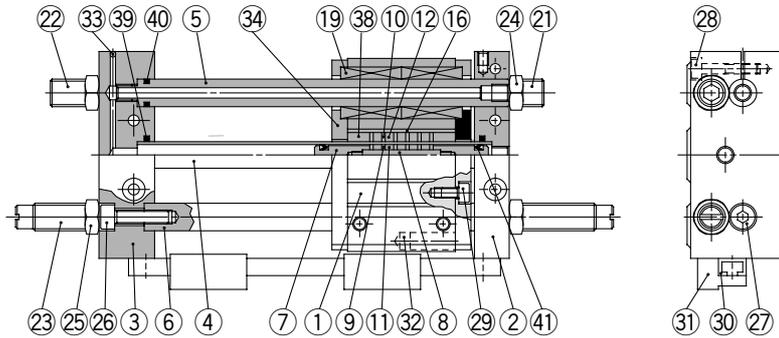
Bore size (mm)	Model	Allowable kinetic energy for intermediate stop (Es) (J)
6	CY1L6H	0.007
10	CY1L10H	0.03
15	CY1L15H	0.13
	CY1L15L	0.076
20	CY1L20H	0.24
	CY1L20L	0.16
25	CY1L25H	0.45
	CY1L25L	0.27
32	CY1L32H	0.88
	CY1L32L	0.53
40	CY1L40H	1.53
	CY1L40L	0.95

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

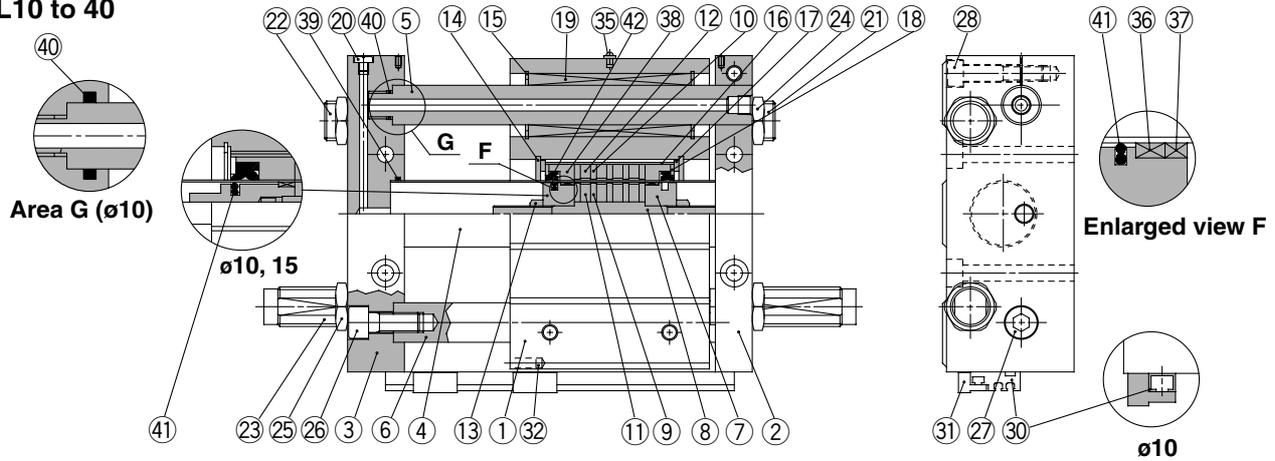
Construction

Slider type/Ball bushing bearing

CY1L6



CY1L10 to 40



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

Component Parts

No.	Description	Material	Note
①	Slide block	Aluminum alloy	Hard anodized
②	Plate A	Aluminum alloy	Hard anodized
③	Plate B	Aluminum alloy	Hard 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)}	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	Rare earth magnet	
⑫	Magnet B	Rare earth magnet	
⑬	Piston nut	Carbon steel	Zinc chromated ø25 to ø40
⑭	Snap ring	Carbon tool steel	Nickel plated
⑮	Snap ring	Carbon tool steel	Nickel plated
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

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	Rare earth magnet	
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	CY1L6-PS-N	Set of nos. above ㉞, ㉟, ㊱, ㊲, ㊳, ㊴
10	CY1L10-PS-N	Set of nos. above ㉞, ㉟, ㊱, ㊲, ㊳, ㊴, ㊵, ㊶
15	CY1L15-PS-N	
20	CY1L20-PS-N	Set of nos. above ㉞, ㉟, ㊱, ㊲, ㊳, ㊴, ㊵, ㊶, ㊷
25	CY1L25-PS-N	
32	CY1L32-PS-N	
40	CY1L40-PS-N	

* Seal kit includes ㉞, ㉟, ㊱, ㊲ for ø6. ㉞, ㉟ to ㊱ are for ø10, ø15. ㉞ to ㊱ are for ø20 to ø40. Order the seal kit, based on each bore size.

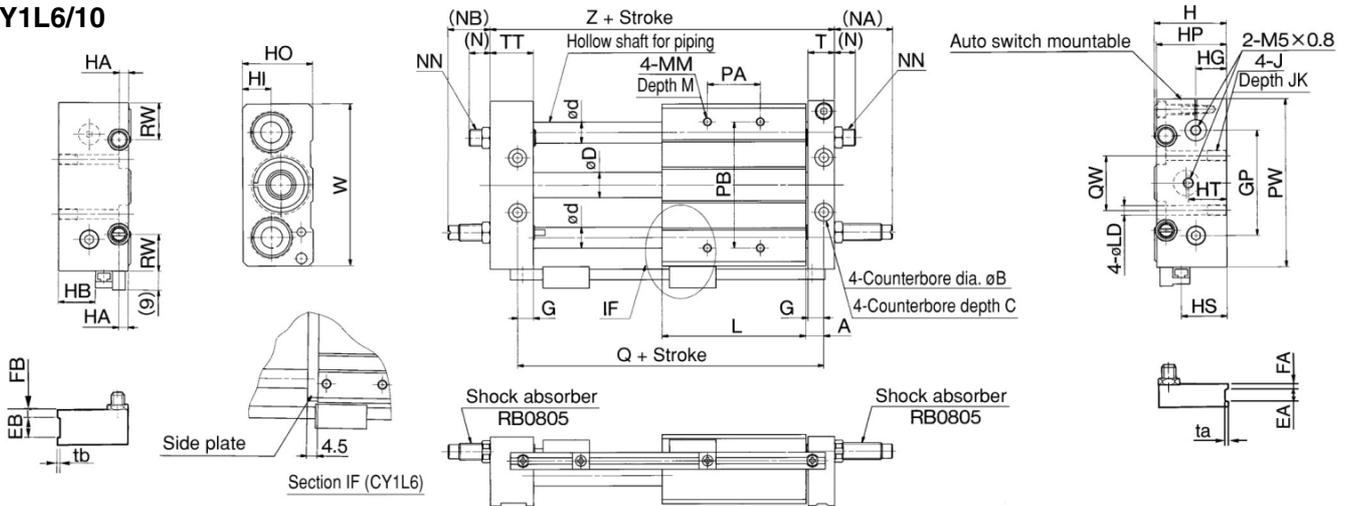
Note) Brass for ø6, ø10 and ø15

Series CY1L

Dimensions

Slider type/Ball bushing bearing

CY1L6/10



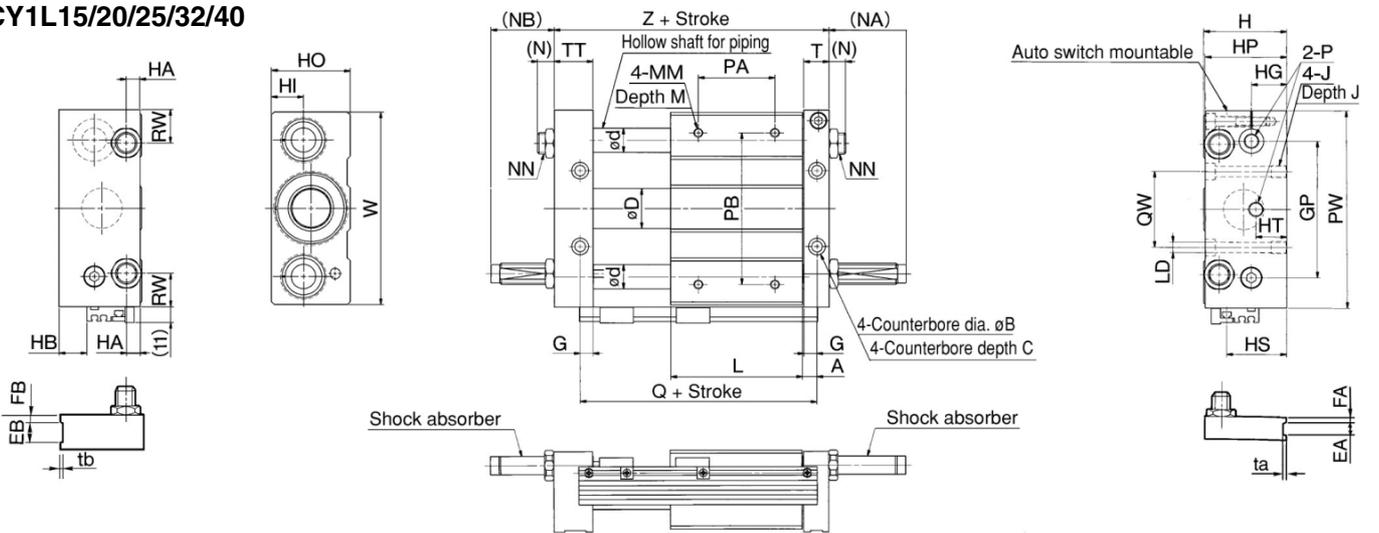
(mm)

Model	A	B	C	D	d	EA	EB	FA	FB	G	GP	H	HA	HB	HG	HI	HO	HP	HS	HT	J	JK
CY1L6	7	6.5	3	7.6	8	—	—	—	—	6	36	27	6	10	11	9	25	26	14	16	M4 x 0.7	6.5
CY1L10	8.5	8	4	12	10	6	12	3	5	7.5	50	34	6	17.5	14.5	13.5	33	33	21.5	18	M5 x 0.8	9.5

Model	L	LD	M	MM	(N)	(NA)	(NB)	NN	PA*	PB	PW	Q	QW	RW	T	TT	ta	tb	W	Z
CY1L6	40	3.5	6	M4 x 0.7	10	30	24	M8 x 1.0	24	40	60	54	20	12	10	16	—	—	56	68
CY1L10	68	4.3	8	M4 x 0.7	9.5	27	19	M8 x 1.0	30	60	80	85	26	17.5	12.5	20.5	0.5	1.0	77	103

* PA dimensions are for split from center.

CY1L15/20/25/32/40



(mm)

Model	A	B	C	D	d	EA	EB	FA	FB	G	GP	H	HA	HB	HG	HI	HO	HP	HS	HT	J	JK	L	LD
CY1L15	7.5	9.5	5	16.6	12	6	13	3	6	6.5	65	40	6.5	4	16	14	38	39	25	16	M6 x 1.0	9.5	75	5.6
CY1L20	9.5	9.5	5.2	21.6	16	—	—	—	—	8.5	80	46	9	10	18	16	44	45	31	20	M6 x 1.0	10	86	5.6
CY1L25	9.5	11	6.5	26.4	16	8	14	4	7	8.5	90	54	9	18	23	21	52	53	39	20	M8 x 1.25	10	86	7
CY1L32	10.5	14	8	33.6	20	8	16	5	7	9.5	110	66	12	26.5	26.5	24.5	64	64	47.5	25	M10 x 1.5	15	100	9.2
CY1L40	11.5	14	8	41.6	25	10	20	5	10	10.5	130	78	12	35	30.5	28.5	76	74	56	30	M10 x 1.5	15	136	9.2

Model	M	MM	(N)	(NA)	(NB)	NN	P	PA*	PB	PW	Q	QW	RW	T	ta	tb	TT	W	Z	Shock absorber
CY1L15	8	M5 x 0.8	7.5	27	17	M8 x 1.0	M5 x 0.8	45	70	95	90	30	15	12.5	0.5	1.0	22.5	92	112	RB0805
CY1L20	10	M6 x 1.0	10	29	20	M10 x 1.0	Rc 1/8	50	90	120	105	40	28	16.5	—	—	25.5	117	130	RB1006
CY1L25	10	M6 x 1.0	11	49	40	M14 x 1.5	Rc 1/8	60	100	130	105	50	22	16.5	0.5	1.0	25.5	127	130	RB1411
CY1L32	12	M8 x 1.25	11.5	52	42	M20 x 1.5	Rc 1/8	70	120	160	121	60	33	18.5	0.5	1.0	28.5	157	149	RB2015
CY1L40	12	M8 x 1.25	10.5	51	36	M20 x 1.5	Rc 1/4	90	140	190	159	84	35	20.5	1.0	1.0	35.5	187	194	RB2015

* PA dimensions are for split from center.

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

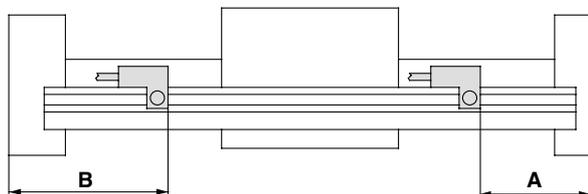
Shock Absorber Specifications/Series RB

For detailed specifications about shock absorber, refer to "Series RB" of Best Pneumatics Vol. 10.

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	
Weight equivalent to impact object	* Select a model from data D of Shock Absorber (RB series) of Best Pneumatics Vol. 10.				
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	8.34
	Retracted	3.83	6.18	15.3	20.50

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

Proper Auto Switch Mounting Position (Detection at stroke end)

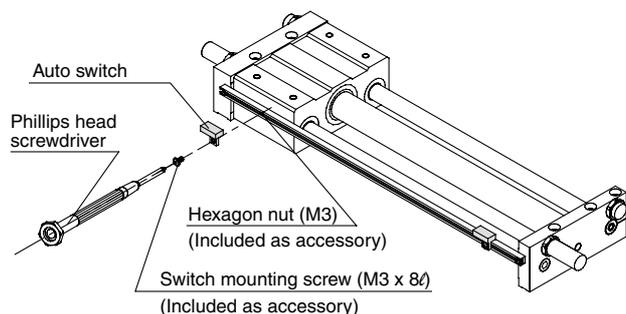


Bore size (mm)	Applicable auto switch							
	D-A73/A80		D-A72 D-A7□H/A80H D-A73C/A80C D-F7□J79 D-F7□W/J79C D-F7□W/J79W D-F7□WV D-F7BAL/F7BAVL		D-F79F		D-F7NTL	
	A	B	A	B	A	B	A	B
6	23	45	23.5	44.5	27.5	40.5	28.5	39.5
10	58	45	58.5	44.5	62.5	40.5	63.5	39.5
15	65	47	65.5	46.5	69.5	42.5	70.5	41.5
20	76	54	76.5	53.5	80.5	49.5	81.5	48.5
25	76	54	76.5	53.5	80.5	49.5	81.5	48.5
32	92	57	92.5	56.5	96.5	52.5	97.5	51.5
40	130	64	130.5	63.5	134.5	59.5	135.5	58.5

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

Mounting of Auto Switch

When mounting an auto switch, the switch mounting screw should be screwed into a hexagon nut (M3 x 0.5) which has been inserted into the groove of the switch rail. (Use a tightening torque of approximately 0.05 to 0.1 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 8-30-1.

Type	Model	Electrical entry (Fetching direction)	Features
Reed switch	D-A80	Grommet (Perpendicular)	Without indicator light
	D-A80H	Grommet (In-line)	
	D-A80C	Connector (Perpendicular)	
Solid state switch	D-F7NTL	Grommet (In-line)	With timer

* With pre-wire connector is available for D-F7NTL type, too.
For details, refer to page 8-30-52.

Magnetically Coupled Rodless Cylinder High Precision Guide Type



Series **CY1H**

ø10, ø15, ø20, ø25, ø32

How to Order

CY1H **25** — **300** **Y7BW**

High precision guide type •

Guide •

Bore size (mm)		10	15	20	25	32
Symbol						
Nil	1 axis	●	●	●	●	—
T	2 axes	—	—	—	●	●

Bore size •

10	10 mm
15	15 mm
20	20 mm
25	25 mm
32	32 mm

Standard stroke (mm) •
Refer to "Standard Stroke" on page 8-15-69.

Number of auto switches

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

Auto switch

Nil	Without auto switch
-----	---------------------

* For the applicable auto switch model, refer to the table below.
* Auto switches are shipped together, (but not assembled).

Adjustment type

Nil	With adjusting bolt
B	With shock absorbers (2 pcs.)
BS	With shock absorber (1 pc. on port side)

* The adjusting bolt is installed even when B or BS is selected.
(Except ø10)

Applicable Auto Switch/Refer to page 8-30-1 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-wire connector	Applicable load	
					DC	AC		Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)			
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	Z76	●	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	—	Z73	●	●	●	—	—	—
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	Y69A	Y59A	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				Y7PV	Y7P	●	●	○	○	IC circuit	
				2-wire				Y69B	Y59B	●	●	○	○	—	
				3-wire (NPN)				Y7NWV	Y7NW	●	●	○	○	IC circuit	
				3-wire (PNP)				Y7PWV	Y7PW	●	●	○	○	IC circuit	
				2-wire				Y7BWV	Y7BW	●	●	○	○	—	

* Lead wire length symbols: 0.5 m Nil (Example) Y59A
3 m L (Example) Y59AL
5 m Z (Example) Y59AZ

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

- Since there are other applicable auto switches than listed, refer to page 8-15-80 for details.
- For details about auto switches with pre-wire connector, refer to page 8-30-52.

Magnetically Coupled Rodless Cylinder High Precision Guide Type Series CY1H



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

Symbol	Specifications
-X168	Helical insert thread specifications

Specifications

Bore size (mm)	10	15	20	25	32
Fluid	Air				
Action	Double acting				
Maximum operating pressure	0.7 MPa				
Minimum operating pressure	0.2 MPa				
Proof pressure	1.05 MPa				
Ambient and fluid temperature	-10 to 60°C				
Piston speed	70 to 1000 mm/s				
Cushion (External stopper)	Urethane bumpers on both ends (Standard), Shock absorber (Option)				
Lubrication	Non-lube				
Stroke length tolerance	0 to 1.8 mm				
Piping	Centralized piping type				
Piping port size	M5 x 0.8		Rc 1/8		

Standard Stroke

Bore size (mm)	Number of axes	Standard stroke (mm)	Maximum available stroke (mm) ^{Note)}
10	1 axis	100, 200, 300	500
15		100, 200, 300, 400, 500	750
20		100, 200, 300, 400, 500, 600	1000
25		100, 200, 300, 400, 500, 600, 800	1200
25	2 axes	100, 200, 300, 400, 500,	1500
32		600, 800, 1000	

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

Magnetic Holding Force

Bore size (mm)	10	15	20	25	32
Holding force (N)	53.9	137	231	363	588

Theoretical Output

Bore size (mm)	Piston area (mm ²)	Operating pressure (MPa)					
		0.2	0.3	0.4	0.5	0.6	0.7
10	78	15	23	31	39	46	54
15	176	35	52	70	88	105	123
20	314	62	94	125	157	188	219
25	490	98	147	196	245	294	343
32	804	161	241	322	402	483	563

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²)

Weight

Model	Standard stroke (mm)							
	100	200	300	400	500	600	800	1000
CY1H10	1.0	1.3	1.6	—	—	—	—	—
CY1H15	2.2	2.7	3.2	3.6	4.1	—	—	—
CY1H20	3.0	3.5	4.0	4.4	4.9	5.4	—	—
CY1H25	4.6	5.3	6.0	6.6	7.3	8.0	9.4	—
CY1HT25	5.1	6.2	7.3	8.3	9.4	10.4	12.5	14.6
CY1HT32	8.4	9.6	10.7	11.9	13.0	14.2	16.5	18.8

Shock Absorber Specifications

For detailed specifications about shock absorber, refer to "Series RB" of Best Pneumatics Vol. 10.

Applicable cylinder size (mm)	10	15	20	25	32	
Shock absorber model	RB0805	RB0806	RB1006	RB1411	RB2015	
Maximum energy absorption (J)	0.98	2.94	3.92	14.7	58.8	
Weight equivalent to impact object	* Select a model from data link page for Shock Absorber (Series RB).					
Stroke absorption (mm)	5	6	6	11	15	
Collision speed (m/s)*	0.05 to 5					
Max. operating frequency (cycle/min)	80		70	45	25	
Spring force (N)	Extended		1.96	4.22	6.86	8.34
	Retracted		3.83	22	6.18	15.30
Weight (g)	15		25	65	150	

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

MX

MTS

MY

CY

MG

CX

D-

-X

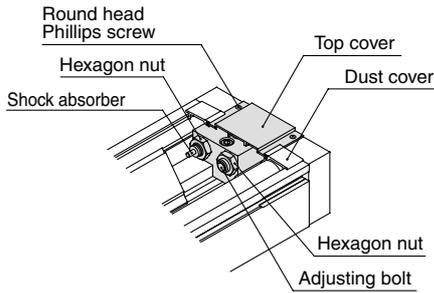
20-

Data

Series CY1H

Stroke Adjustment Method

Loosen the round head Phillips Screws, and remove the top cover and dust covers (4 pcs.).



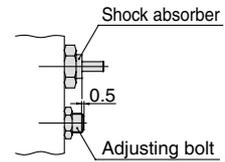
Loosen the hexagon nut, adjust the stroke with a hexagon wrench from the plate side, and secure by retightening the hexagon nut. When there is a shock absorber, loosen the hexagon nut, adjust the stroke, and then retighten the hexagon nut. Adjustment should be performed to make effective use of the shock absorber's absorption capacity, with its position relative to the adjustment bolt as shown in the figure to the right.

Caution

If the effective stroke of the shock absorber is shortened by the stroke adjustment, its absorption capacity will be drastically reduced. Therefore, the adjusting bolt should be secured at a position where it projects about 0.5 mm farther than the shock absorber.

Lock Nut Tightening Torque (N·m)

Model	For shock absorber	Adjusting bolt
CY1H10	1.67	1.67
CY1H15		
CY1H20		
CY1H25	10.8	3.14
CY1HT25		
CY1HT32	23.5	



After completing the above adjustment, replace the top cover and dust covers back into place.

The round head Phillips screws for securing the top cover should be tightened with a torque of 0.58 N·m.

Precautions

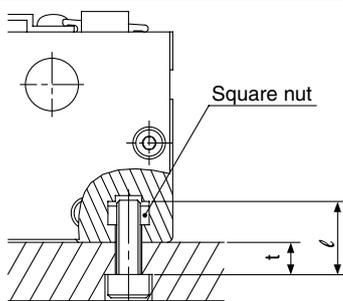
Be sure to read before handling. Refer to pages 8-34-3 to 8-34-6 for Safety Instructions and Actuator Precautions.

Mounting

Caution

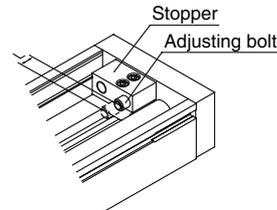
- The interior is protected to a certain extent by the top cover, however, when performing maintenance, etc., take care not to cause scratches or other damage to the cylinder tube, slide table or linear guide by striking them or placing objects on them. Cylinder bores are manufactured to precise tolerances, so that even a slight deformation may cause faulty operation.
- Because the slider is supported by precision bearings, take care not to apply strong impacts or excessive moments to the table when loading a workpiece.
- Mounting of the cylinder body**
The body is mounted using the square nuts, which are included, in the two T-slots on the bottom of the body. Refer to the table below for mounting bolt dimensions and tightening torque.

Bolt dimensions	Model	CY1H10	CY1H15	CY1H20	CY1H25	CY1HT25	CY1HT32
	Thread size	M4 x 0.7	M5 x 0.8	M6 x 1.0	M8 x 1.25		
Dimension t	ℓ-7	ℓ-8	ℓ-8	ℓ-9	ℓ-12		
Tightening torque	N·m	1.37	2.65	4.4	13.2		



4. Stroke adjustment

Stroke adjustment on one side of 15 mm (CY1H10/15/20) or 30 mm (CY1H25, CY1HT25, CY1HT32) can be performed with the adjusting bolt, but when the amount of adjustment exceeds 3 mm, the magnetic coupling may be broken depending on the operating conditions. Therefore, operation should confirm to the intermediate stop conditions on page 8-15-64. Moreover, the stroke should not be adjusted by moving the stopper, as this can cause damage to the cylinder.



Model	Stroke adjustment range L (mm)
CY1H10, CY1H15, CY1H20	0 to 15
CY1H25, CY1HT25, CY1HT32	0 to 30

Operation

Caution

- The unit can be used with a direct load within the allowable range, but when connecting to a load which has an external guide mechanism, careful alignment is necessary. Since variation of the shaft center increases as the stroke becomes longer, a connection method should be devised which allows for this displacement.
- Since the guide is adjusted at the time of shipment, unintentional movement of the adjustment setting should be avoided.
- This unit can be operated without lubrication. If lubrication is performed, use turbine oil Class 1 (with no additives), ISO VG32. (Machine oil and spindle oil cannot be used.)
- Please contact SMC before operating in an environment where there will be contact with cutting chips, dust (paper debris, lint, etc.) or cutting oil (gas oil, water, warm water, etc.).
- Do not operate with the magnetic coupling out of position. In case the magnetic coupling is out of position, push the external slider back into the correct position by hand at the end of the stroke (or correct the piston slider with air pressure).
- Do not disassemble the magnetic components (piston slider, external slider). This can cause a loss of holding power and malfunction.

Series CY1H 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)

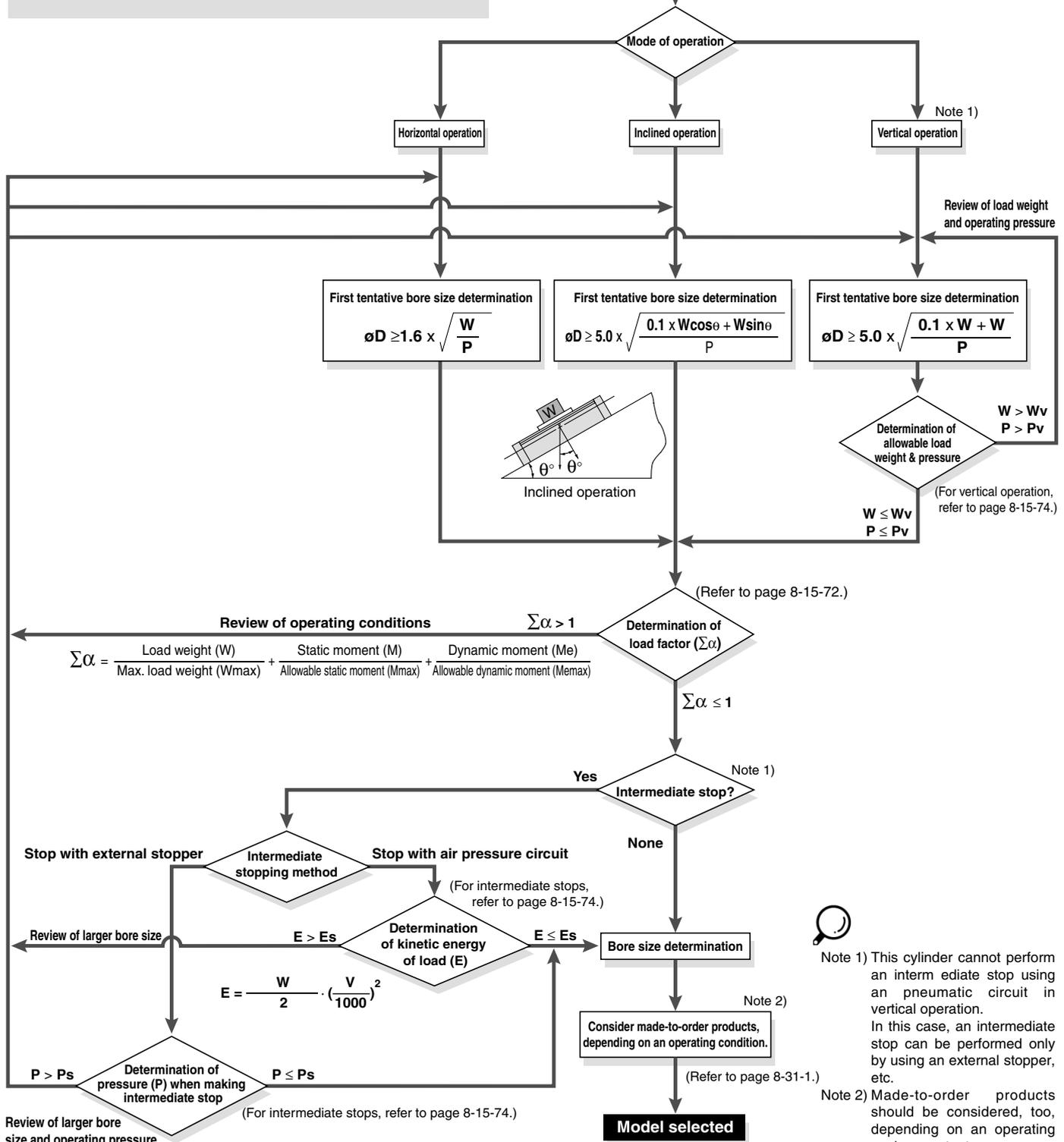
Wv: Allowable load weight for vertical operation (kg)

α: Load factor

$$\sum \alpha = \frac{\text{Load weight (W)}}{\text{Max. load weight (Wmax)}} + \frac{\text{Static moment (M)}}{\text{Allowable static moment (Mmax)}} + \frac{\text{Dynamic moment (Me)}}{\text{Allowable dynamic moment (Memax)}}$$

Operating Conditions

- W: Load weight (kg)
- V: Speed (mm/s)
- P: Operating pressure (MPa)
- Stroke (mm)
- Position of workpiece center of gravity (m)
- Mode of operation (Horizontal, Inclined, Vertical)



- 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.

Series CY1L

Model Selection 2

Caution on Design (1)

The maximum load weight and allowable moment will differ depending on the workpiece mounting method, cylinder mounting orientation and piston speed. A determination of usability is performed based on the operating limit values in the graphs with respect to operating conditions, but the total ($\Sigma \alpha_n$) of the load factors (α_n) for each weight and moment should not exceed 1.

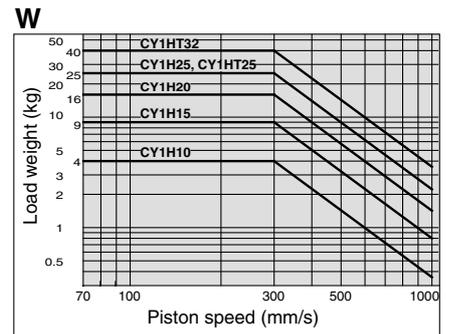
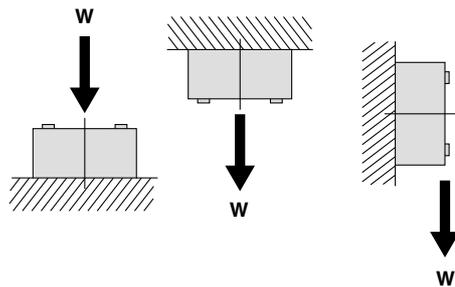
$$\Sigma \alpha_n = \frac{\text{Load weight (W)}}{\text{Maximum load weight (Wmax)}} + \frac{\text{Static moment (M)}}{\text{Allowable static moment (Mmax)}} + \frac{\text{Dynamic moment (Me)}}{\text{Allowable dynamic moment (Memax)}} \leq 1$$

Wmax, Mmax and Memax values are according to **graph (1), (2) and (3)** below.

Load Weight

Maximum Load Weight

Model	W _{max} (kg)
CY1H10	4.0
CY1H15	9.0
CY1H20	16.0
CY1H25	25.0
CY1HT25	
CY1HT32	40.0



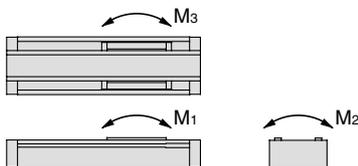
Graph (1)

Moment

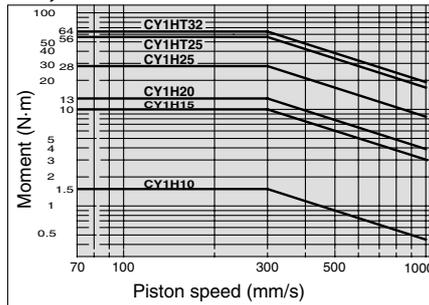
Allowable Moment

(Static moment/Dynamic moment) (N·m)

Model	M1	M2	M3	Model	M1	M2	M3
CY1H10	1.5	2.5	1.5	CY1H25	28	26	28
CY1H15	10	16	10	CY1HT25	56	85	56
CY1H20	13	16	13	CY1HT32	64	96	64

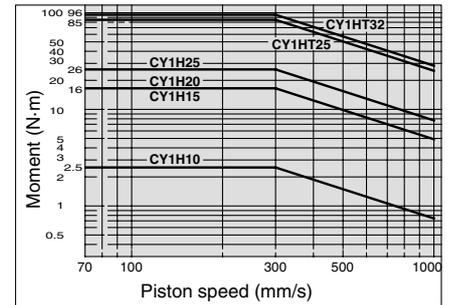


M1, M3



Graph (2)

M2



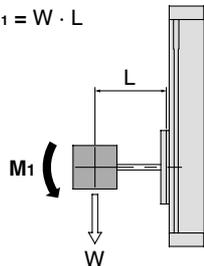
Graph (3)

Static Moment

Moment generated by the workpiece weight even when the cylinder is stopped

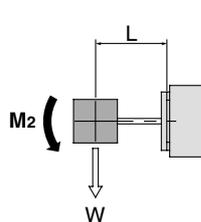
Pitch moment

$$M_1 = W \cdot L$$



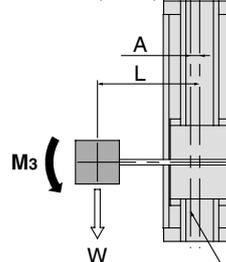
Roll moment

$$M_2 = W \cdot L$$



Yaw moment

$$M_3 = W (L - A)$$



(mm)

Model	A
CY1H10	15
CY1H15	17.5
CY1H20	19.5
CY1H25	23.5
CY1HT25	0*
CY1HT32	0*

* Since there are 2 guides, the guides' central axis and the cylinder's central axis are the same.

Dynamic Moment

Moment generated by the load equivalent to impact at the stroke end

$$We = \delta \cdot W \cdot V$$

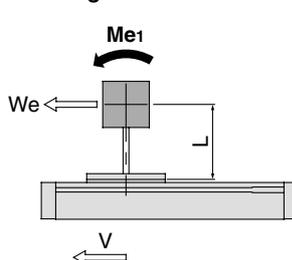
$$V = 1.4 Va$$

We: Load equivalent to impact [N]
 δ : Bumper coefficient
 With adjusting bolt (standard) = 4/100
 With shock absorber = 1/100
 W: Load weight [kg]
 V: Collision speed [mm/s]
 Va: Average speed [mm/s]

Pitch moment

$$Me_1 = 1/3^* \cdot We \cdot L$$

* Average load coefficient



Yaw moment

$$Me_3 = 1/3^* \cdot We (L - A)$$

(mm)

Model	A
CY1H10	15
CY1H15	17.5
CY1H20	19.5
CY1H25	23.5
CY1HT25	0*
CY1HT32	0*

* Since there are 2 guides, the guides' central axis and the cylinder's central axis are the same.

Series CY1H

Model Selection 3

Selection Calculation

The selection calculation finds the load factors (α_n) of the items below, where the total ($\sum\alpha_n$) does not exceed 1.

$$\sum\alpha_n = \alpha_1 + \alpha_2 + \alpha_3 \leq 1$$

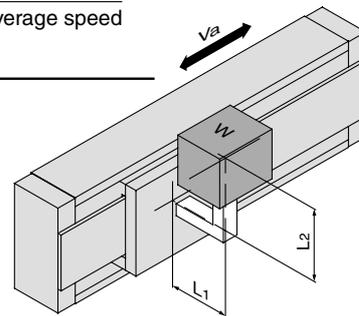
Item	Load factor α_n	Note
1. Max. load weight	$\alpha_1 = W/W_{max}$	Examine W . W_{max} is the max. load weight for V_a .
2. Static moment	$\alpha_2 = M/M_{max}$	Examine M_1, M_2, M_3 . M_{max} is the allowable moment for V_a .
3. Dynamic moment	$\alpha_3 = M_e/M_{e_{max}}$	Examine M_{e1}, M_{e3} . $M_{e_{max}}$ is the allowable moment for V .

V: Collision speed V_a : Average speed

Calculation Example

Operating Conditions

Cylinder: CY1H15
 Cushion: Standard (Adjusting bolt)
 Mounting: Horizontal wall mounting
 Speed (average): $V_a = 300$ [mm/s]
 Load weight: $W = 1$ [kg] (excluding weight of arm section)
 $L_1 = 50$ [mm]
 $L_2 = 50$ [mm]



Item	Load factor α_n	Note
1. Maximum load weight 	$\alpha_1 = W/W_{max}$ $= 1/9$ $= \mathbf{0.111}$	Examine W . Find the value of W_{max} when $V_a = 300$ mm/s from Graph (1).
2. Static moment 	$M_2 = W \cdot L_1$ $= 10 \times 0.05$ $= 0.5$ [N·m] $\alpha_2 = M_2/M_{2_{max}}$ $= 0.5/16$ $= \mathbf{0.031}$	Examine M_2 . Since M_1 & M_3 are not generated, investigation is unnecessary. Find the value $M_{2_{max}}$ when $V = 1.4$ and $V_a = 300$ mm/s from Graph (3).
3. Dynamic moment 	From $V = 1.4$ V_a $We = \delta \cdot W \cdot V$ $= 4/100 \cdot 10 \cdot 1.4 \cdot 300$ $= 168$ [N] $M_{e3} = 1/3 \cdot We \cdot (L_2 - A)$ $= 1/3 \cdot 168 \cdot 0.032$ $= 1.8$ [N·m] $\alpha_3 = M_{e3}/M_{e3_{max}}$ $= 1.8/7.2$ $= \mathbf{0.250}$	Examine M_{e3} . Find the load equivalent to impact We . Damper coefficient $\delta = 4/100$ (urethane damper) Find the value of $M_{e3_{max}}$ when $V = 1.4$ and $V_a = 420$ mm/s from Graph (2).
	$M_{e1} = 1/3 \cdot We \cdot L_1$ $= 1/3 \cdot 168 \cdot 0.05$ $= 2.8$ [N·m] $\alpha_4 = M_{e1}/M_{e1_{max}}$ $= 2.8/7.2$ $= \mathbf{0.389}$	Examine M_{e1} . From above, $We = 168$ Find the value of $M_{e3_{max}}$ when $V = 1.4$ and $V_a = 420$ mm/s from Graph (2).

$$\begin{aligned} \sum\alpha_n &= \alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 \\ &= 0.111 + 0.031 + 0.250 + 0.389 \\ &= 0.781 \end{aligned}$$

Can be used based on $\sum\alpha_n = 0.781 \leq 1$

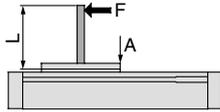
Series CY1H Model Selection 4

Caution on Design (2)

Table Deflection

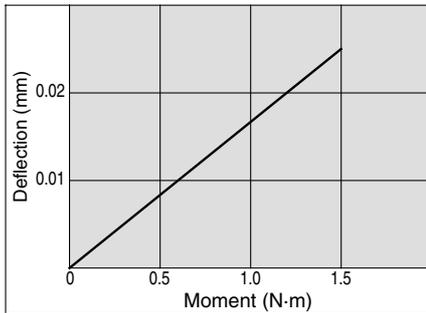
Table Displacement due to Pitch Moment Load

Displacement of Section A when force acts on Section F

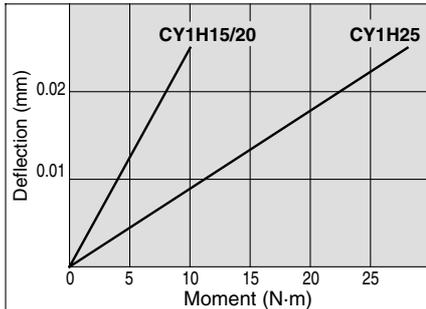


$$M_1 = F \times L$$

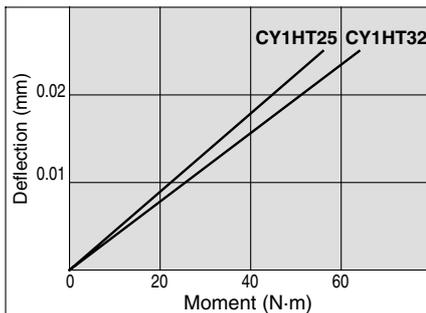
CY1H10



CY1H15/20/25



CY1HT25/32



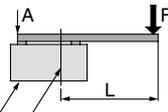
Vertical Operation

When using in vertical operation, prevention of workpiece dropping due to breaking of the magnetic coupling should be considered. The allowable load mass and maximum operating pressure should be as shown in the table below.

Model	Allowable load weight (Wv) (kg)	Maximum operating pressure Pv (MPa)
CY1H10	2.7	0.55
CY1H15	7.0	0.65
CY1H20	11.0	0.65
CY1H25	18.5	0.65
CY1HT25	18.5	0.65
CY1HT32	30.0	0.65

Table Displacement due to Roll Moment Load

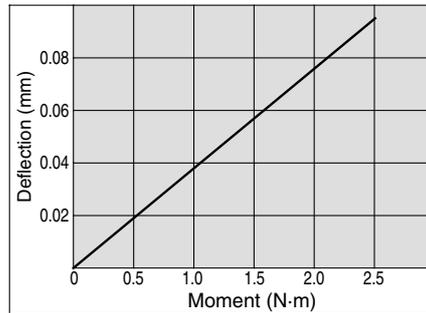
Displacement of Section A when force acts on Section F



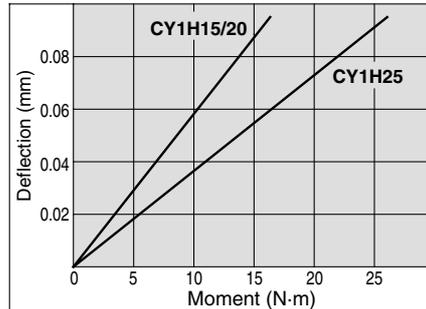
Opposite port side
Guide central axis (1 axis type)
* For the double axis type, this is the cylinder's central axis.

$$M_2 = F \times L$$

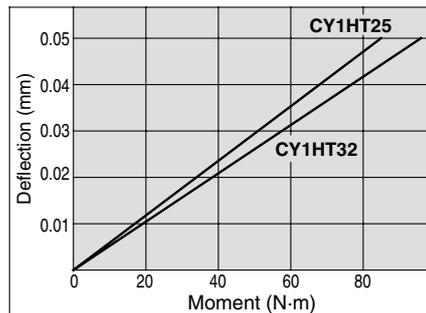
CY1H10



CY1H15/20/25



CY1HT25/32



Intermediate Stop

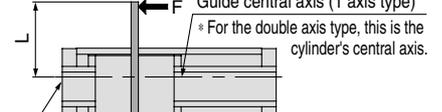
(1) Intermediate Stopping of Load with External Stopper, etc.

When stopping a load in mid-stroke using an external stopper, etc., operate within the operating pressure limits shown in the table below. The magnetic coupling will break if operated at a pressure exceeding these limits.

Model	Operating pressure limit for intermediate stop Ps (MPa)
CY1H10	0.55
CY1H15	0.65
CY1H20	0.65
CY1H25	0.65
CY1HT25	0.65
CY1HT32	0.65

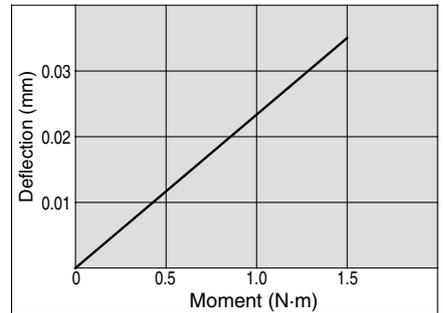
Table Displacement due to Yaw Moment Load

Displacement of Section A when force acts on Section F

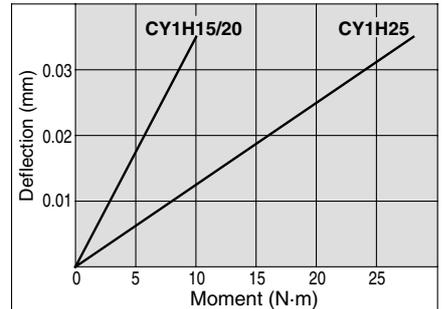


$$M_3 = F \times L$$

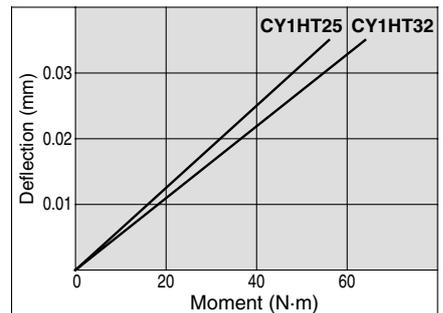
CY1H10



CY1H15/20/25



CY1HT25/32



(2) Intermediate Stopping of Load with Air Pressure Circuit

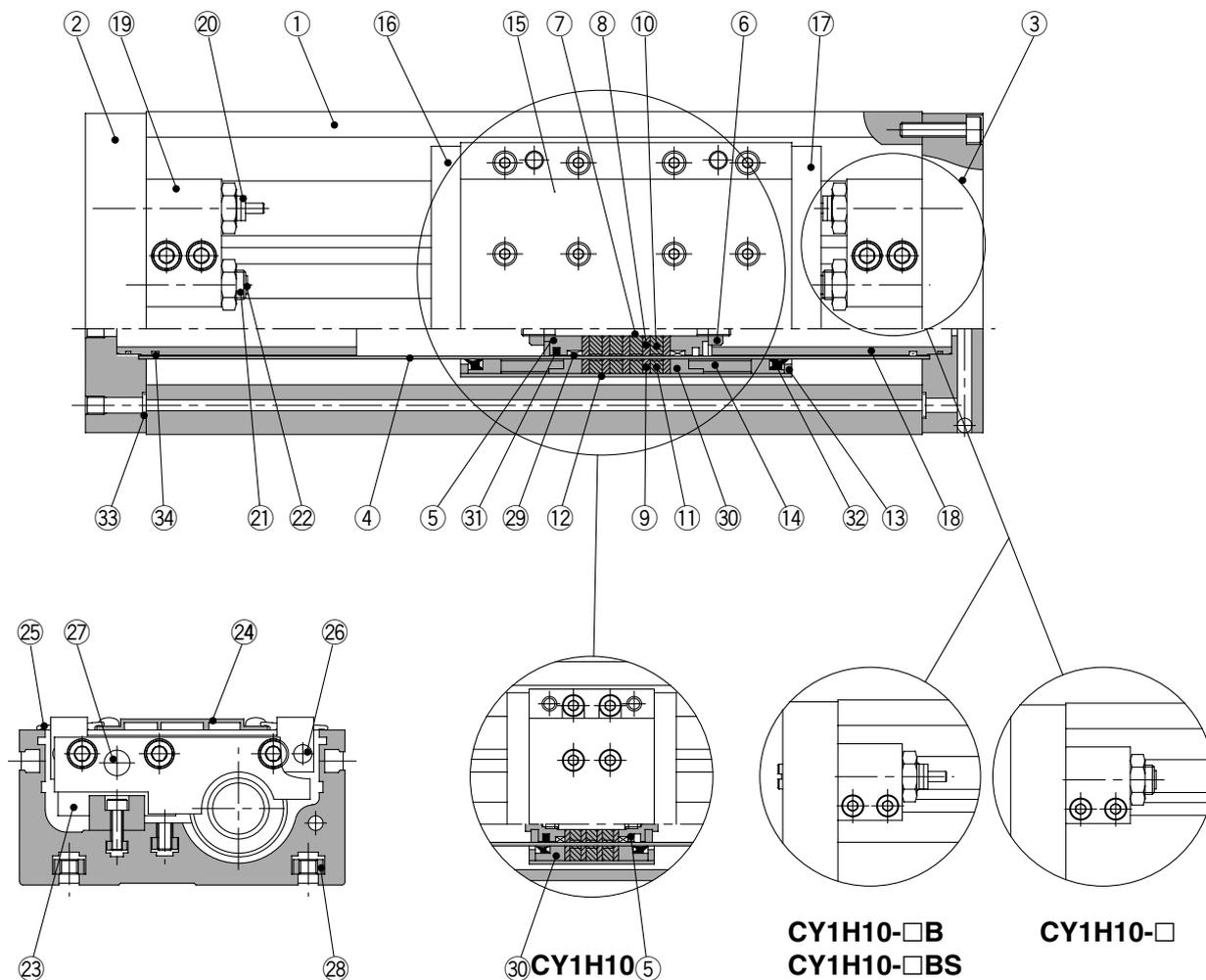
When stopping a load using an air pressure circuit/operate at or below the kinetic energy shown in the table below. The magnetic coupling will break if the allowable value is exceeded.

Model	Allowable kinetic energy for intermediate stop Es (J)
CY1H10	0.03
CY1H15	0.13
CY1H20	0.24
CY1H25	0.45
CY1HT25	0.45
CY1HT32	0.88

Magnetically Coupled Rodless Cylinder High Precision Guide Type Series CY1H

Construction

Single axis type: CY1H



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

Component Parts

No.	Description	Material	Note
①	Body	Aluminum alloy	Hard anodized
②	Plate A	Aluminum alloy	Hard anodized
③	Plate B	Aluminum alloy	Hard anodized
④	Cylinder tube	Stainless steel	
⑤	Piston	Brass	Electroless nickel plated (CY1H10/15)
		Aluminum alloy	Chromated (CY1H20/25)
⑥	Piston nut	Carbon steel	Zinc chromated (Except CY1H10/15)
⑦	Shaft	Stainless steel	
⑧	Piston side yoke	Rolled steel plate	Zinc chromated
⑨	External slider side yoke	Rolled steel plate	Zinc chromated
⑩	Magnet A	Rare earth magnet	
⑪	Magnet B	Rare earth magnet	
⑫	External slider tube	Aluminum alloy	
⑬	Spacer	Rolled steel plate	Nickel plated
⑭	Space ring	Aluminum alloy	Chromated (Except CY1H10)
⑮	Slide table	Aluminum alloy	Hard anodized
⑯	Side plate A	Aluminum alloy	Hard anodized
⑰	Side plate B	Aluminum alloy	Hard anodized

No.	Description	Material	Note
⑱	Internal stopper	Aluminum alloy	Anodized
⑲	Stopper	Aluminum alloy	Anodized
⑳	Shock absorber	—	Series RB
㉑	Adjusting bolt	Chrome molybdenum steel	Nickel plated
㉒	Adjusting bumper	Urethane rubber	
㉓	Linear guide	—	
㉔	Top cover	Aluminum alloy	Hard anodized
㉕	Dust cover	Special resin	
㉖	Magnet (For auto switch)	Rare earth magnet	
㉗	Parallel pin	Carbon steel	Nickel plated
㉘	Square nut for body mounting	Carbon steel	Nickel plated
㉙*	Wear ring A	Special resin	
㉚*	Wear ring B	Special resin	
㉛*	Piston seal	NBR	
㉜*	Scraper	NBR	
㉝*	O-ring	NBR	
㉞*	O-ring	NBR	

Replacement Parts: Seal Kit

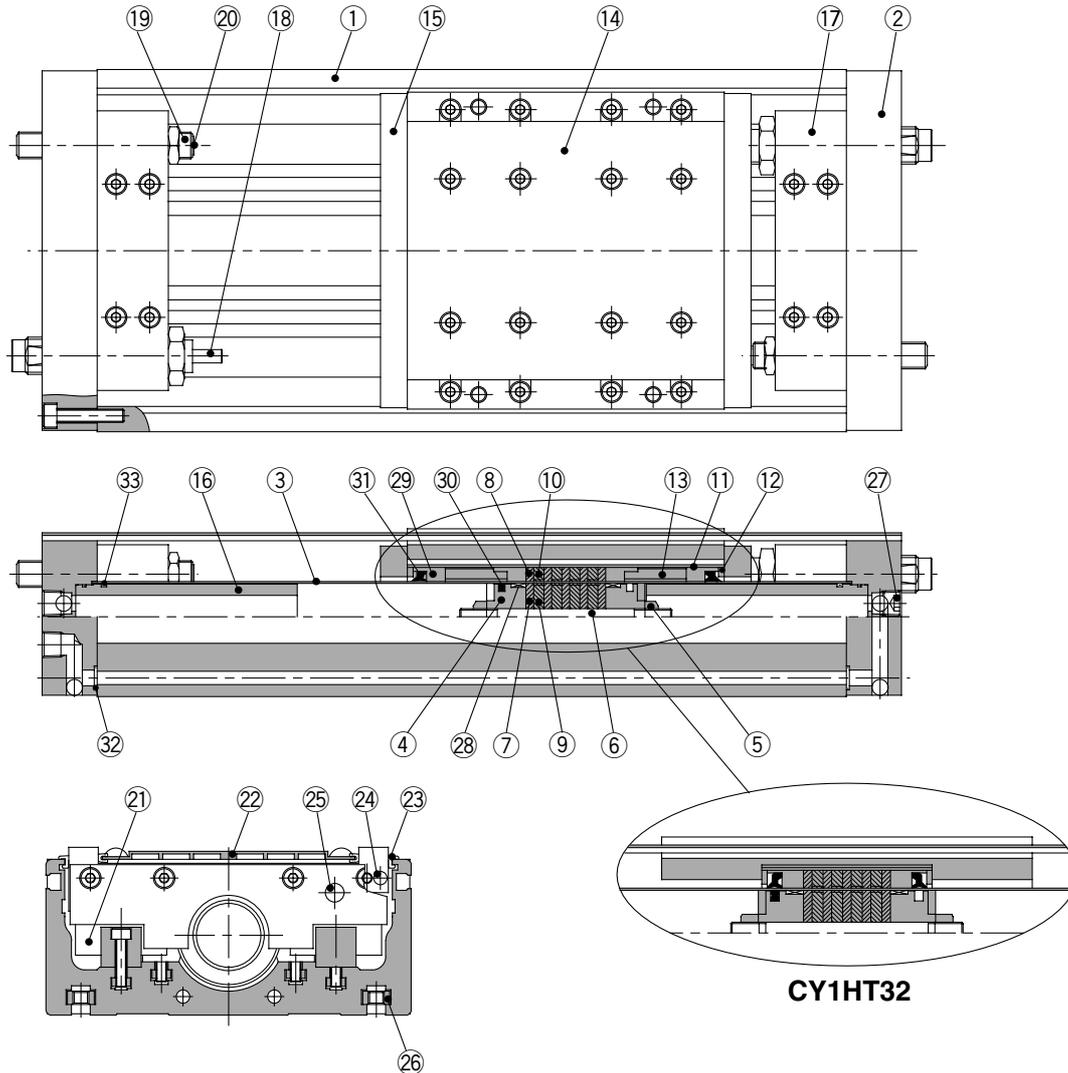
Bore size (mm)	Kit no.	Contents
10	CY1H10-PS	Set of the above nos. ⑳, ㉚, ㉛, ㉜, ㉝, ㉞
15	CY1H15-PS	
20	CY1H20-PS	
25	CY1H25-PS	

* Seal kit includes ㉙ to ㉞. Order the seal kit, based on each bore size.

Series CY1H

Construction

Double axes type: CY1HT



Component Parts

No.	Description	Material	Note
①	Body	Aluminum alloy	Hard anodized
②	Plate	Aluminum alloy	Hard anodized
③	Cylinder tube	Stainless steel	
④	Piston	Aluminum alloy	Chromated
⑤	Piston nut	Carbon steel	Zinc chromated
⑥	Shaft	Stainless steel	
⑦	Piston side yoke	Rolled steel plate	Zinc chromated
⑧	External slider side yoke	Rolled steel plate	Zinc chromated
⑨	Magnet A	Rare earth magnet	
⑩	Magnet B	Rare earth magnet	
⑪	External slider tube	Aluminum alloy	
⑫	Spacer	Rolled steel plate	Nickel plated
⑬	Space ring	Aluminum alloy	Chromated (Except CY1HT32)
⑭	Slide table	Aluminum alloy	Hard anodized
⑮	Side plate	Aluminum alloy	Hard anodized (Except CY1HT32)
⑯	Internal stopper	Aluminum alloy	Anodized
⑰	Stopper	Aluminum alloy	Anodized

No.	Description	Material	Note
⑱	Shock absorber	—	Series RB
⑲	Adjusting bolt	Chrome molybdenum steel	Nickel plated
⑳	Adjusting bumper	Urethane rubber	
㉑	Linear guide	—	
㉒	Top cover	Aluminum alloy	Hard anodized
㉓	Dust cover	Special resin	
㉔	Magnet (For auto switch)	Rare earth magnet	
㉕	Parallel pin	Stainless steel	
㉖	Square nut for body mounting	Carbon steel	Nickel plated
㉗	Hexagon socket head taper plug	Carbon steel	Nickel plated
㉘*	Wear ring A	Special resin	
㉙*	Wear ring B	Special resin	
㉚*	Piston seal	NBR	
㉛*	Scraper	NBR	
㉜*	O-ring	NBR	
㉝*	O-ring	NBR	

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
25	CY1HT25-PS	Set of the above nos.
32	CY1HT32-PS	㉘, ㉙, ㉚, ㉛, ㉜, ㉝

* Seal kit includes ㉘ to ㉝. Order the seal kit, based on each bore size.

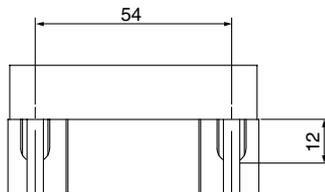
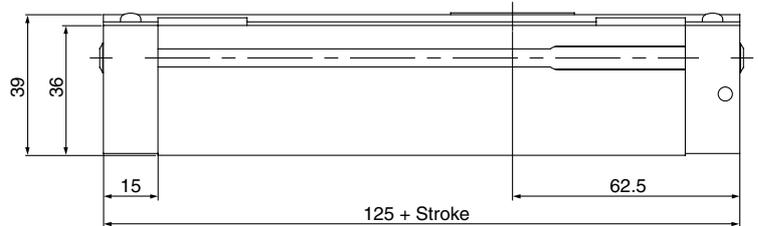
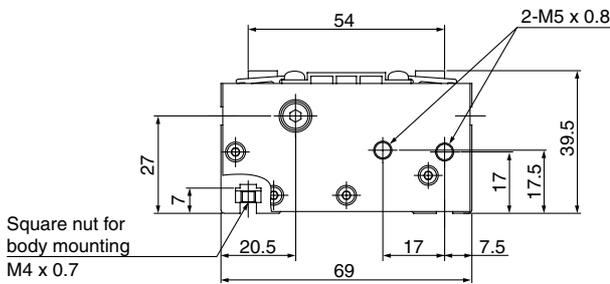
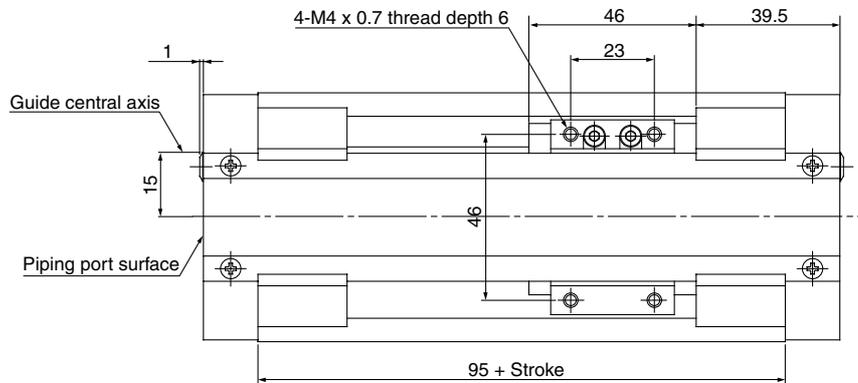
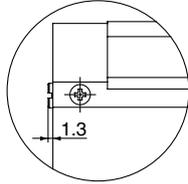
Magnetically Coupled Rodless Cylinder High Precision Guide Type **Series CY1H**

Dimensions

Single axis type: $\varnothing 10$

CY1H10

CY1H10-□B



MX□

MTS

MY□

CY□

MG□

CX□

D-

-X

20-

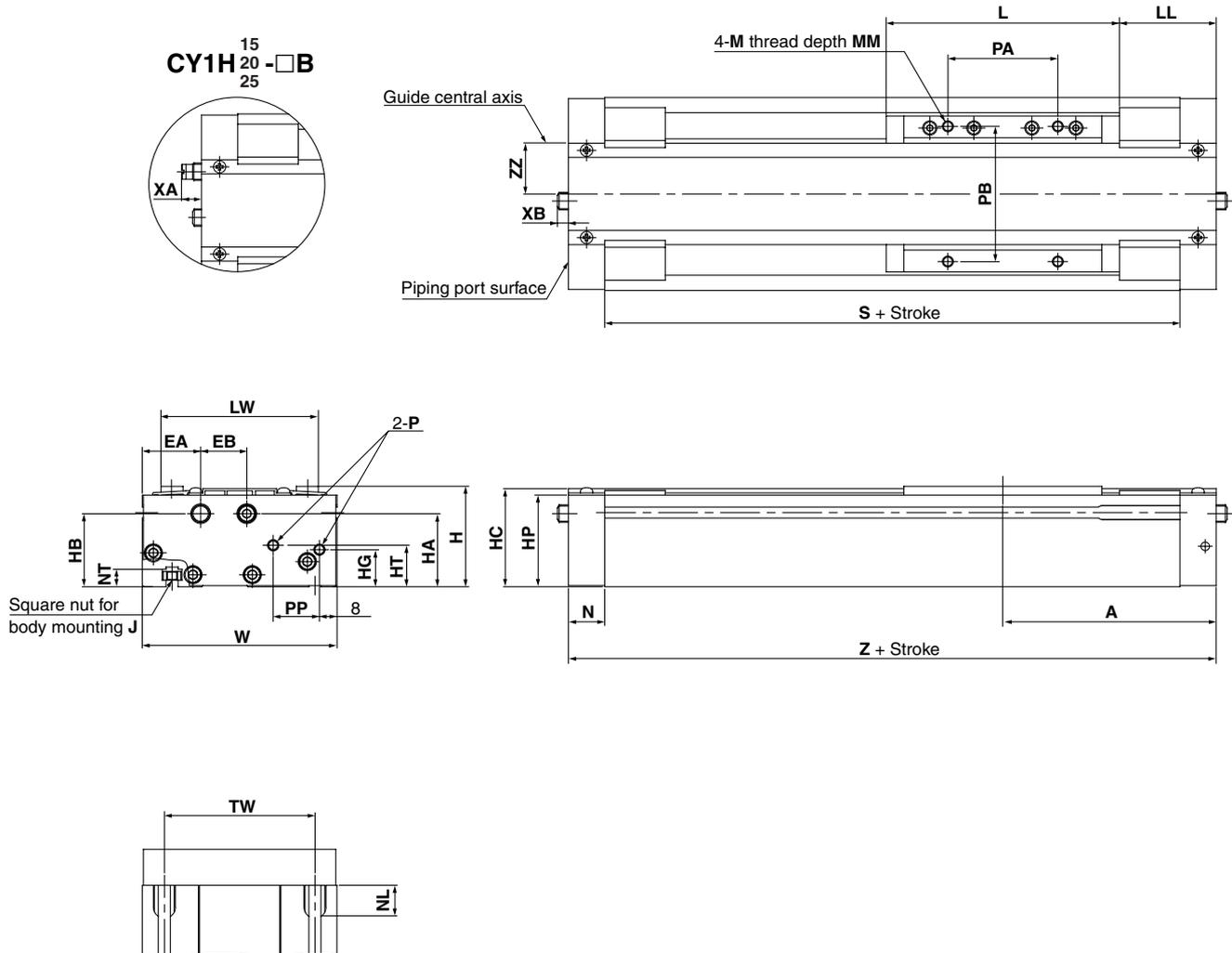
Data

Series CY1H

Dimensions

Single axis type: $\varnothing 15$, $\varnothing 20$, $\varnothing 25$

CY1H15/20/25



Model	A	EA	EB	H	HA	HB	HC	HG	HP	HT	J	L	LL	LW	M	MM	N	NL	NT
CY1H15	97	26.5	21	46	33.5	33.5	45	17	42	19	M5 x 0.8	106	44	71.5	M5 x 0.8	8	16.5	15	8
CY1H20	102.5	26.5	22	54	42.5	41.5	53	16	50	23.5	M5 x 0.8	108	48.5	75.5	M5 x 0.8	8	18	15	8
CY1H25	125	29	24	63	46	46	61.5	25	58.5	28	M6 x 1.0	138	56	86	M6 x 1.0	10	20.5	18	9

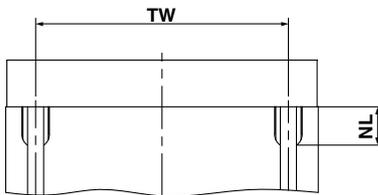
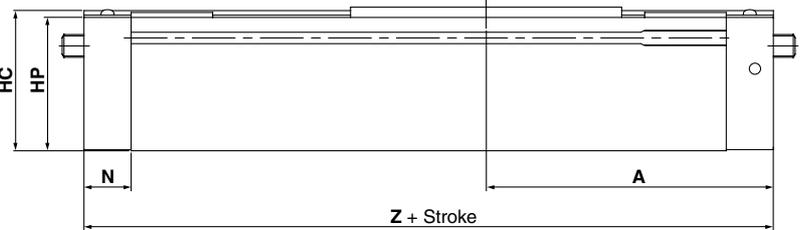
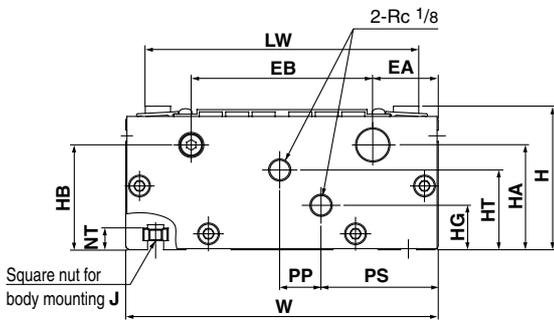
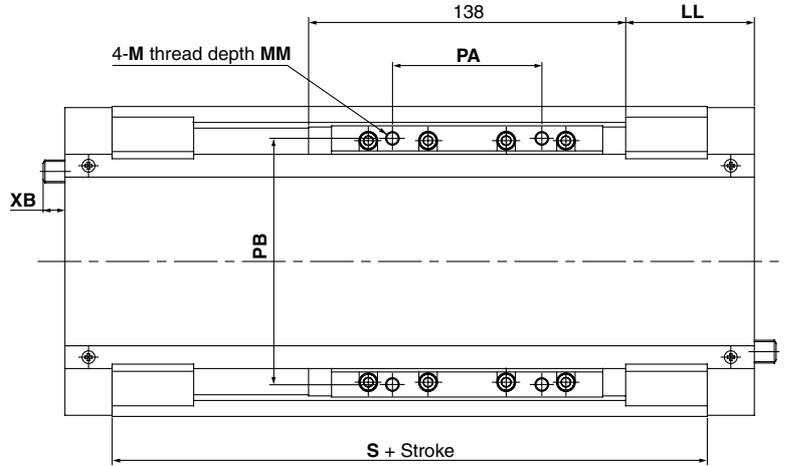
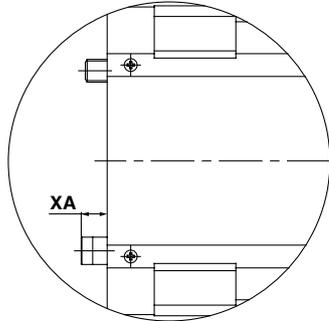
Model	P	PA	PB	PP	S	TW	W	XA	XB	Z	ZZ
CY1H15	M5 x 0.8	50	62	21	161	65	88.5	—	—	194	17.5
CY1H20	Rc 1/8	50	65	23	169	70	92.5	—	—	205	19.5
CY1H25	Rc 1/8	65	75	27	209	75	103	11.3	9.5	250	23.5

Magnetically Coupled Rodless Cylinder High Precision Guide Type **Series CY1H**

Double axes type: $\varnothing 25$, $\varnothing 32$

CY1HT25/32

CY1HT $\frac{25}{32}$ - □ B



MX

MTS

MY

CY

MG

CX

D-

-X

20-

Data

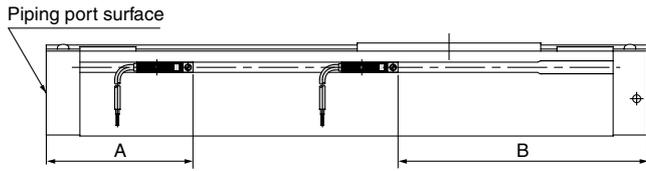
(mm)

Model	A	EA	EB	H	HA	HB	HC	HG	HP	HT	J	LL	LW	M	MM	N	NL	NT	PA
CY1HT25	125	28.5	79	63	46	46	61.5	19.5	58.5	35	M6 x 1.0	56	119	M6 x 1.0	10	20.5	18	9	65
CY1HT32	132.5	30	90	75	52.5	57.5	72.5	25	69.5	43	M8 x 1.25	63.5	130	M8 x 1.25	12	23	22.5	12	66

Model	PB	PP	PS	S	TW	W	XA	XB	Z
CY1HT25	108	18	51	209	110	136	11.3	9.5	250
CY1HT32	115	14	61	219	124	150	9.7	2	265

Series CY1H

Proper Auto Switch Mounting Position (Detection at stroke end)



Cylinder model	Applicable auto switch D-Z7□/Z80/Y5□/Y6□/Y7□	
	A	B
CY1H10	65.5	59.5
CY1H15	72	122
CY1H20	77.5	127.5
CY1H25	86	164
CY1HT25	86	164
CY1HT32	82	183

* 50 mm is the minimum stroke available with 2 auto switches mounted. Please contact SMC in the case of a stroke less than this.

Operating Range

Cylinder model	Auto switch model	Bore size (mm)				
		10	15	20	25	32
CY1H	D-Z7□/Z80	8	6	6	6	—
	D-Y5□/Y6□/Y7□	6	5	5	5	—
CY1HT	D-Z7□/Z80	—	—	—	6	9
	D-Y5□/Y6□/Y7□	—	—	—	5	6

* Some switches cannot be mounted.

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

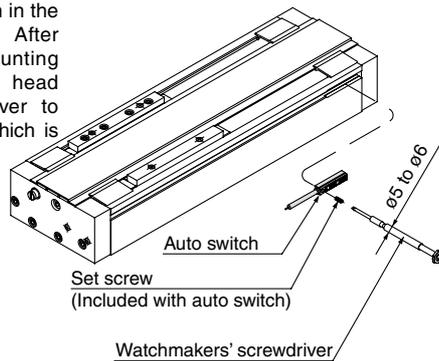
Other than the models listed in "How to Order", the following auto switches are applicable. For detailed specifications, refer to page 8-30-1.

Type	Model	Electrical entry	Features
Reed switch	D-Z80	Grommet (In-line)	Without indicator light

* Normally closed (NC = b contact), solid state switch (D-Y7G/Y7H type) are also available. For details, refer to page 8-30-52.

Mounting of Auto Switch

When mounting auto switches, they should be inserted into the cylinder's switch groove from the direction shown in the drawing on the right. After setting in the mounting position, use a flat head watchmakers' screwdriver to tighten the set screw which is included.



Note) When tightening the auto switch set screw (included with auto switch), Use a watchmakers' screwdriver with a handle about 5 to 6 mm in diameter. Use a tightening torque of approximately 0.05 to 0.1 N·m.

Auto Switch Lead Wire Containment Groove

On models CY1H20 and CY1H25 a groove is provided on the side of the body (one side only) to contain auto switch lead wires. This should be used for management of wiring.

