Basic type/Direct mount type

Series CY3B/CY3R

ø6, ø10, ø15, ø20, ø25, ø32, ø40, ø50, ø63

Magnetically Coupled Rodless Cylinder

Series CY3B/CY3R

Basic type / Direct mount type

Improved durability

Improved bearing performance

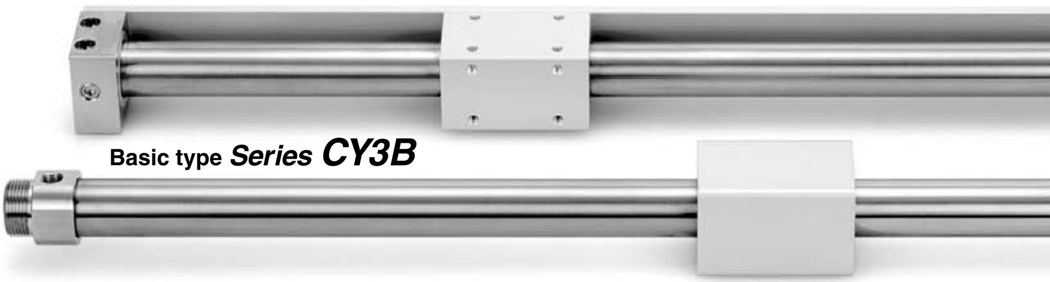
A 70% longer wear ring length achieving an improvement in bearing performance compared to the CY1B.

Improved lubrication by using a Lub-retainer

A special resin Lub-retainer is installed on the dust seal to achieve ideal lubrication on the external surface of the cylinder tube.

Direct mount type ***Series CY3R***

Basic type ***Series CY3B***



Series Variations

Standard stroke (mm)

Series	Bore size	50	100	150	200	250	300	350	400	450	500	600	700	800	900	1000
CY3B	ø6	●	●	●	●											
	ø10	●	●	●	●	●	●									
	ø15	●	●	●	●	●	●	●	●	●	●					
	ø20		●	●	●	●	●	●	●	●	●	●	●	●		
	ø25		●	●	●	●	●	●	●	●	●	●	●	●		
	ø32		●	●	●	●	●	●	●	●	●	●	●	●		
	ø40		●	●	●	●	●	●	●	●	●	●	●	●	●	●
	ø50		●	●	●	●	●	●	●	●	●	●	●	●	●	●
	ø63		●	●	●	●	●	●	●	●	●	●	●	●	●	●
CY3R	ø6	●	●	●	●											
	ø10	●	●	●	●	●	●									
	ø15	●	●	●	●	●	●	●	●	●	●					
	ø20		●	●	●	●	●	●	●	●	●	●	●	●		
	ø25		●	●	●	●	●	●	●	●	●	●	●	●		
	ø32		●	●	●	●	●	●	●	●	●	●	●	●		
	ø40		●	●	●	●	●	●	●	●	●	●	●	●	●	●
	ø50		●	●	●	●	●	●	●	●	●	●	●	●	●	●
	ø63		●	●	●	●	●	●	●	●	●	●	●	●	●	●

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

Individual Made-to-Order products	
Heat resistant specifications	(XB6)
Low speed specifications (15 to 50 mm/s)	(XB9)
Long stroke	(XB11)
Low speed specifications (7 to 50 mm/s)	(XB13)
Hydro specifications	(X116)
Air supply port relocated in axial direction	(X132)
High speed specifications	(X160)
Helical insert thread specifications	(X168)
Added mounting tap positions for slider	(X206)
Non-lubricated exterior specifications	(X210)
Outside of cylinder tube with hard chrome plated	(X322)
Non-lubricated exterior specifications (with dust seal)	(X324)
Interchangeable with CY1□6	(X1468)
With magnetic shielding plate	(XC24)
With floating joint	(XC57)

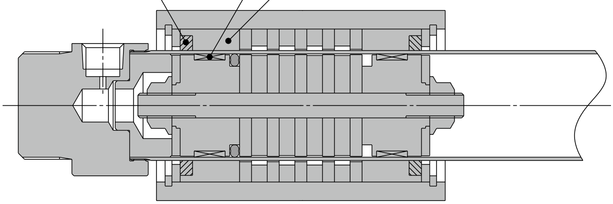
Availability of Made to Order products varies with the series and the bore size. For more information, please refer to pages 1699 to 1818.

Upgraded version of space saving magnetically rodless cylinder!

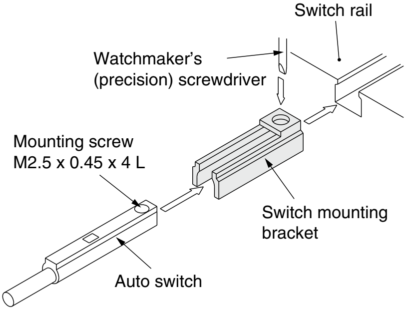
Reduction of sliding resistance

Minimum operating pressure reduced by 30%

By using a Lub-retainer, the minimum operating pressure is reduced by 30%.
(CY3B40 compared with CY1B40)



Series CY3B



Small auto switches are mountable.

Small auto switches can be mounted on the currrent auto switch mounting groove of the CY3R25 to 63. So, they can be mounted to all of the cylinder sizes in the CY3R series, making inventory control of the product easy.

Lightweight

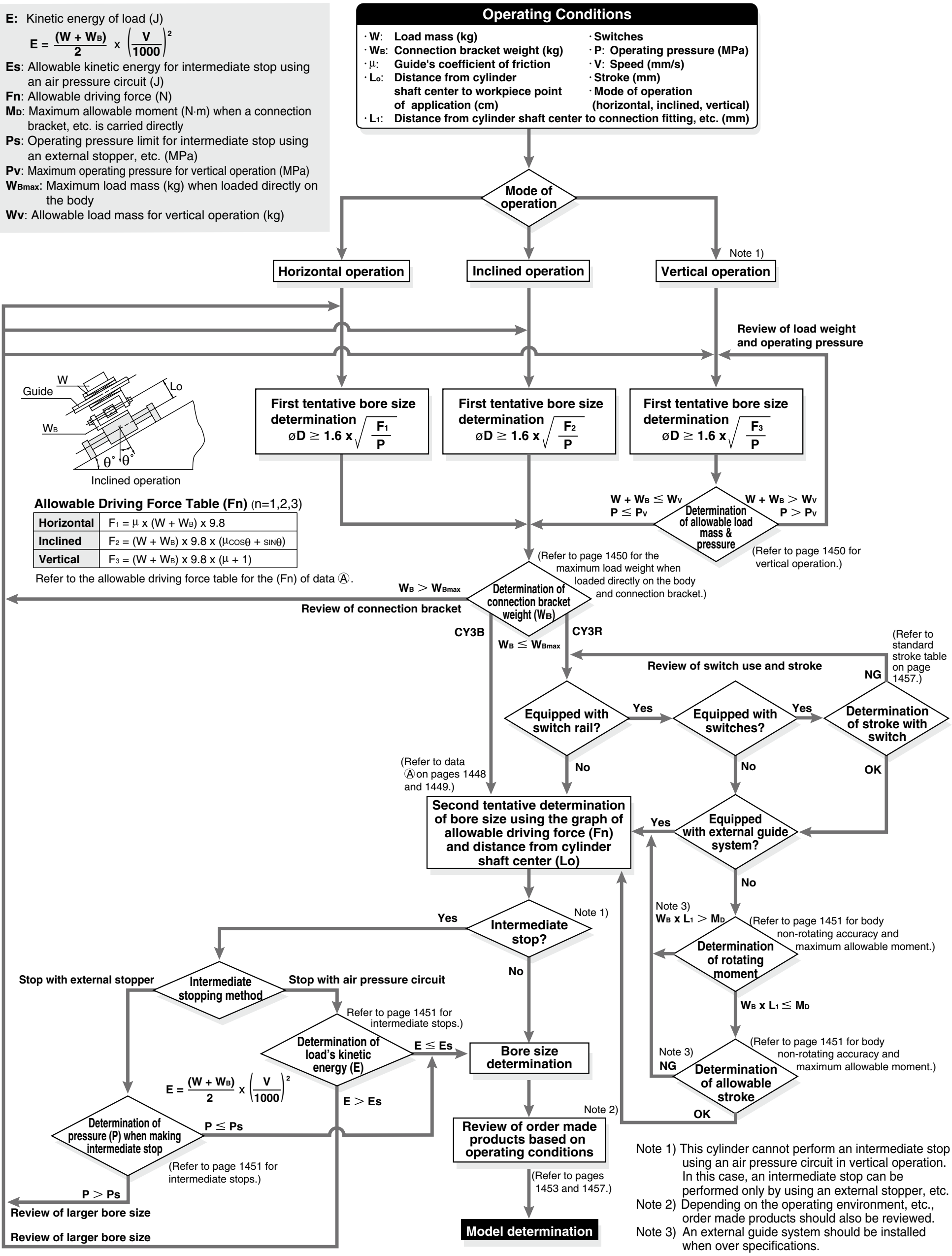
The body weight has been reduced by approximately 10% by eliminating unnecessary body weight and by reducing the outer diameter of the cylinder tube. (Compared with previous ø50 and ø60 models)

Series CY3B/CY3R
Model Selection

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)
M_D: 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)
W_{Bmax}: Maximum load mass (kg) when loaded directly on the body
Wv: Allowable load mass for vertical operation (kg)



Inclined operation

Allowable Driving Force Table (Fn) (n=1,2,3)

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

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

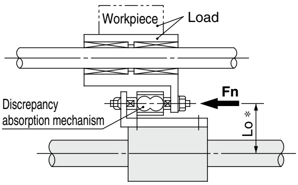
Note 1) This cylinder cannot perform an intermediate stop using an air pressure circuit in vertical operation. In this case, an intermediate stop can be performed only by using an external stopper, etc.
Note 2) Depending on the operating environment, etc., order made products should also be reviewed.
Note 3) An external guide system should be installed when over specifications.

Precautions on Design 1

Selection Procedure

Selection procedure

1. Find the drive resisting force **Fn** (N) when moving the load horizontally.
2. Find the distance **Lo** (cm) from the point of the load where driving force is applied, to the center of the cylinder shaft.
3. Select the bore size from **Lo** and **Fn**, based on data Ⓐ.



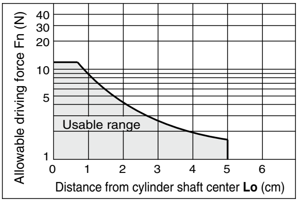
Selection example

Given a load drive resisting force of **Fn** = 100 (N) and a distance from the cylinder shaft center to the load application point of **Lo** = 8 cm, find the intersection point by extending upward from the horizontal axis of data Ⓐ 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 in satisfying the requirement of 100 (N) are **CY3□32** or **CY3□40**.

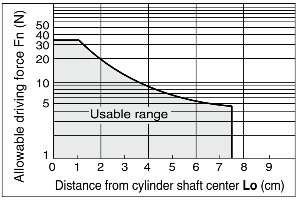
∗ The Lo point from the cylinder shaft center is the moment working point between the cylinder and the load section.

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

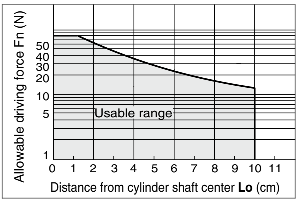
CY3B6



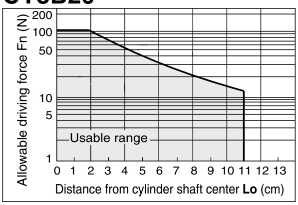
CY3B10



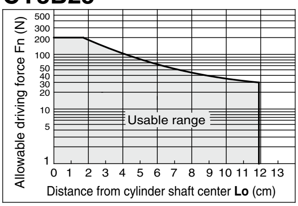
CY3B15



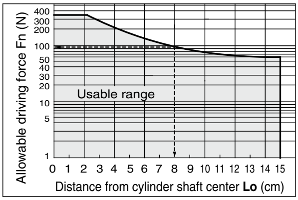
CY3B20



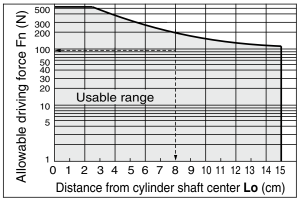
CY3B25



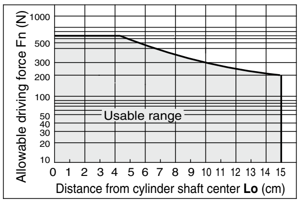
CY3B32



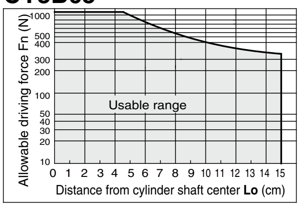
CY3B40



CY3B50



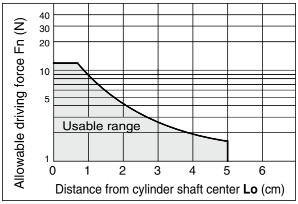
CY3B63



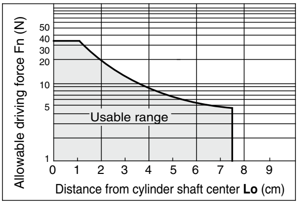
Precautions on Design 1

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

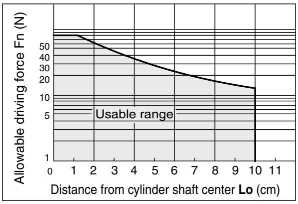
CY3R6



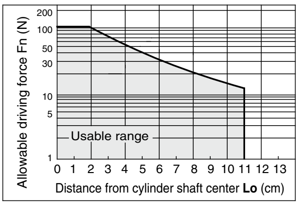
CY3R10



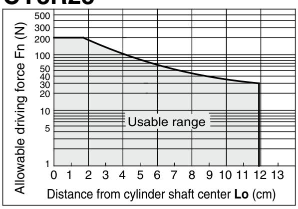
CY3R15



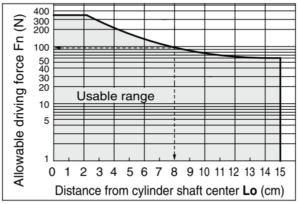
CY3R20



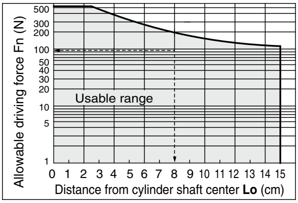
CY3R25



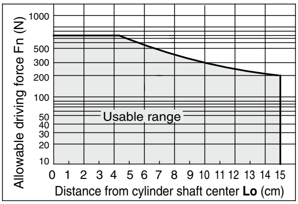
CY3R32



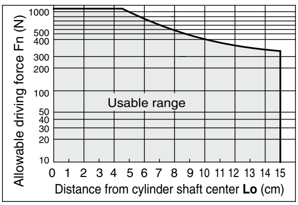
CY3R40



CY3R50



CY3R63

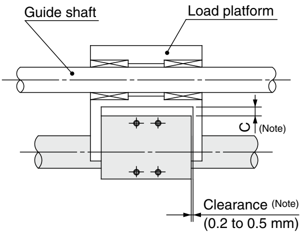


CY3B CY3R
CY1S -Z
CY1L
CY1H
CY1F
CYP
D-□
-X□
Technical data

Precautions on Design 2

Cylinder Dead Weight Deflection

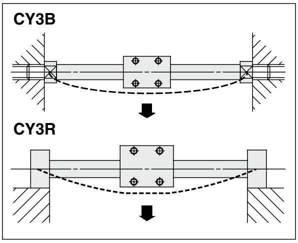
When the cylinder is mounted horizontally, deflection appears due to its own weight as shown in the data, and the longer the stroke is, the greater the amount of variation in the shaft center. Therefore, a connection method should be considered which can assimilate this deflection.

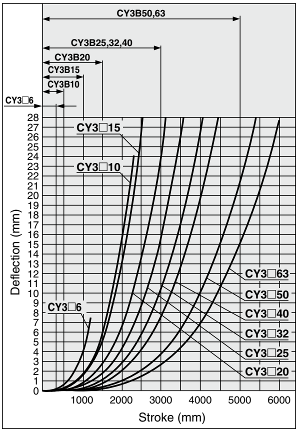


The above clearance amount is a reference value.

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 case of the CY3R, install a shim, etc. to eliminate clearance between the body and the switch rail. For more information, refer to the CY3R instruction manual.
Note 3) The amount of deflection differs from the CY1B/CY1R. Adjust the clearance value by referring to the dead weight deflection as shown in the table on the right.

When CY1B/CY1R are replaced with CY3B/CY3R, install a cylinder after confirming a full stroke and clearance are allowed.

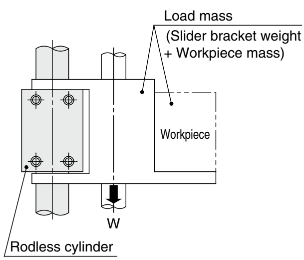




∗ The above deflection data represent values at the time when the external sliding part moves to the middle of the stroke.

Vertical Operation

It is recommended that the load is guided by a ball type bearing (linear guide, etc.). If a slide bearing is used, sliding resistance increases due to the load mass and moment, which may cause malfunctions.
When the cylinder is mounted vertically or sidelong, a slider may move downwards due to the self-weight or workpiece mass. If an accurate stopping position is required at the stroke end or mid-stroke, use an external stopper to secure accurate positioning.



Bore size (mm)	Model	Allowable load mass (Wv) (kg)	Max. operating pressure (Pv) (MPa)
6	CY3□6	1.0	0.55
10	CY3□10	2.7	0.55
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
50	CY3□50	75.0	0.65
63	CY3□63	115.0	0.65

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

Maximum Weight of Connection Bracket to the Body

Series CY3B 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, make sure 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 the Instruction Manual.)

Max. Connection Bracket Weight

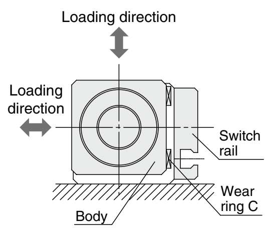
Model	Max. connection bracket weight (WBmax) (kg)
CY3□6	0.2
CY3□10	0.4
CY3□15	1.0
CY3□20	1.1
CY3□25	1.2
CY3□32	1.5
CY3□40	2.0
CY3□50	2.5
CY3□63	3.0

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

<CY3R>
Maximum Load Mass 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 (WBmax) (kg)
CY3R6	0.2
CY3R10	0.4
CY3R15	1.0
CY3R20	1.1
CY3R25	1.2
CY3R32	1.5
CY3R40	2.0
CY3R50	2.5
CY3R63	3.0



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)
6	**CY3□6**	0.55
10	**CY3□10**	0.55
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
50	**CY3□50**	0.65
63	**CY3□63**	0.65

(2) Intermediate stopping of load with an air pressure circuit

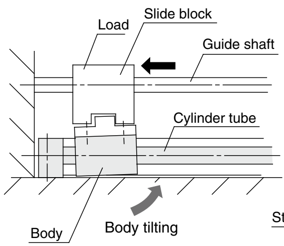
When performing an intermediate stop of a load using an air pressure circuit, operate at or below the kinetic energy shown in the table below. Use caution, as operation when exceeding the allowable value can result in breaking of the magnetic coupling.

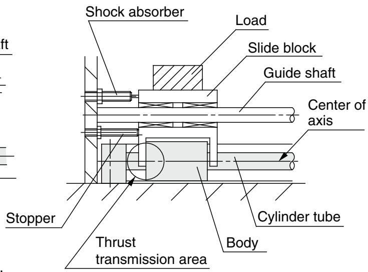
(Reference values)

Bore size (mm)	Model	Allowable kinetic energy for intermediate stop (Es) (J)
6	**CY3□6**	0.007
10	**CY3□10**	0.03
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
50	**CY3□50**	3.12
63	**CY3□63**	5.07

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.





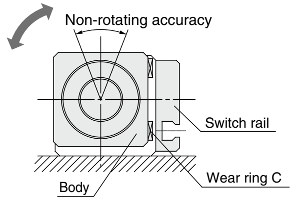
Note) The drawing shows the CY3R series.

<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 (M_D) (N·m)	Allowable stroke (mm) Note 2)
6	7.3	0.02	100
10	6.0	0.05	100
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
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 weight on page 1450.

Magnetically Coupled Rodless Cylinder/ Basic Type

Series CY3B

ø6, ø10, ø15, ø20, ø25, ø32, ø40, ø50, ø63

How to Order

Basic type

CY3B 25 [ ] – 300 – [ ]

Basic type (B)

Bore size

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

Port thread type

Symbol	Type	Bore size
Nil	M thread	6, 10, 15
	Rc	20, 25, 32, 40 50, 63
TN	NPT	
TF	G	

Standard stroke
Refer to the standard stroke table shown below.

Made to Order
Refer to page 1453 for details.

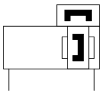
Standard Stroke

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	1000
20	100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800	1500
25		3000
32		
40	100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	3000
50		5000
63		

Note 1) Long stroke specification (XB11) applies to the strokes exceeding 2000 mm. (Refer to page 1711.)
Note 2) The longer the stroke, the larger the amount of deflection in a cylinder tube. Pay attention to the mounting bracket and clearance value.
Note 3) Intermediate stroke is available by the 1 mm interval.

Symbol

Rubber bumper (Magnet type)



Made to Order: Individual Specifications
(For details, refer to pages 1464 to 1466.)

Symbol	Specifications
-X116	Hydro specifications
-X132	Axial ports
-X160	High speed specifications
-X168	Helical insert thread specifications
-X206	Added mounting tap positions for slider
-X210	Non-lubricated exterior specifications
-X322	Outside of cylinder tube with hard chrome plating
-X324	Non-lubricated exterior specifications (with dust seal)
-X1468	Interchangeable specification with CY1□6

Made to Order
(Refer to pages 1699 to 1818 for details.)

Symbol	Specifications
-XB6	Head resistant cylinder (–10 to 150°C)
-XB9	Low-speed cylinder (15 to 50mm/s)
-XB11	Long stroke type
-XB13	Low-speed cylinder (7 to 50mm/s)
-XC24	With magnetic shielding plate
-XC57	With floating joint

Specifications

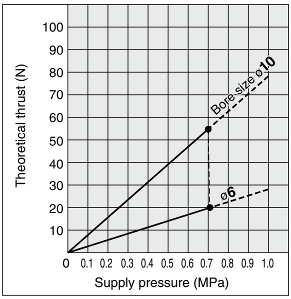
Bore size (mm)	6	10	15	20	25	32	40	50	63
Fluid	Air								
Proof pressure	1.05 MPa								
Max. operating pressure	0.7 MPa								
Min. operating pressure	0.16	0.16	0.16	0.16	0.15	0.14	0.12	0.12	0.12
Ambient and fluid temperature	–10 to 60°C (No freezing)								
Piston speed	50 to 500 mm/s								
Cushion	Rubber bumper								
Lubrication	Not required (Non-lube)								
Stroke length tolerance (mm)	0 to 250 st: $^{+1.0}_{0}$, 251 to 1000 st: $^{+1.4}_{0}$, 1001 st to: $^{+1.8}_{0}$								
Mounting orientation	Horizontal, Inclined, Vertical Note)								
Mounting nut (2 pcs.)	Standard equipment (accessory)								
Magnet holding force (N)	19.6	53.9	137	231	363	588	922	1471	2256

Note) When vertically mounting, it is impossible to perform an intermediate stop by means of a pneumatic circuit.

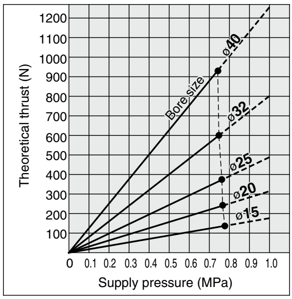
Theoretical Cylinder Thrust

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

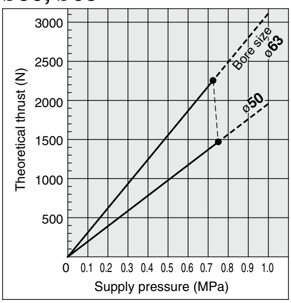
ø6, ø10



ø15, ø20, ø25, ø32, ø40



ø50, ø63



Weight

Unit: kg

Bore size (mm)	6	10	15	20	25	32	40	50	63
Basic weight (at 0 st)	0.052	0.08	0.275	0.351	0.672	1.287	2.07	3.2	5.3
Additional weight per 50 mm of stroke	0.004	0.014	0.015	0.02	0.023	0.033	0.04	0.077	0.096

Calculation method/Example: **CY3B32-500**

Basic weight. . . . . .1.287 kg
Additional weight. . . . . 0.033/50 st
Cylinder stroke. . . . . .500 st

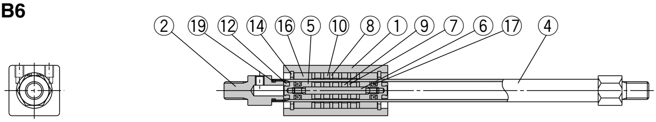
1.287 + 0.033 x 500 ÷ 50 = 1.617 kg

CY3B CY3R
CY1S -Z
CY1L
CY1H
CY1F
CYP
D-□
-X□
Technical data

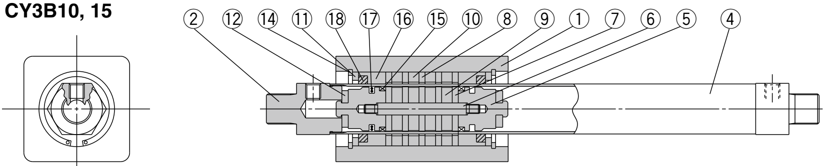
Construction

Basic type

CY3B6

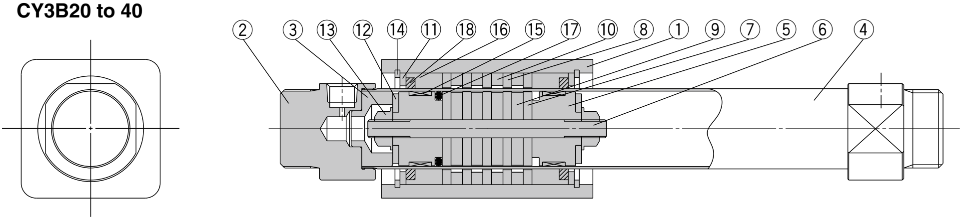


CY3B10, 15

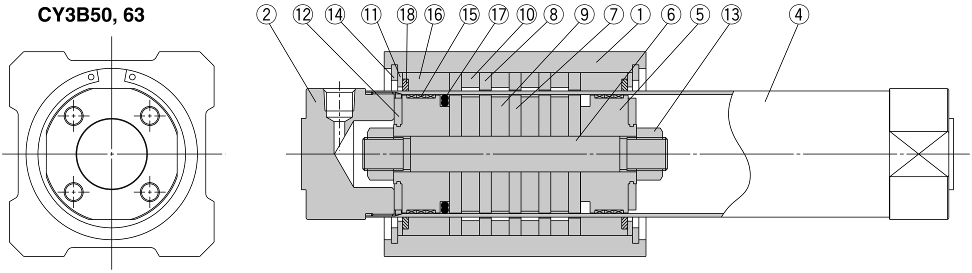


∗ The above drawing is ø15. (3 magnets are used in ø10.)

CY3B20 to 40



CY3B50, 63



Component Parts

No.	Description	Material		Note	
1	**Body**	Aluminum alloy		Hard anodized	
2	**Head cover**	ø6, ø10	Brass		
		ø15 to ø63	Aluminum alloy		
3	**End collar**	Aluminum alloy		ø20 to ø40 only	
4	**Cylinder tube**	Stainless steel			
5	**Piston**	ø6	Brass	ø6	Electroless Ni plated
		ø10 to ø63	Aluminum alloy	ø10 to ø63	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**	—			
10	**Magnet B**	—			
11	**Spacer**	Aluminum alloy		ø6: not available	
12	**Bumper**	Urethane rubber			
13	**Piston nut**	Carbon steel		ø6 to ø15: not available	
14	**C type retaining ring for hole**	Carbon tool steel		Phosphate coated	
15	**Wear ring A**	Special resin			
16	**Wear ring B**	Special resin			
17	**Piston seal**	NBR			
18	**Lub-retainer**	Special resin		ø6: not available	
19	**Cylinder tube gasket**	NBR		ø6, ø10 only	

Replacement Parts/Seal Kit

Bore size (mm)	Kit no.	Contents
6	CY3B6-PS	Set of nos. above ⑯, ⑰, ⑲
10	CY3B10-PS	Set of nos. above ⑯, ⑰, ⑱, ⑲
15	CY3B15-PS	Set of nos. above ⑮, ⑯, ⑰, ⑱
20	CY3B20-PS	
25	CY3B25-PS	
32	CY3B32-PS	
40	CY3B40-PS	
50	CY3B50-PS	
63	CY3B63-PS	

Note 1) Seal kits are sets consisting of numbers 15 through 19. Order using the kit number corresponding to each bore size.

Note 2) Adhesive glue is applied to the thread fixed section of the head cover and cylinder tube. Contact SMC if the head cover removal is difficult.

Note 3) For replacement of the ø10 wear ring A, contact SMC or your nearest sales representative.

∗ Seal kit includes a grease pack (ø6, ø10: 5 and 10 g, ø15 to ø63: 10 g). Order with the following part number when only the grease pack is needed.

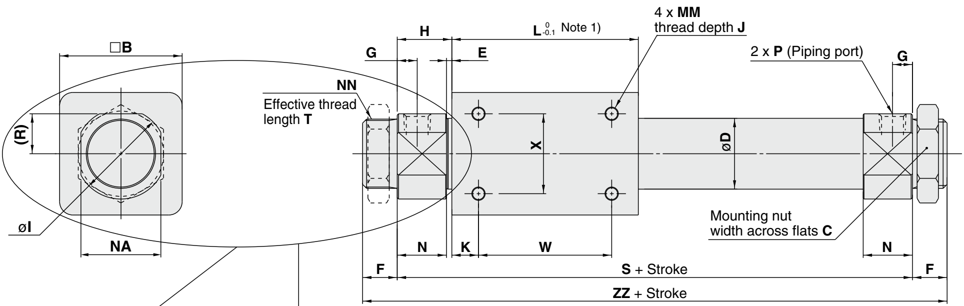
Grease pack part number for ø6, ø10: GR-F-005 (5 g) For external sliding sections
GR-S-010 (10 g) For tubing interior

Grease pack part number for ø15 to ø63: GR-S-010 (10 g)

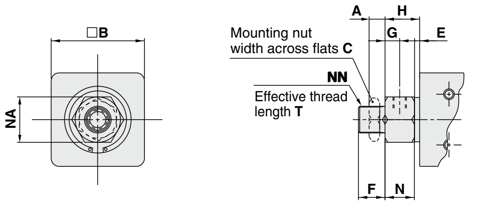
Dimensions

Basic type

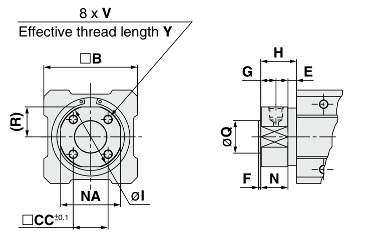
CY3B6 to 63



Note 1) ø50, ø63: L 0 -0.2



CY3B6 to 15



CY3B50, 63

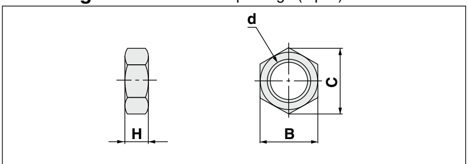
(mm)

Model	A	B	C	CC	D	E	F	G	H	I	J	K	L	MM	N	NA	NN	Q	R	S	T	V
CY3B6	4	17	8*	—	7.6	4	8*	5	13.5*	—	4.5	5	35	M3 x 0.5	9.5*	10*	M6 x 1*	—	—	62*	6.5	—
CY3B10	4	25	14	—	12	1.5	9	5	12.5	—	4.5	4	38	M3 x 0.5	11	14	M10 x 1	—	—	63	7.5	—
CY3B15	4	35	14	—	16.6*	2	10	5.5	13	—	6	11	57	M4 x 0.7	11	17	M10 x 1	—	—	83	8	—
CY3B20	8	36	26	—	21.6*	2*	13	7.5*	20	28	6	8	66	M4 x 0.7	18*	24	M20 x 1.5	—	12*	106	10	—
CY3B25	8	46	32	—	26.4*	2*	13	7.5*	20.5	34	8	10	70	M5 x 0.8	18.5*	30	M26 x 1.5	—	15*	111	10	—
CY3B32	8	60	32	—	33.6*	2*	16	8*	22	40	8	15	80	M6 x 1	20*	36	M26 x 1.5	—	18*	124	13	—
CY3B40	10	70	41	—	41.6*	3*	16	11	29	50	10	16	92	M6 x 1	26*	46	M32 x 2	—	23*	150	13	—
CY3B50	—	86	—	32	52.4*	8	2	14	33	58*	12	25	110	M8 x 1.25	25	55	—	$30^{-0.007}_{-0.037}$	27.5*	176	—	M8 x 1.25
CY3B63	—	100	—	38	65.4*	8	2	14	33	72*	12	26	122	M8 x 1.25	25	69	—	$32^{-0.007}_{-0.043}$	34.5*	188	—	M10 x 1.5

Model	W	X	Y	ZZ	P (Piping port)		
					Nil	TN*	TF*
CY3B6	25	10	—	78*	M3 x 0.5*	—	—
CY3B10	30	16	—	81	M5 x 0.8	—	—
CY3B15	35	19	—	103	M5 x 0.8	—	—
CY3B20	50	25	—	132	Rc 1/8	NPT 1/8	G 1/8
CY3B25	50	30	—	137	Rc 1/8	NPT 1/8	G 1/8
CY3B32	50	40	—	156	Rc 1/8	NPT 1/8	G 1/8
CY3B40	60	40	—	182	Rc 1/4	NPT 1/4	G 1/4
CY3B50	60	60	16	180	Rc 1/4	NPT 1/4	G 1/4
CY3B63	70	70	16	192	Rc 1/4	NPT 1/4	G 1/4

Note 2) The astrisk denotes the dimensions which are different from the CY1B series.
Note 3) Mounting nuts can be screwed on only for the effective thread length of the head cover (T dimension). When mounting a cylinder, consider the thickness of flange, etc.

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



Part no.	Applicable bore size (mm)	d	H	B	C
SNJ-006B	**6**	M6 x 1.0	4	8	9.2
SNJ-016B	**10, 15**	M10 x 1.0	4	14	16.2
SN-020B	**20**	M20 x 1.5	8	26	30
SN-032B	**25, 32**	M26 x 1.5	8	32	37
SN-040B	**40**	M32 x 2.0	10	41	47.3

Note) Mounting nuts are not available for ø50 and ø63.

Magnetically Coupled Rodless Cylinder/ Direct Mount Type

Series CY3R

ø6, ø10, ø15, ø20, ø25, ø32, ø40, ø50, ø63

How to Order

CY3R [ ] 25 [ ] – 300 [ ] – M9BW [ ] – [ ]

Direct mount type

Piping type

Nil	Standard type
G	Centralized piping type

∗ Type G (centralized piping) is not available for ø6.

Bore size

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

Port thread type

Symbol	Type	Bore size
Nil	M thread	6, 10, 15
	Rc	20, 25, 32, 40 50, 63
TN	NPT	
TF	G	

Cylinder stroke (mm)
Refer to page 1457 for standard stroke.

Switch rail

Nil	With switch rail
N	Without switch rail

Note 1) A type with switch rail has built-in auto switch magnets.
Note 2) ø15 has built-in auto switch magnets even without switch rail.
Note 3) Centralized piping type (G) is not available without switch rail (N).

Auto switch type

Nil	Without auto switch (Built-in magnet)

Note) In case of ø20 with switch rail but without auto switch, the cylinder construction is for reed auto switch. Mounting a solid state auto switch causes malfunctions.
∗ Refer to the table below for auto switch model numbers.

Number of auto switches

Nil	2 pcs.
S	1 ps,
n	"n" pcs.

Made to Order
Refer to page 1457 for details.

Applicable Auto Switches/Refer to pages 1599 to 1673 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage DC		Load voltage AC	Auto switch model	Lead wire length (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	——	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**M9N**	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9P**	●	●	●	○	○		
				2-wire		12 V		**M9B**	●	●	●	○	○	—	
	Diagnostic indication (2-color display)			3-wire (NPN)		5 V, 12 V		**M9NW**	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PW**	●	●	●	○	○		
				2-wire		12 V		**M9BW**	●	●	●	○	○	—	
	Water resistant (2-color display)			3-wire (NPN)		5 V, 12 V		**M9NA**∗1	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PA**∗1	○	○	●	○	○		
				2-wire		12 V		**M9BA**∗1	○	○	●	○	○	—	
Reed auto switch	——	Grommet	Yes	3-wire (NPN equiv.)	—	5 V	—	**A96**	●	—	●	—	—	IC circuit	—
				2-wire	24 V	5 V, 12 V	100 V	**A93**	●	●	●	●	—	—	Relay, PLC
			No				100 V or less	**A90**	●	—	●	—	—	IC circuit	

∗1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.
Consult with SMC regarding water resistant types with the above model numbers.

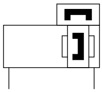
∗ Lead wire length symbols: 0.5 m .... Nil (Example) M9NW
1 m .... M (Example) M9NWM
3 m .... L (Example) M9NWL
5 m .... Z (Example) M9NWZ

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

∗ Other than the applicable auto switches listed in "How to Order", the other auto switches can be mounted. For detailed specifications, refer to page 1463.
∗ With pre-wired connector is also available in solid state auto switches. For specifications, refer to pages 1626 and 1627.
∗ The auto switch is shipped together, but not assembled.

Symbol

Rubber bumper (Magnet type)



Made to Order: Individual Specifications
(For details, refer to pages 1464 to 1466.)

Symbol	Specifications
-X116	**Hydro specifications**
-X160	**High speed specifications**
-X322	**Outside of cylinder tube with hard chrome plating**
-X1468	**Interchangeable specification with CY1□6**

Made to Order
(Refer to pages 1699 to 1818 for details.)

Symbol	Specifications
-XC57	**With floating joint**

Specifications

Bore size (mm)	6	10	15	20	25	32	40	50	63
Fluid	Air								
Proof pressure	1.05 MPa								
Max. operating pressure	0.7 MPa								
Min. operating pressure	0.16	0.16	0.16	0.16	0.15	0.14	0.12	0.12	0.12
Ambient and fluid temperature	–10 to 60°C (No freezing)								
Piston speed	50 to 500 mm/s								
Cushion	Rubber bumper								
Lubrication	Not required (Non-lube)								
Stroke length tolerance (mm)	0 to 250 st: $^{+1.0}_{0}$, 251 to 1000 st: $^{+1.4}_{0}$, 1001 st to: $^{+1.8}_{0}$								
Mounting	Direct mount type								
Mounting orientation	Horizontal, Inclined, Vertical Note 2)								
Magnet holding force (N)	19.6	53.9	137	231	363	588	922	1471	2256

Note 1) 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.
Note 2) When vertically mounting, it is impossible to perform an intermediate stop by means of a pneumatic circuit.

Standard Stroke

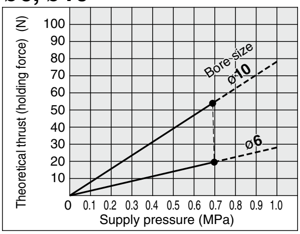
Bore size (mm)	Standard stroke (mm)	Max. stroke without switch (mm)	Max. stroke with switch (mm)
6	50, 100, 150, 200	300	300
10	50, 100, 150, 200, 250, 300	500	500
15	50, 100, 150, 200, 250, 300 350, 400, 450, 500	1000	750
20	100, 150, 200, 250, 300, 350 400, 450, 500, 600, 700, 800	1500	1000
25			1200
32		2000	1500
40	100, 150, 200, 250, 300, 350 400, 450, 500, 600, 700, 800 900, 1000		
50			
63			

Note 1) The longer the stroke, the larger the amount of deflection in a cylinder tube. Pay attention to the mounting bracket and clearance value.
Note 2) Intermediate stroke is available by the 1 mm interval.

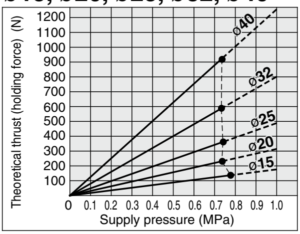
Theoretical Cylinder Thrust

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

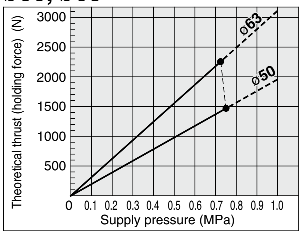
ø6, ø10



ø15, ø20, ø25, ø32, ø40



ø50, ø63



Weight

Unit: kg

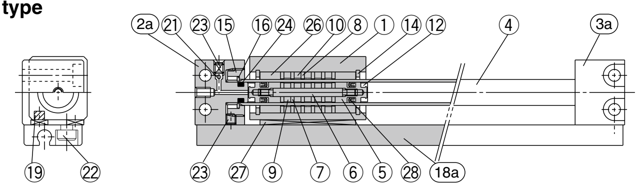
Bore size (mm)		6	10	15	20	25	32	40	50	63
Basic weight (at 0 st)	With switch rail	0.086	0.111	0.272	0.421	0.622	1.217	1.98	3.54	5.38
	Without switch rail	0.069	0.08	0.225	0.351	0.542	1.097	1.82	3.25	5.03
Additional weight per 50 mm of stroke	With switch rail	0.016	0.034	0.040	0.051	0.056	0.076	0.093	0.159	0.188
	Without switch rail	0.004	0.014	0.015	0.020	0.023	0.033	0.040	0.077	0.096

Calculation method/Example: **CY3R25-500** (with switch rail) Basic weight…0.622 (kg), Additional weight…0.056 (kg/50 st), Cylinder stroke…500 (st)
0.622 + 0.056 x 500 ÷ 50 = 1.182 (kg)

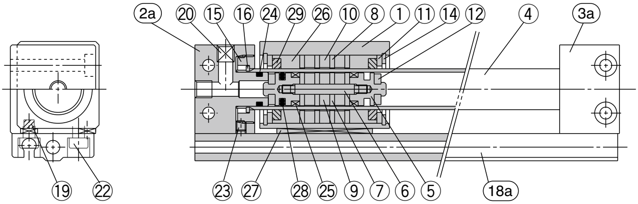
Construction

Both sides piping type

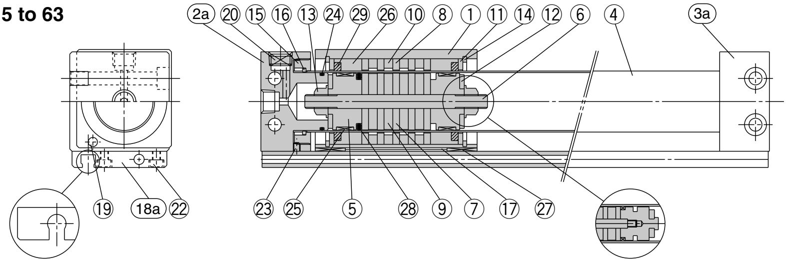
CY3R6



CY3R10



CY3R15 to 63



CY3R15, 20

CY3R15

Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Hard anodized
2a	**End cover A**	Aluminum alloy	
2b	**End cover C**	Aluminum alloy	
3a	**End cover B**	Aluminum alloy	
3b	**End cover D**	Aluminum alloy	
4	**Cylinder tube**	Stainless steel	
5	**Piston**	ø6: Brass ø10 to ø63: Aluminum alloy	ø6: Electroless nickel plated ø10 to ø63: Chromate
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**	—	
10	**Magnet B**	—	
11	**Spacer**	Aluminum alloy	ø6: not available
12	**Bumper**	Urethane rubber	
13	**Piston nut**	Carbon steel	Zinc chromate (ø6 to ø15: not available)
14	**Type C retaining ring for hole**	Carbon tool steel	Phosphate coated
15	**Attachment ring**	Aluminum alloy	Chromate
16	**Type C retaining ring for shaft**	Hard steel wire	
17	**Magnetic shielding plate**	Rolled steel plate	Chromated (ø6, ø10: not available)
18a	**Switch rail (both sides piping)**	Aluminum alloy	White anodized
18b	**Switch rail (centralized piping)**	Aluminum alloy	White anodized
19	**Magnet**	—	
20	**Hexagon socket head plug**	Chromium steel	Nickel plated
21	**Steel balls**	Chromium steel	ø40: Hexagon socket head plug ø20, ø50, ø63: None
22	**Hexagon socket head screw**	Chromium steel	Nickel plated
23	**Hexagon socket head set screw**	Chromium steel	Nickel plated
24 Note 2)	**Cylinder tube Gasket**	NBR	
25 Note 2)	**Wear ring A**	Special resin	ø6: not available
26 Note 2)	**Wear ring B**	Special resin	
27 Note 2)	**Wear ring C**	Special resin	
28 Note 2)	**Piston seal**	NBR	
29 Note 2)	**Lubretainer**	Special resin	ø6: not available
30 Note 2)	**Switch rail gasket**	NBR	Both sides piping type: None

Replacement Parts/Seal Kit

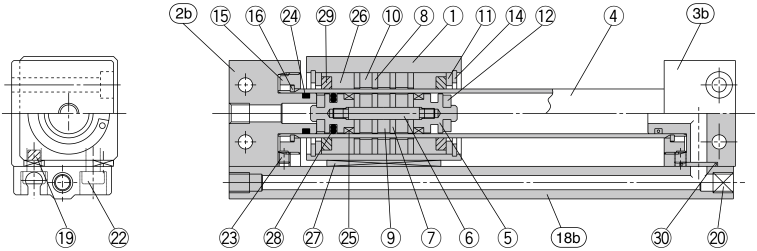
Bore size (mm)	Kit no.	Contents
6	CY3R6-PS	Set of nos. above ㉔, ㉖, ㉗, ㉘
10	CY3R10-PS	Set of nos. above ㉔, ㉖, ㉗, ㉘, ㉙, ㉚
15	CY3R15-PS	Set of nos. above ㉔, ㉕, ㉖, ㉗, ㉘, ㉙, ㉚
20	CY3R20-PS	
25	CY3R25-PS	
32	CY3R32-PS	
40	CY3R40-PS	
50	CY3R50-PS	
63	CY3R63-PS	

Note1) Seal kits are the same for both the both sides piping type and the centralized piping type.
Note2) Seal kits are sets consisting of numbers 24 through 30. Order using the kit number corresponding to each bore size.
Note3) For replacement of the ø10 wear ring A, contact SMC or your nearest sales representative.
∗ Seal kit includes a grease pack (ø6, ø10: 5 and 10 g, ø15 to ø63: 10 g). Order with the following part number when only the grease pack is needed.
Grease pack part number for ø6, ø10: GR-F-005 (5 g) For external sliding sections
GR-S-010 (10 g) For tubing interior
Grease pack part number for ø15 to ø63: GR-S-010 (10 g)

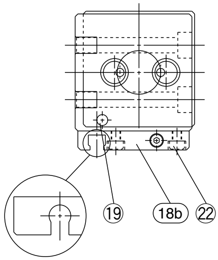
Construction

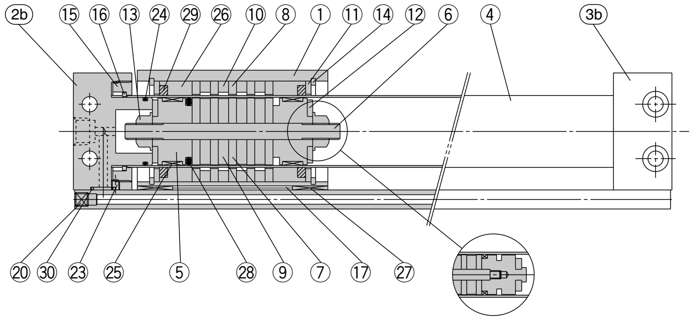
Centralized piping type

CY3RG10

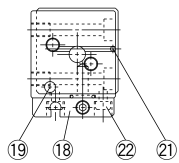


CY3RG15 to 63





CY3RG15, 20 **CY3RG15**



CY3RG15

Switch Rail Accessory

CYR **15** **E** **B** **(N)** – **100**

Bore size

Cylinder piping type

Nil	Centralized piping (CY3RG)
B	Both sides piping (CY3R)

Note) Only "B" for ø6.

Auto switch type (ø20 only)

Nil	For reed switch
N	For solid state switch

Stroke

Switch Rail Accessory Kit

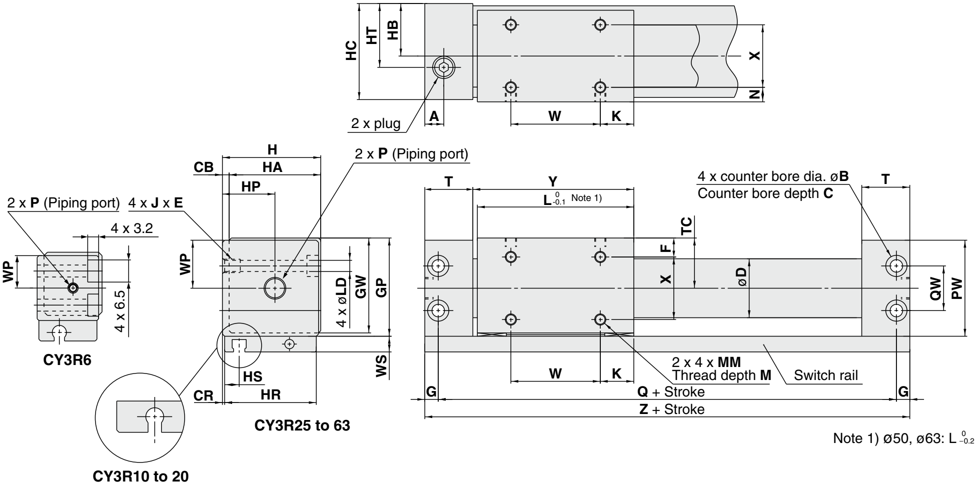
Bore size (mm)		Kit no. Both sides piping	Kit no. Centralized piping	Contents
6		CYR6EB-□	—	Numbers (18a), (18b), ⑲, ㉒, ㉗ above
10		CYR10EB-□	CYR10E-□	Numbers (18a), (18b), ⑲, ⑳, ㉒, ㉗ above
15		CYR15EB-□	CYR15E-□	Numbers ⑰, (18a), (18b), ⑳, ㉒, ㉗ above Note 2)
20	For reed switch	CYR20EB-□	CYR20E-□	Numbers ⑰, (18a), (18b), ⑳, ㉒, ㉗ above
20	For solid state switch	CYR20EBN-□	CYR20EN-□	
25		CYR25EB-□	CYR25E-□	
32		CYR32EB-□	CYR32E-□	
40		CYR40EB-□	CYR40E-□	
50		CYR50EB-□	CYR50E-□	
63		CYR63EB-□	CYR63E-□	

Note 1) □ indicates the stroke.
Note 2) A magnet is already built in for ø15.
Note 3) (18a) is attached on both sides piping.
Note 4) (18b) and ⑳ are attached on centralized piping.

Dimensions

Both sides piping type: ø6 to ø63

Note) This figure shows types with switch rail (Nil).



(mm)

Model	A	B	C	CB	CR	D	F	G	GP	GW	H	HA	HB	HC	HP	HR	HS	HT	J x E	K
CY3R6	7*	—*	—*	2	0.5	7.6	5.5	3*	20	18.5	19	17	10.5	18	10.5*	17	6	10.5*	M4 x 0.7 x 6	7
CY3R10	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	9
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
CY3R50	14	14	8.2	5	2	52.4*	17	8.5	83	81.5	85	80	45	84	45	80	9	45	M10 x 1.5 x 15	25
CY3R63	15	14	8.2	5	3	65.4*	18	8.5	95	93.5	97	92	51	96	51	90	9.5	51	M10 x 1.5 x 15	24

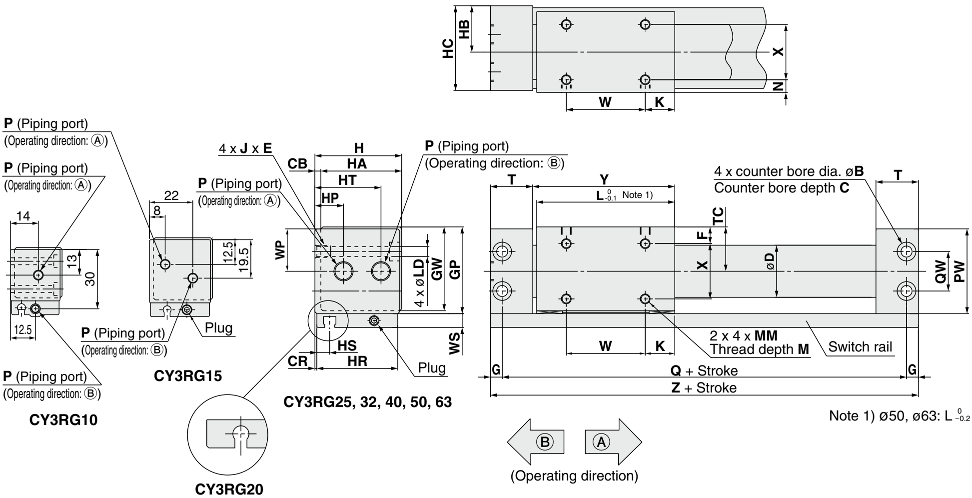
Model	L	LD	M	MM	N	PW	Q	QW	T	TC	W	WP	WS	X	Y	Z
CY3R6	34	3.5	3.5	M3 x 0.5	3.5	19	60*	10	14.5*	10.5	20	9.5	6	10	35.5	66*
CY3R10	38	3.5	4	M3 x 0.5	4.5	26	68	14	17.5	14	20	13	8	15	39.5	76
CY3R15	53	4.3	5	M4 x 0.7	6	32	84	18	19	17	25	16	7	18	54.5	94
CY3R20	62	5.4	5	M4 x 0.7	7	38	95	17	20.5	20	40	19	7	22	64	107
CY3R25	70	5.4	6	M5 x 0.8	6.5	43	105	20	21.5	22.5	40	21.5	7	28	72	117
CY3R32	76	7	7	M6 x 1	8.5	54	116	26	24	28	50	27	7	35	79	130
CY3R40	90	7	8	M6 x 1	11	64	134	34	26	33	60	32	7	40	93	148
CY3R50	110	8.6	10	M8 x 1.25	15	82	159	48	30	42	60	41	10	50	113	176
CY3R63	118	8.6	10	M8 x 1.25	16	94	171	60	32	48	70	47	10	60	121	188

Model	P (Piping port)		
	Nil	TN*	TF*
CY3R6	M3 x 0.5*	—	—
CY3R10	M5 x 0.8	—	—
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
CY3R50	Rc 1/4	NPT 1/4	G 1/4
CY3R63	Rc 1/4	NPT 1/4	G 1/4

Note 2) The astrisk denotes the dimensions which are different from the CY1R series.

Dimensions

Centralized piping type: ø10 to ø63



(mm)

Model	B	C	CB	CR	D	F	G	GP	GW	H	HA	HB	HC	HP	HR	HS	HT	J x E	K	L
CY3RG10	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	38
CY3RG15	8	4.2	2	0.5	16.6*	8	5	33	31.5	32	30	17	31	—	30	8.5	—	M5 x 0.8 x 7	14	53
CY3RG20	9.5	5.2	3	1	21.6*	9	6	39	37.5	39	36	21	38	11	36	7.5	28	M6 x 1 x 8	11	62
CY3RG25	9.5	5.2	3	1	26.4*	8.5	6	44	42.5	44	41	23.5	43	14.5	41	6.5	33.5	M6 x 1 x 8	15	70
CY3RG32	11	6.5	3	1.5	33.6*	10.5	7	55	53.5	55	52	29	54	20	51	7	41	M8 x 1.25 x 10	13	76
CY3RG40	11	6.5	5	2	41.6*	13	7	65	63.5	67	62	36	66	25	62	8	50	M8 x 1.25 x 10	15	90
CY3RG50	14	8.2	5	2	52.4*	17	8.5	83	81.5	85	80	45	84	32	80	9	56	M10 x 1.5 x 15	25	110
CY3RG63	14	8.2	5	3	65.4*	18	8.5	95	93.5	97	92	51	96	35	90	9.5	63.5	M10 x 1.5 x 15	24	118

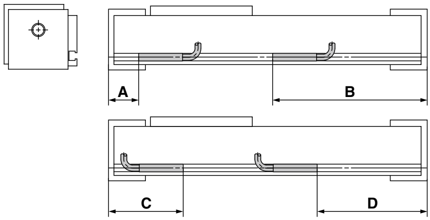
Model	LD	M	MM	N	PW	Q	QW	T	TC	W	WP	WS	X	Y	Z
CY3RG10	3.5	4	M3 x 0.5	4.5	26	68	14	17.5	14	20	13	8	15	39.5	76
CY3RG15	4.3	5	M4 x 0.7	6	32	84	18	19	17	25	16	7	18	54.5	94
CY3RG20	5.4	5	M4 x 0.7	7	38	95	17	20.5	20	40	19	7	22	64	107
CY3RG25	5.4	6	M5 x 0.8	6.5	43	105	20	21.5	22.5	40	21.5	7	28	72	117
CY3RG32	7	7	M6 x 1	8.5	54	116	26	24	28	50	27	7	35	79	130
CY3RG40	7	8	M6 x 1	11	64	134	34	26	33	60	32	7	40	93	148
CY3RG50	8.6	10	M8 x 1.25	15	82	159	48	30	42	60	41	10	50	113	176
CY3RG63	8.6	10	M8 x 1.25	16	94	171	60	32	48	70	47	10	60	121	188

Model	P (Piping port)		
	Nil	TN*	TF*
CY3RG10	M5 x 0.8	—	—
CY3RG15	M5 x 0.8	—	—
CY3RG20	Rc 1/8	NPT 1/8	G 1/8
CY3RG25	Rc 1/8	NPT 1/8	G 1/8
CY3RG32	Rc 1/8	NPT 1/8	G 1/8
CY3RG40	Rc 1/4	NPT 1/4	G 1/4
CY3RG50	Rc 1/4	NPT 1/4	G 1/4
CY3RG63	Rc 1/4	NPT 1/4	G 1/4

Note 2) The astrisk denotes the dimensions which are different from the CY1RG series.

Auto Switch Mounting

Auto Switch Proper Mounting Position for Stroke End Detection



(Reference dimension)

Auto Switch Proper Mounting Position

ø6 to ø20

(mm)

Bore size (mm) \ Auto switch model	A		B		C		D	
	D-A9□	D-M9□ D-M9□W D-M9□A	D-A9□	D-M9□ D-M9□W D-M9□A	D-A9□	D-M9□ D-M9□W D-M9□A	D-A9□	D-M9□ D-M9□W D-M9□A
6	26	30	46	42	46	42	26	30
10	28	32	48	44	48	44	—	32
15	17.5	21.5	76.5	72.5	—	—	56.5	60.5
20	19.5	23.5	87.5	83.5	39.5	35.5	67.5	71.5

Note 1) Auto switches cannot be installed in Area C in the case of ø15.
Note 2) D-A9□ type cannot be mounted on the section D of ø10.
Note 3) The above values are a guideline of the auto switch mounting position when detected at the stroke end. Adjust the auto switch after confirming the operating conditions in the actual setting.
Note 4) D-Z7□ and D-Y□ types cannot be mounted.

ø25 to ø63

(mm)

Bore size (mm) \ Auto switch model	A			B			C			D		
	D-A9□	D-M9□ D-M9□W D-M9□A	D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W D-Y7BA	D-A9□	D-M9□ D-M9□W D-M9□A	D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W D-Y7BA	D-A9□	D-M9□ D-M9□W D-M9□A	D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W D-Y7BA	D-A9□	D-M9□ D-M9□W D-M9□A	D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W D-Y7BA
25	19	23	18	98	94	99	42	38	43	75	79	74
32	22.5	26.5	21.5	107.5	103.5	108.5	45.5	41.5	46.5	84.5	88.5	83.5
40	24.5	28.5	23.5	123.5	119.5	124.5	47.5	43.5	48.5	100.5	104.5	99.5
50	28.5	32.5	27.5	147.5	143.5	148.5	51.5	47.5	52.5	124.5	128.5	123.5
63	30.5	34.5	29.5	157.5	153.5	158.5	53.5	49.5	54.5	134.5	138.5	133.5

Note 1) 50 mm is the minimum stroke available with 2 auto switches mounted.
Note 2) Figures in the table above are used as a reference when mounting the auto switches for stroke end detection. In the case of actually setting the auto switches, adjust them after confirming their operation.
Note 3) Auto switch brackets are required when ordering D-A9□/M9□/M9□W/M9□A types and cylinders separately. (Refer to the auto switch mounting bracket: part no. on page 1463.)

Auto Switch Operation Range

(mm)

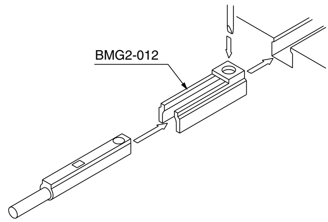
Auto switch model	Bore size (mm)								
	6	10	15	20	25	32	40	50	63
D-A9□	8	11	8	6	6	7	9	8	8
D-M9□ **D-M9□W** **D-M9□A**	4.5	6.5	4.5	5	5	5.5	5.5	6.5	7
D-Z7□/Z80	—	—	—	—	9	9	11	9	10
D-Y59□/Y7P/Y7□W/Y7BA	—	—	—	—	5	5	6	6	6

∗ The auto switches cannot be mounted in some cases.
∗ Since the operating range is provided as a guideline including hysteresis, it cannot be guaranteed (assuming approximately ±30% dispersion). It may vary substantially depending on an ambient environment.

Auto Switch Mounting Bracket/Part No.

Auto switch model	Bore size (mm)
	ø25 to ø63
D-A9□ **D-M9□** **D-M9□W** **D-M9□A**	BMG2-012

D-A9□/M9□/M9□W/M9□A



Other than the applicable auto switches listed in "How to Order", the following auto switches can be mounted.
For detailed specifications, refer to pages 1559 to 1673.

Type	Model	Electrical entry	Features	Applicable bore size
Reed auto switch	D-Z73, Z76	Grommet (In-line)	—	ø25 to ø63
	D-Z80		Without indicator light	
Solid state auto switch	D-Y59A, Y59B, Y7P	Grommet (In-line)	—	
	D-Y7NW, Y7PW, Y7BW		Diagnostic indication (2-color display)	
	D-Y7BA		Water resistant (2-color display)	

∗ With pre-wired connector is also available in solid state auto switches. For specifications, refer to pages 1626 and 1627.
∗ Normally closed (NC = b contact), solid state switch (D-F9G/F9H/Y7G/Y7H type) are also available. For details, refer to pages 1577 and 1579.
∗ Applicable bore sizes are ø25 to ø63.

CY3B CY3R
CY1S -Z
CY1L
CY1H
CY1F
CYP
D-□
-X□
Technical data

Series CY3B/CY3R
Made to Order: Individual Specifications 1

Please contact SMC for detailed dimensions, specifications, and lead times.

Made to Order

Applicable Series

No.	Symbol	Specifications/Description	Basic type **CY3B**	Direct mount type **CY3R**
1	**-X116**	Hydro specifications	●(ø25 to ø63)	●(ø25 to ø63)
2	**-X132**	Air supply port relocated in axial direction	●(ø6 to ø63)	—
3	**-X160**	High speed specifications	●(ø20 to ø63)	●(ø20 to ø63)
4	**-X168**	Helical insert thread specifications	●(ø20 to ø63)	—
5	**-X206**	Added mounting tap positions for slider	●(ø6 to ø63)	—
6	**-X210**	Non-lubricated exterior specifications	●(ø6 to ø63)	—
7	**-X322**	Outside of cylinder tube with hard chrome plated	●(ø15 to ø63)	●(ø15 to ø63)
8	**-X324**	Non-lubricated exterior specifications (with dust seal)	●(ø10 to ø63)	—
9	**-X1468**	Interchangeable with CY1□6	●(ø6)	●(ø6)

1 Hydro Specifications

Symbol **-X116**

This type is applicable for precision constant speed feed, intermediate stop and skip feed.

[Basic type] [Direct mount type]

CY3B / **CY3R** Bore size | Port thread type | – | Stroke | – **X116**

Hydro specifications

Specifications

Type	Basic type, Direct mount type
Bore size	Basic type CY3B25 to 63, CY3R25 to 63
Fluid	Turbine oil
Piston speed	15 to 300mm/s

Note) Piping is from each plate on both sides.

2 Air Supply Port Relocated in Axial Direction

Symbol **-X132**

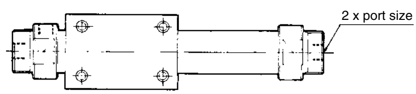
CY3B Bore size | Port thread type | – | Stroke | – **X132**

Air supply port relocated in axial direction

The air supply port has been changed to an axial position on the head cover.

Specifications

Applicable series	**CY3B**
Bore size	ø6 to ø63



The port size is the same as the standard type.

3 High Speed Specifications

Symbol **-X160**

CY3B / CY3R [Bore size] [Port thread type] – [Stroke] – X160

High speed specifications

This makes a high speed piston drive of 1,500 mm/s possible (basic type, without load), but it is not applicable for all conditions. Consult with SMC for the operating conditions, etc.

Specifications

Applicable series	CY3B/CY3R
Bore size	ø20 to ø63
Piston speed (no load)	1500 mm/s (MAX)

Note 1) When operating this cylinder at high speed, a shock absorber must be provided.
Note 2) For the CY3R, only the piping on both sides can be made.
Note 3) The piston speed may vary depending on the operating conditions. For details, contact SMC or your nearest sales representative.
Note 4) Speed tends to decrease over a period of time depending on the operating conditions. Apply grease periodically if necessary.

4 Helical Insert Thread Specifications

Symbol **-X168**

CY3B [Bore size] [Port thread type] – [Stroke] – X168

Helical insert thread specifications

Helical insert thread is used for standard mounting thread.

Specifications

Applicable series	CY3B
Bore size	CY3B: ø20 to ø63

5 Added Mounting Tap Positions for Slider

Symbol **-X206**

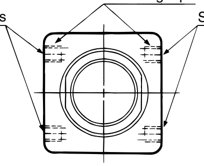
CY3B [Bore size] [Port thread type] – [Stroke] – X206

Added mounting tap positions for slider

Mounting taps have been added on the surface opposite the standard positions.

Specifications

Applicable series	CY3B
Bore size	ø6 to ø63



∗ Dimensions are the same as the standard product.

6 Non-lubricated Exterior Specifications

Symbol **-X210**

CY3B [Bore size] [Port thread type] – [Stroke] – X210

Non-lubricated exterior specifications

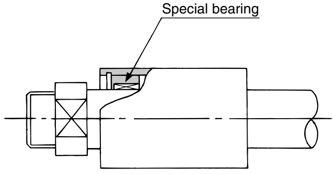
Suitable for environments where oil is not tolerated. A scraper is not installed. A separate version -X324 (with a felt dust seal) is available in cases in which dust, etc. is dispersed throughout the environment.

Specifications

Applicable series	CY3B
Bore size	ø6 to ø63

Construction

CY3B (Basic type)



Made to Order: Individual Specifications 2

Please contact SMC for detailed dimensions, specifications, and lead times.

Made to Order

7 Outside of Cylinder Tube with Hard Chrome Plated

Symbol **-X322**

CY3B
CY3R(G) [Bore size] [Port thread type] — [Stroke] — X322

Outside of cylinder tube with hard chrome plated

The cylinder tube outer circumference is plated with hard chrome, which further reduces bearing abrasion.

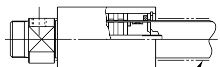
∗ Be sure to install a shock absorber to the stroke end.
Note 1) The maximum stroke is 3,500 st, or the maximum stroke for the standard type.
CY3R is compatible with the maximum stroke for the standard type.
Note 2) When exceeding 2,000 strokes, contact SMC separately.

Specifications

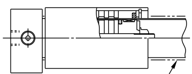
Applicable series	Bore size (mm)
∗CY3B·3R	ø15 to ø63

Construction/Dimensions

CY3B



CY3R



8 Non-lubricated Exterior Specifications (with Dust Seal)

Symbol **-X324**

CY3B [Bore size] [Port thread type] — [Stroke] — X324

Non-lubricated exterior specifications (with dust seal)

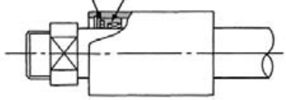
Non-lubricated exterior type with a felt dust seal on the cylinder body.

Specifications

Applicable series	Bore size (mm)
CY3B	ø10 to ø63

Construction

CY3B (Basic type)



9 Interchangeable with CY1□6

Symbol **-X1468**

CY3B
CY3R [Bore size] [Port thread type] — [Stroke] — X1468

Interchangeable with CY1□6

Can be interchanged with CY1□6.

Series *CY3B/CY3R*
Specific Product Precautions 1

Be sure to read before handling.
Refer to front matter 57 for Safety Instructions and pages 3 to 12 for Actuator and Auto Switch Precautions.

Handling

⚠ Warning

1. **Pay attention to the space between the head cover and the body.**
   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.**
   Applying an improper load may cause malfunctions.
3. **When the cylinder is used in a place where water or cutting oil may splash it or the lubrication on its sliding parts could be deteriorate, please consult with SMC.**
4. **When applying grease to the cylinder, use the grease that has already been applied to the product. Contact SMC for available grease packs.**

Mounting

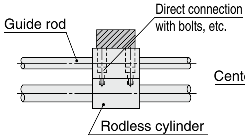
⚠ Caution

1. **Take care to avoid nicks or other damage on the outside surface of the cylinder tube.**
   This can lead to damage of the wear ring and lubretainer, which in turn can cause malfunction.
2. **Take care regarding rotation of the external slider.**
   Even when the rotation is controlled by connecting the external slider to other shaft (linear guide, etc.), keep it in the floating connection status.
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.

Mounting

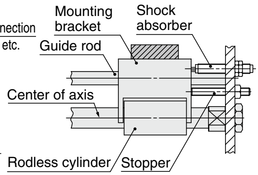
⚠ Caution

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. (Figure 1) 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 Figure 2.



Variations in the load and cylinder shaft alignment cannot be assimilated, resulting in malfunction.

Figure 1. Incorrect mounting
Note) The drawing shows the CY3B series.



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.

Figure 2. Recommended mounting

8. **Use caution regarding the allowable load mass when operating in a vertical direction.**
   The allowable load mass when operating in a vertical direction (reference values on page 1450) 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.).
9. **Careful alignment is necessary when connecting to a load having an external guide mechanism.**
   As the stroke becomes longer, variations in the center axis become larger. Consider using a connection method (floating mechamism) that is able to absorb these variations. Furthermore, use the special floating brackets (XC57) which have been provided for the CY3B and CY3R series (page 1796).

Series CY3B/CY3R
Specific Product Precautions 2

Be sure to read before handling.
Refer to front matter 57 for Safety Instructions and pages 3 to 12 for Actuator and Auto Switch Precautions.

Disassembly & Maintenance

⚠ Warning

1. Use caution as the attractive power of the magnets is very strong.

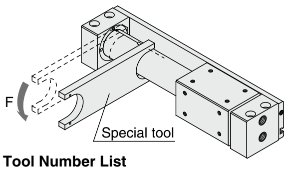
When removing the external slider and piston slider from the cylinder tube for maintenance, etc., handle with caution, since the magnets installed in each slider have very strong attractive power.

⚠ 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 Locktight (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

Part no.	Applicable bore size (mm)
CYRZ-V	6, 10, 15, 20
CYRZ-W	25, 32, 40
CYRZ-X	50
CYRZ-Y	63

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.

Disassembly & Maintenance

⚠ Caution

6. Note the direction of the external slider and piston slider.

Since the external slider and piston slider are directional for ø6 and ø10, 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 Figure 3. If they align as shown in Figure 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.

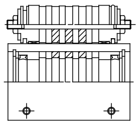


Figure 3. Correct position

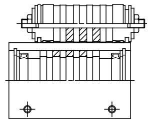


Figure 4. Incorrect position

For ø6 and ø10