Air Cylinder: With End Lock

Series CBA2

ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch CBA2 **L** ☐ **50** ☐ – **150** ☐ – **H** **N**

With auto switch CDBA2 **L** **50** ☐ – **150** ☐ – **H** **N** – **Y7BW** ☐

With auto switch

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
C	Single clevis style
D	Double clevis style
T	Center trunnion style

Tube material

Nil	Aluminum tube
F *	Steel tube

* Types with auto switch are not available.

Bore size

40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)

For more information, please refer to the next page.

Cylinder suffix

Rod boot	**Nil**	Without rod boot
	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	**Nil**	With cushion on both sides
	N	Without cushion

* When more than one symbol is to be specified, indicate them in alphabetical order.

Lock position

H	Head side end lock
R	Rod side end lock
W	Double end lock

Manual release type

N	Non-lock type
L	Lock type

Auto switch

Nil	Without auto switch

* Select an applicable auto switch part number from the table below.
* D-Z7☐/Z80/Y59☐/Y69☐/Y7☐☐ are not mounted and are supplied loose. (Only the switch mounting brackets for these models are mounted.)

Number of auto switches

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

Cylinders with Built-in Magnets

If built-in magnet type is ordered without auto switch, leave the field for the auto switch type blank. (Example) CDBA2L40-100-HN

Applicable Auto Switch/Refer to page 6-16-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model Tie-rod mount	Lead wire length (m)* 0.5 (Nil)	3 (L)	5 (Z)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	—	5 V	—	**Z76**	●	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	**Z73**	●	●	●	—	—	Relay, PLC
							100 V, 200 V	**A54**	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	**A59W**	●	●	—	—		
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	—	—	100 V, 200 V	**J51**	●	●	○	—	—	
					24 V	12 V	—	**Y59B**	●	●	○	○		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		**Y7NW**	●	●	○	○	IC circuit	
				3-wire (PNP)				**Y7PW**	●	●	○	○		
				2-wire		12 V		**Y7BW**	●	●	○	○	—	
	Water resistant (2-color indication)							**Y7BA**	—	●	○	○		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		**F59F**	●	●	○	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire		—		**P5DW**	—	●	●	○	—	

* Lead wire length symbols: 0.5 m ····· Nil (Example) A54
3 m ····· L (Example) A54L
5 m ····· Z (Example) A54Z

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

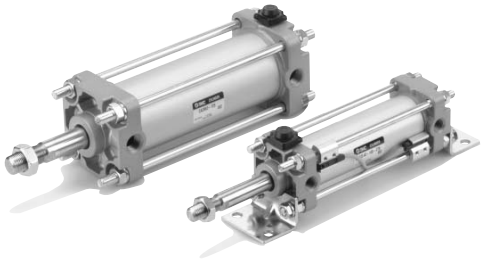
• In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 6-8-16.

Maintains the cylinder's original position even if the air supply is interrupted.

When air is discharged at the stroke end position, the lock engages to maintain the rod in that position.

Same dimensions as those of the standard cylinder (Series CA2)

Non-lock and lock types are standard for manual release.



Specifications

Fluid	Air
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.15 MPa*
Ambient and fluid temperature	Without auto switch: –10 to 70°C (With no freezing) With auto switch: –10 to 60°C (With no freezing)
Piston speed	50 to 500 mm/s
Cushion	Interchangeable
Thread tolerance	JIS Class 2
Stroke length tolerance	To 250 st: $^{+1.0}_{0}$ 251 to 1000 st: $^{+1.4}_{0}$ 1001 to 1500 st: $^{+1.8}_{0}$
Lubrication	Not required (Non-lube)
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Center trunnion style

* 0.05 MPa except locking parts.

Lock Specifications

Lock position	Head side end, Rod side end, Double end				
Holding force (Max.) (N)	ø40	ø50	ø63	ø80	ø100
	860	1340	2140	3450	5390
Backlash	2 mm or less				
Manual release	Non-lock type, Lock type				

Accessory /For more information, refer to page 6-8-13.

Accessory / Mounting	Standard			Option		
	Rod end nut	Clevis pin	Lock release bolt (N type only)	Single knuckle joint	Double knuckle joint (With pin)	Rod boot
Basic style	●	—	●	●	●	●
Axial foot style	●	—	●	●	●	●
Rod side flange style	●	—	●	●	●	●
Head side flange style	●	—	●	●	●	●
Single clevis style	●	—	●	●	●	●
Double clevis style *	●	●	●	●	●	●
Center trunnion style	●	—	●	●	●	●

* Double clevis and double knuckle joint types are packed with pin, cotter pin and flat washer.

Made to Order Specifications

(For details, refer to page 6-8-63.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB5 *1	Oversized rod
-XB6	Heat resistant (150°C)
-XC4 *1	With heavy duty scraper
-XC6 *1	Piston rod, rod end nut made of stainless steel
-XC7	Tie-rod, cushion valve, and tie-rod nut made of stainless steel
-XC8 *1	Adjustable stroke/Extension adjustment
-XC9 *2	Adjustable stroke/Retraction adjustment
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC22	Fluoro rubber seal
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC28	Compact flange made of SS400
-XC29	Double knuckle joint with spring pin
-XC35 *1	With coil scraper

*1: For head side end lock type only
*2: For rod side end lock type only

Standard Stroke

Bore size (mm)	Standard stroke (mm)
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
50, **63**	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600
80, **100**	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700

* Types with auto switch have different minimum strokes. Please refer to page 6-8-14.

Rod Boot Material

Symbol	Rod boot materials	Max. ambient temperature
J	Nylon tarpaulin	70°C
K	Neoprene cross	110°C*

* Maximum ambient temperature for the rod boot itself.

Minimum Stroke for Auto Switch Mounting

⚠ Caution

1.The minimum stroke for mounting varies with the auto switch type and mounting style of the cylinder. In particular, the center trunnion style needs careful attention. (For more information, please refer to page 6-8-14.)

Weight/Aluminum Tube (Steel tube)

(kg)

Bore size (mm)		40	50	63	80	100
Basic weight	Basic style	0.89 (0.94)	1.36 (1.40)	2.00 (2.04)	3.48 (3.63)	4.87 (5.07)
	Axial foot style	1.08 (1.13)	1.58 (1.62)	2.34 (2.38)	4.15 (4.30)	5.86 (6.06)
	Flange style	1.26 (1.30)	1.81 (1.86)	2.79 (2.84)	4.93 (5.08)	6.79 (6.99)
	Single clevis style	1.12 (1.17)	1.70 (1.74)	2.63 (2.67)	4.59 (4.74)	6.65 (6.86)
	Double clevis style	1.16 (1.21)	1.79 (1.84)	2.79 (2.83)	4.88 (5.03)	7.17 (7.38)
	Trunnion style	1.25 (1.35)	1.84 (1.94)	2.80 (3.00)	5.03 (5.32)	7.15 (7.54)
Additional weight per each 50 mm stroke	All mounting brackets (Except steel tube trunnion)	0.22 (0.28)	0.28 (0.35)	0.37 (0.43)	0.52 (0.70)	0.65 (0.87)
	Steel tube trunnion	(0.36)	(0.46)	(0.65)	(0.86)	(1.07)
Accessory	Single knuckle	0.23	0.26	0.26	0.60	0.83
	Double knuckle (With pin)	0.37	0.43	0.43	0.87	1.27

∗ Values inside the parentheses are those for the steel tube type.

Lock Unit Additional Weight

(kg)

Bore size (mm)		40	50	63	80	100
Manual release Non-lock type (N)	Head side end lock (H)	0.02	0.03	0.03	0.10	0.12
	Rod side end lock (R)	0.02	0.02	0.02	0.07	0.06
	Double end lock (W)	0.04	0.05	0.05	0.17	0.18
Manual release lock type (L)	Head side end lock (H)	0.04	0.05	0.05	0.13	0.15
	Rod side end lock (R)	0.04	0.04	0.04	0.10	0.09
	Double end lock (W)	0.08	0.09	0.09	0.23	0.24

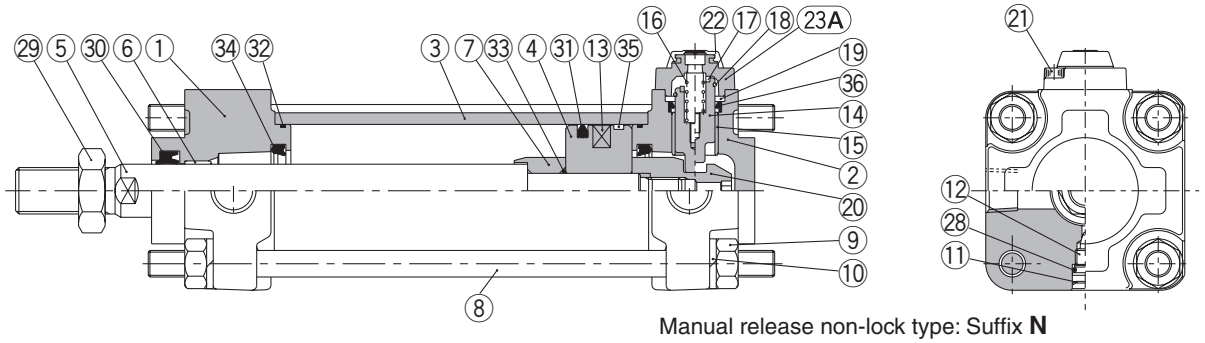
Calculation: (Example) CBA2L40-100-HN
- Basic weight····· 1.08kg (ø40 Axial foot style)
- Additional weight····· 0.22/50 st
- Cylinder stroke····· 100 st
- Lock weight····· 0.02 kg

(Head side end lock, Manual release, Non-lock)
1.08 + 0.22 x 100/50 + 0.02 = 1.54 kg

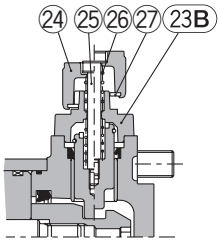
The minimum stroke for auto switch mounting, proper auto switch mounting position and height, operating range, applicable auto switches, auto switch mounting brackets and their part numbers, and bracket part numbers are the same as those for the double acting single rod type of Series CA2.

Construction

Head side end lock



Manual release non-lock type: Suffix **N**



Manual release lock type: Suffix **L**

Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum die-casted	Metallic painted
②	Head cover	Aluminum die-casted	Metallic painted
③	Cylinder tube	Aluminum alloy	Hard anodized
④	Piston	Aluminum alloy	Chromated
⑤	Piston rod	Carbon steel	Hard chromium electroplated
⑥	Bushing	Lead-bronze casted	
⑦	Cushion ring A	Rolled steel	Electroless nickel plated
⑧	Tie-rod	Carbon steel	Corrosion resistant chromated
⑨	Tie-rod nut	Rolled steel	Nickel plated
⑩	Spring washer	Steel wire	Chromated
⑪	Snap ring	Spring steel	
⑫	Cushion valve	Steel wire	Nickel plated
⑬	Rubber magnet*	NBR	With auto switch*
⑭	Lock piston	Carbon steel	Quench hard chrome plated
⑮	Lock bushing	Lead-bronze casted	
⑯	Lock spring	Stainless steel	
⑰	Bumper	Urethane	
⑱	C-ring	Steel wire	Zinc chromated
⑲	Seal retainer	Rolled steel	Zinc chromated
⑳	Cushion ring nut	Chromium molybdenum steel	Quench hard chrome plated
㉑	Hexagon socket head cap screw	Chromium molybdenum steel	Black zinc chromated
㉒	Rubber cap	Chloroprene rubber	
㉓A	Cap A	Aluminum casted	Black coated
㉓B	Cap B	Carbon steel	Black coated, Tufftride

No.	Description	Material	Note
㉔	M/O knob	Zinc die-casted	Black coated
㉕	M/O bolt	Chromium molybdenum steel	Black zinc chromated
㉖	M/O spring	Steel wire	Zinc chromated
㉗	Stopper ring	Carbon steel	Zinc chromated
㉘	Cushion valve seal	NBR	
㉙	Rod end nut	Rolled steel	Nickel plated
㉚	Rod seal	NBR	
㉛	Piston seal	NBR	
㉜	Cylinder tube gasket	NBR	
㉝	Piston gasket	NBR	
㉞	Cushion seal	NBR	
㉟	Wear ring	Resin	
㊱	Lock piston seal	NBR	

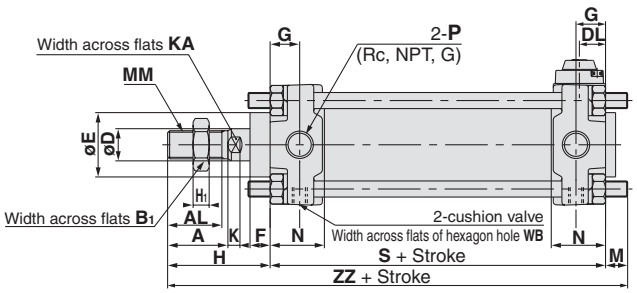
Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.		Content
	Single end lock	Double end lock	
40	MBB40-PS	MBB40-PS-W	Consists of numbers ㉚, ㉛, ㉜, ㉞, and ㊱ above.
50	MBB50-PS	MBB50-PS-W	
63	MBB63-PS	MBB63-PS-W	
80	MBB80-PS	MBB80-PS-W	
100	MBB100-PS	MBB100-PS-W	

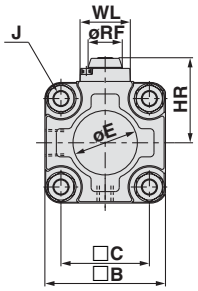
The seal kits consist of items ㉚, ㉛, ㉜, ㉞ and ㊱.
Please order them by using the seal kit number corresponding to each bore size.

Basic Style (Dimensions are common to rear end lock, front end lock and double end lock types.)

Head side end lock: CBA2B Bore size – Stroke -HN



Manual release (Non-lock type): Suffix **N**



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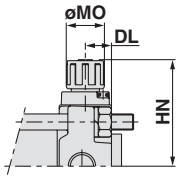
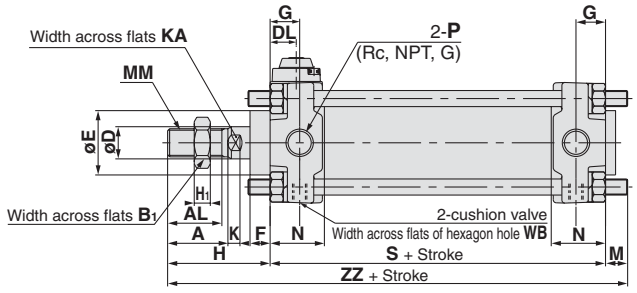
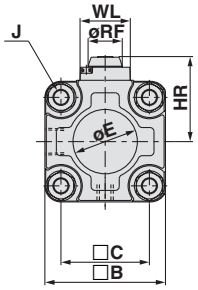


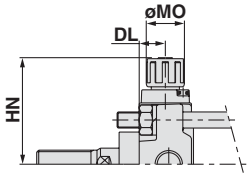
Rod side end lock: CBA2B Bore size – Stroke -RN



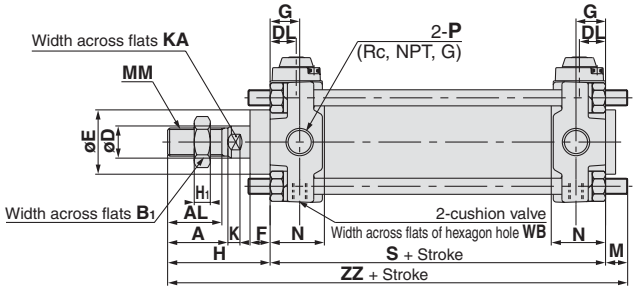
Manual release (Non-lock type): Suffix **N**



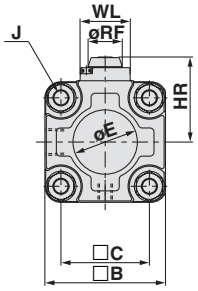
Manual release (Lock type): Suffix **L**



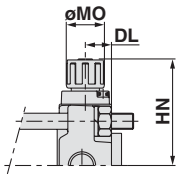
Double lock: CBA2B Bore size – Stroke -WN



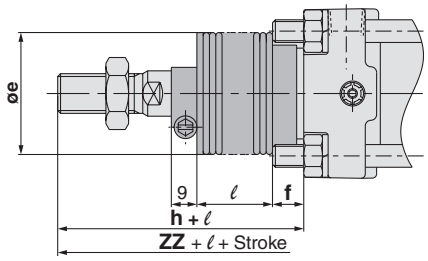
Manual release (Non-lock type): Suffix **N**



Manual release (Lock type): Suffix **L**



With rod boot



Bore size (mm)	Stroke range	A	AL	□B	B1	□C	D	DL	E	F	G	H	H1	HR	HN (MAX)	J	K	KA	M	MM	MO	N	P	RF	S	WB	WL	ZZ
40	up to 500	30	27	60	22	44	16	13	32	10	15	51	8	42.3	56	M8 x 1.25	6	14	11	M14 x 1.5	19	27	1/4	17	84	2.5	25	146
50	up to 600	35	32	70	27	52	20	13	40	12	17	58	11	47.3	61	M8 x 1.25	7	18	11	M18 x 1.5	19	30	3/8	17	90	2.5	25	159
63	up to 600	35	32	85	27	64	20	15.5	40	10	17	58	11	54.8	68.5	M10 x 1.25	7	18	14	M18 x 1.5	19	31	3/8	17	98	4	25	170
80	up to 750	40	37	102	32	78	25	18.5	52	14	21	71	13	65.8	80.5	M12 x 1.75	11	22	17	M22 x 1.5	23	37	1/2	21	116	4	40	204
100	up to 750	40	37	116	41	92	30	20	52	14	21	72	16	72.8	87.5	M12 x 1.75	11	26	17	M26 x 1.5	23	40	1/2	21	126	4	40	215

∗ For more information about the rod end nut and accessories, refer to page 6-8-13.

With Rod Boot

Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	ZZ
40	20 to 500	43	11.2	59	1/4 stroke	154
50	20 to 600	52	11.2	66	1/4 stroke	167
63	20 to 600	52	11.2	66	1/4 stroke	178
80	20 to 750	65	12.5	80	1/4 stroke	213
100	20 to 750	65	14	81	1/4 stroke	224

Dimensions of the mounting brackets are the same as those of the standard double acting single rod type. Refer to pages 6-8-8 to 11.

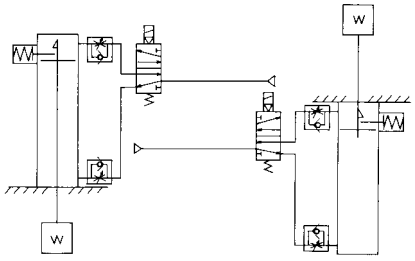
⚠Precautions

Be sure to read before handling. Refer to pages 6-20-3 to 6 for Safety Instructions and Actuator Precautions.

Use the Recommended Pneumatic Circuit.

⚠ Caution

They are required to engage and disengage the locks correctly.



Head side end lock Rod side end lock

Operation

⚠ Caution

1. Do not use a 3 position solenoid valve.
Avoid using this cylinder in combination with a 3 position solenoid valve (particularly the closed center metal seal type). If air pressure becomes sealed inside the port on the side that contains the lock mechanism, the lock will not engage. Even if the lock is engaged at first, the air that leaks from the solenoid valve could enter the cylinder and cause the lock to disengage as time elapses.

2. Back pressure is required when releasing the lock.
Before starting, make sure that air is supplied to the side that is not equipped with a lock mechanism as shown in the diagram above (or the side on which the piston rod is unlocked, if both sides are equipped with a lock). Otherwise, the lock may not disengage.

3. Release the lock when mounting or adjusting the cylinder.
The lock may not disengage if the cylinder is installed with its lock engaged.

4. Operate with a load ratio of 50% or less.
The lock may not disengage or may become damaged if the load exceeds 50%.

5. Do not operate multiple synchronized cylinders.
Avoid applications in which two or more end lock cylinders are synchronized to move one work piece, as one of the cylinder locks may not be disengaged when required.

6. Use a speed controller with meter-out control.
If operated under meter-in control, the lock may not disengage.

7. Be sure to operate completely to the cylinder stroke end on the side with the lock.
The lock may not engage or disengage if the piston in the cylinder has not reached the stroke end.

Operating Pressure

⚠ Caution

1. Supply air pressure of 0.15 MPa or higher to the port on the side that has the lock mechanism, as it is necessary for disengaging the lock.

Exhaust Speed

⚠ Caution

1. When the pressure on the side with the lock mechanism drops to 0.05 MPa or below, the lock engages automatically. If the piping on the side with the lock mechanism is thin and long, or if the speed controller is away from the cylinder port, the lock engagement may take some due to decline of the exhaust speed. The same result will be caused by clogging of the silencer installed at the EXH port of the solenoid valve.

Relation to Cushion

⚠ Caution

1. When the cushion valve on the side with the lock mechanism is fully closed or almost closed, the piston rod may not be able to reach the stroke end, resulting in lock engagement failure. Furthermore, if the lock becomes engaged while the cushion valve is almost fully closed, it may become impossible to be disengaged. Therefore, the cushion valve must be adjusted properly.

Releasing the Lock

⚠ Caution

1.To disengage the lock, make sure to supply air pressure to the port on the side without a lock mechanism, thus preventing the load from being applied to the lock mechanism. (Refer to the recommended air pressure circuit.) If the lock is disengaged, while the port on the side without a lock mechanism is in the exhausted state and the load is being applied to the lock mechanism, undue force may be applied to the lock mechanism, causing the lock mechanism to be damaged. Also, it could be extremely dangerous, because the piston rod could move suddenly.

Manual Release

⚠ Caution

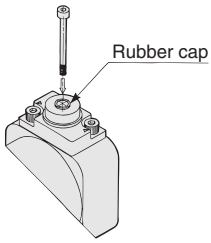
1. Non-lock type manual release

Insert the bolt, which is provided as an accessory part, through the rubber cap (it is not necessary to remove the rubber cap). Screw the bolt into the lock piston and pull the bolt to disengage the lock. Releasing the bolt will re-engage the lock.

The bolt size, pulling force, and the stroke are listed below.

Bore size (mm)	Thread size	Pulling force	Stroke (mm)
40, **50**, **63**	M3 x 0.5 x 30ℓ or more	10 N	3
80, **100**	M5 x 0.8 x 40ℓ or more	24.5 N	3

* Remove the bolt for normal operation.
* It can cause lock malfunction or faulty release.

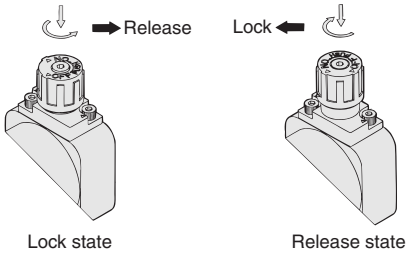


2. Manual release lock type

Push the M/O knob and turn it 90° counterclockwise. The lock disengages when the ▲ mark on the cap is aligned with the ▼ OFF mark on the M/O knob (and the lock will remain disengaged).

To engage the lock, push the M/O knob all the way in and turn it 90° clockwise to align the ▲ mark on the cap with the ▼ ON mark on the M/O knob. At this time, make sure that the knob stops by clicking into place.

Failure to click it into place properly can cause the lock to disengage.



Lock state Release state

Air Cylinder: With End Lock

Series CBJ2

ø16

How to Order

Cylinder stroke (mm)

ø16	15, 30, 45, 60, 75, 100, 125, 150, 175, 200

* Intermediate strokes are available in 1 mm increments without stroke adjustment with a spacer.
* For types with auto switch, refer to Minimum Strokes for Auto Switch Mounting on page 6-3-78.

Mounting Style

B	Basic style
L	Axial foot style
F	Rod side flange style
D	Double clevis style Note)

Note) Front end lock only.

Lock position

H	Head end lock
R	Rod end lock

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDJ2B16-45-A
	Band mounting style	CDJ2B16-60-B

* For rail mounting style, screws and nuts for 2 pcs. switches come with the rail.

Without auto switch **CBJ2 L 16—60 H N**

With auto switch **CDBJ2 L 16—60 H N —J79W**

Built-in magnet

Manual release

N	Non-locking type

Auto switch

* Refer to the table below for applicable auto switch.
* Rail mounting type auto switches are not mounted and are supplied loose at the time of shipment.
** For cylinders with built-in magnet and without auto switch, refer to How to Order for cylinders with built-in magnet.

Number of auto switches

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

Applicable Auto Switch/Refer to page 6-16-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Band mounting	Auto switch model: Rail mounting: Perpendicular	Auto switch model: Rail mounting: In-line	Lead wire length (m): 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	5 V	—	C76	—	A76H	●	●	—	—	—	IC circuit	
				2-wire	—	200 V	—	A72	A72H	●	●	—	—	—	—	Replay, PLC
					24 V 12 V	200 V	C73	A73	A73H	●	●	●	—	—		
		Connector				—	C73C	A73C	—	●	●	●	●	—		
	Diagnostic indication (2-color)	Grommet				—	—	A79W **	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	H7A1	F7NV	F79	●	●	○	—	○	IC circuit	Replay, PLC
				3-wire (PNP)			H7A2	F7PV	F7P	●	●	○	—	—		
				2-wire		12 V	H7B	F7BV	J79	●	●	○	—	○	—	
		Connector					H7C	J79C	—	●	●	●	●	—		
	Diagnostic indication (2-color)	Grommet		3-wire (NPN)		5 V, 12 V	H7NW	F7NWV	F79W	●	●	○	—	○	IC circuit	
				3-wire (PNP)			H7PW	—	F7PW	●	●	○	—	○		
				2-wire		12 V	H7BW	F7BWV	J79W	●	●	○	—	○	—	
	Water resistant (2-color)						H7BA	—	F7BA	—	●	○	—	○		
							—	F7BAV	—	—	●	○	—	—		
	Diagnostic output (2-color)					5 V,12 V	H7NF	—	F79F	●	●	○	—	○	IC circuit	

* Lead wire length symbols: 0.5 m ····· Nil (Example) C73C
3 m ····· L (Example) C73CL
5 m ····· Z (Example) C73CZ
None ····· N (Example) C73CN

* Solid state switches marked with "○" are manufactured upon receipt of order.
** Model D-A79W cannot be mounted on a ø10 cylinder with air cushion.

• In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 6-3-78.

Series CJ2 air cylinder is equipped with end lock function.

Maintains the cylinder's original position even if the air supply interrupted.

When air is discharged at the stroke end position, the lock engages to maintain the rod in that position.

Specifications

Action	Double acting, Single rod
Fluid	Air
Proof pressure	1.05 MPa
Maximum operating pressure	0.7 MPa
Minimum operating presuure	0.06 MPa
Ambient and fluid temperature	Without auto switch: –10˚C to 70˚C With auto switch: –10˚C to 60˚C*
Cushion	Rubber bumper
Lubrication	Not required (Non-lube)
Thread tolerance	JIS Class 2
Stroke tolerance	$^{+1.0}_{0}$
Piston speed	50 to 750 mm/s
Allowable kinetic energy	0.090 J

* With no freezing

Lock Specifications

Lock position	Head end, Rod end
Holding force (Max.)	98 N
Lock release pressure	0.15 MPa or less
Backlash	1 mm or less
Manual release	Non-locking type

Standard Stroke

Bore size (mm)	Standard stroke
16	15, 30, 45, 60, 75, 100, 125, 150, 175, 200

* Intermediate strokes are available in 1 mm increments without stroke adjustment with a spacer.

Minimum Strokes for Auto Switch Mounting

Auto switch mounting style	Auto switch model	Number of auto switches	Min. cylinder stroke (mm)
Band mounting style (ø16)	D-C7□ D-C80	3 (Same side)	90
		3 (Different sides)	55
		2 (Same side)	50
		2 (Different sides)	15
		1	10
	D-H7□ D-H7□W D-H7BAL D-H7NF	3 (Same side)	105
		3 (Different sides)	60
		2 (Same side)	60
		2 (Different sides)	15
		1	10
	D-C73C D-C80C D-H7C	3 (Same side)	105
		3 (Different sides)	65
		2 (Same side)	65
		2 (Different sides)	15
		1	10

Auto switch mounting style	Auto switch model	Number of auto switches	Min. cylinder stroke (mm)
Rail mounting style (ø16)	D-A7□ D-A80 D-A73C D-A80C	3	35
		2	10
		1	5
	D-A7□H D-A80H	3	45
		2	10
		1	5
	D-A79W	3	40
		2	15
		1	10
	D-F7□ D-J79	3	45
		2	5
		1	5
	D-F7□V D-J79C	3	30
		2	5
		1	5
	D-F7□W D-J79W D-F7BAL D-F79F	3	55
		2	15
		1	10
	D-F7□WV D-F7BAVL	3	40
		2	15
		1	10

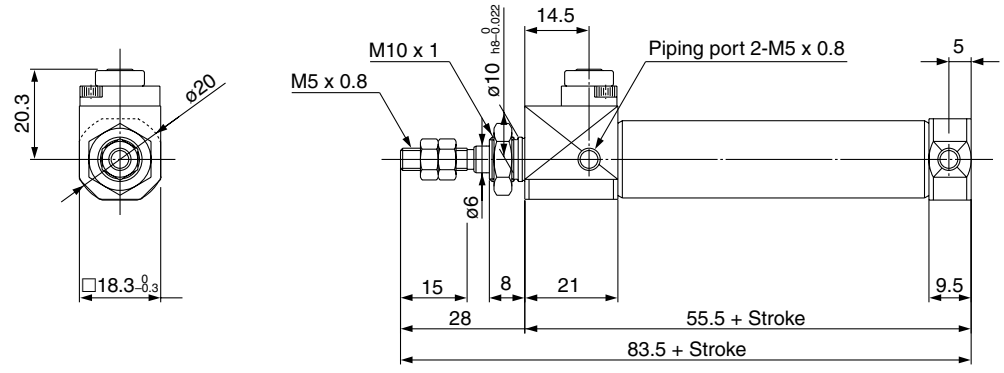
Other than the applicable auto switches listed in "How to Order", the following auto switches can be mounted. For detailed specifications, refer to page 6-16-1.

Type	Model	Electrical entry	Features
Reed switch	D-A80	Grommet	Without indicator light
	D-A80H		
	D-A80C	Connector	
	D-C80	Grommet	
	D-C80C	Connector	
Solid state switch	D-F7NTL	Grommet	With timer

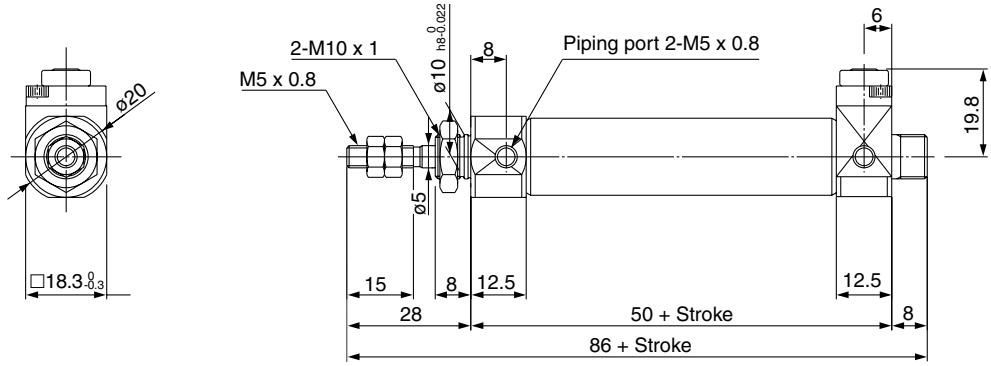
* D-F7NTL is also available with pre-wire connector.

Dimensions

Basic style
With rod end lock: C□BJ2B16-□-RN

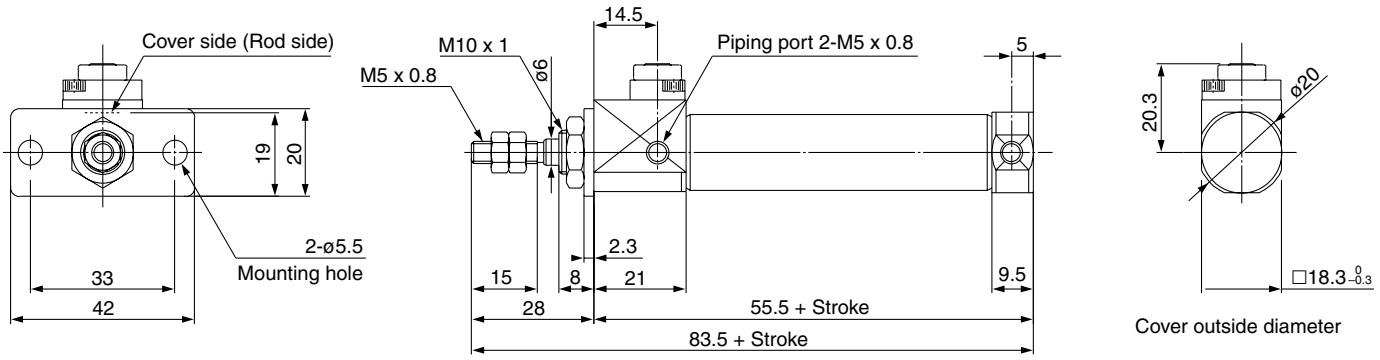


With head end lock: C□BJ2B16-□-HN

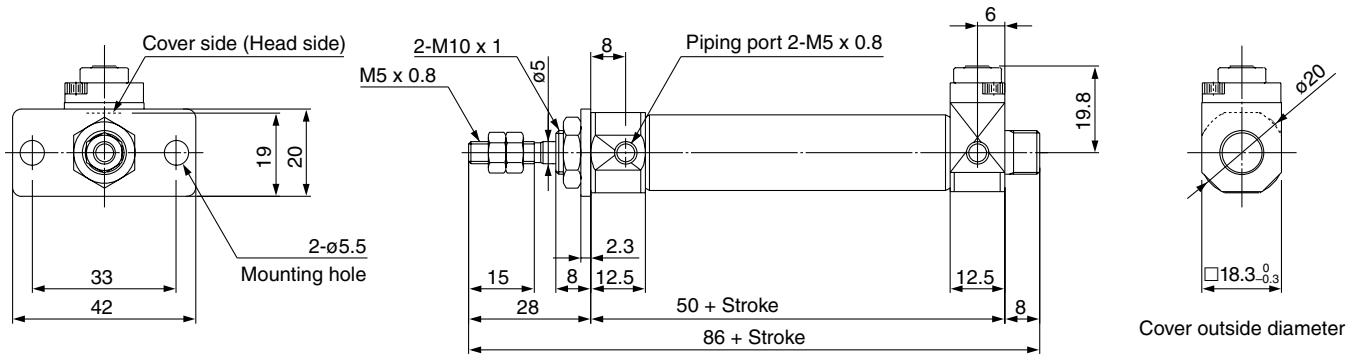


Dimensions

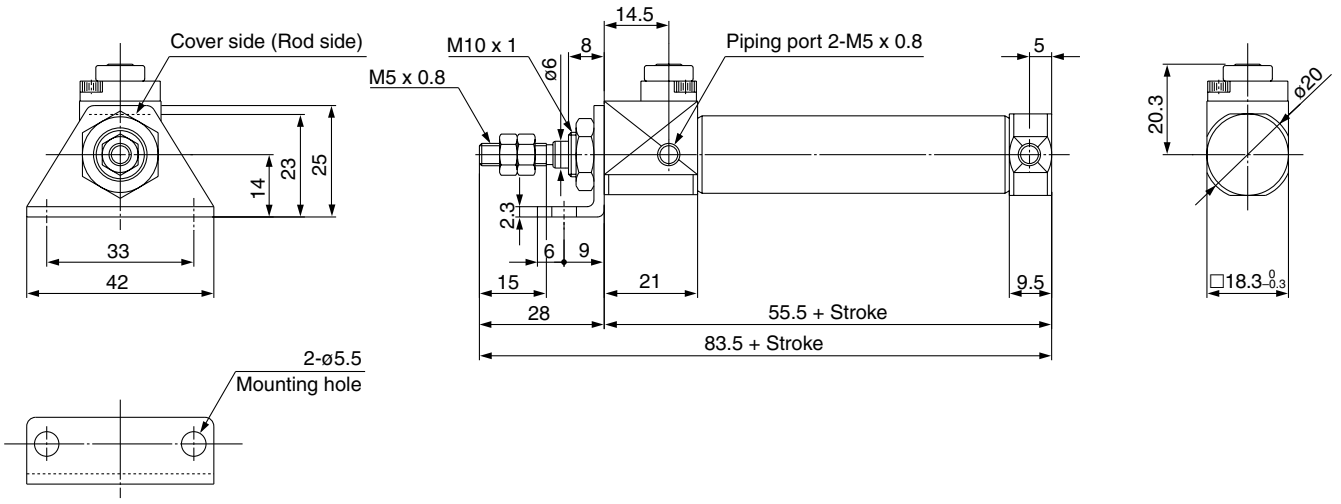
Flange style
With rod end lock: C□BJ2F16-□-RN



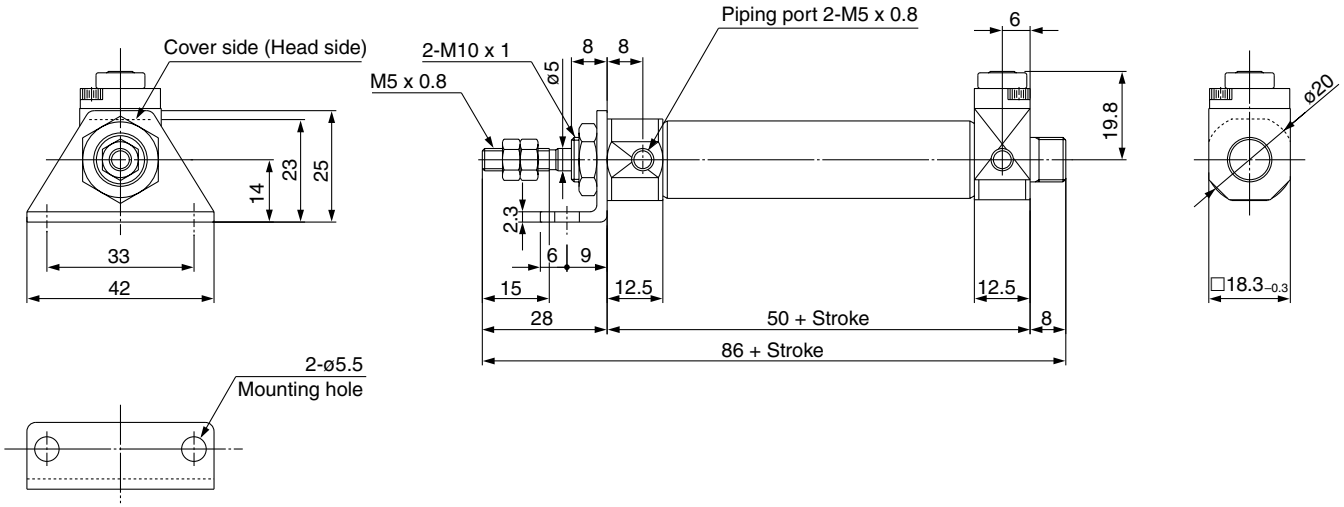
With head end lock: C□BJ2F16-□-HN



Axial foot style
With rod end lock: C□BJ2L16-□□-RN

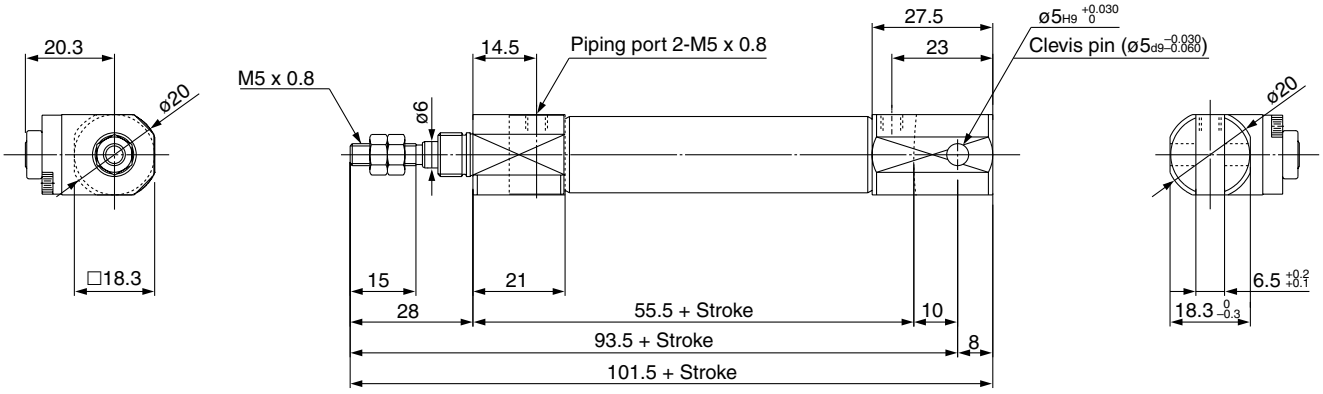


With head end lock: C□BJ2L16-□□-HN



Dimensions

Double clevis style
With rod end lock: C□BJ2D16-□-RN



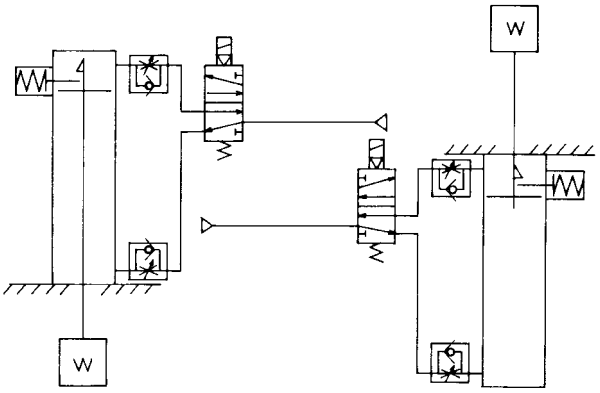
⚠ Precautions

Be sure to read before handling. Please consult with SMC for products outside these specifications.

Use Recommended Air Pressure Circuit.

⚠ Caution

• It is necessary for proper locking and unlocking.



With rear lock | With front lock

Operating Precautions

⚠ Caution

1. **Do not use a 3 position solenoid valve.**
   Avoid using this cylinder in combination with a 3 position solenoid valve (particularly the closed center metal seal type). If air pressure becomes sealed inside the port on the side that contains the lock mechanism, the lock will not engage. Even if the lock is engaged at first, the air that leaks from the solenoid valve could enter the cylinder and cause the lock to disengage as time elapses.
2. **Back pressure is necessary for unlocking.**
   Before starting, make sure that air is supplied to the side that is not equipped with a lock mechanism as shown in the diagram above. Otherwise, the lock may not disengage.
   (Refer to “Rock Disengagement”.)
3. **Disengage the lock before installing or adjusting the cyliner.**
   The lock could become damaged if the cylinder is installed with its lock engaged.
4. **Operate the cylinder at a load ratio of 50% or less.**
   The lock might not disengage or might become damaged if a load ratio of 50% is exceeded.
5. **Do not synchronize multiple cylinders.**
   Do not operate two or more end lock cylinders synchronized to move a single workpiece because one of the cylinder locks may not be able to disengage when required.
6. **Operate the speed controller under meter-out control.**
   If operated under meter-in control, the lock might not disengage.
7. **On the side that has a lock, make sure to operate at the stroke end of the cylinder.**
   The lock might not engage or disengage if the piston of the cylinder has not reached the stroke end.
8. **The position adjustment of the auto switch should be performed at two positions; a position determined by the stroke and a position after the backlash movement (by 1 mm).**
   When a 2-color indication switch is adjusted to show green at the stroke end, the indication may turn red when the cylinder returns by the backlash. This, however, is not an error.

Operating Pressure

⚠ Caution

Supply air pressure of 0.15 MPa or higher to the port on the side that has the lock mechanism, as it is necessary for disengaging the lock.

Exhaust Air Speed

⚠ Caution

The lock will engage automatically if the air pressure at the port on the side that has the lock mechanism becomes 0.05 MPa or less. Be aware that if the piping on the side that has the lock mechanism is narrow and long, or if the speed controller is located far from the cylinder port, the exhaust air speed could become slower, involving a longer time for the lock to engage. A similar result will ensure if the silencer that is installed on the exhaust port of the solenoid valve becomes clogged.

Lock Disengagement

⚠ Warning

To disengage the lock, make sure to supply air pressure to the port on the side without a lock mechanism, thus preventing the load from being applied to the lock mechanism. (Refer to the recommended air pressure circuit.) If the lock is disengaged when the port on the side that does not contain a lock mechanism is in the exhausted state and the load is being applied to the lock mechanism, undue force will be applied to the lock mechanism, and it may damage the lock mechanism. Also, it could be extremely dangerous, because the piston rod could move suddenly.

Manual Disengagement

⚠ Caution

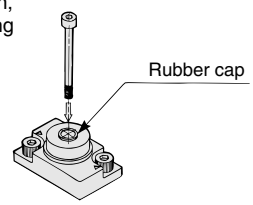
Non-locking style manual release

Insert the bolt, which is provided as an accessory part, through the rubber cap (it is not necessary to remove the rubber cap). Screw the bolt into the lock piston and pull the bolt to disengage the lock. Releasing the bolt will re-engage the lock.

The bolt size, pulling force, and the stroke are listed below.

Bore size (mm)	Thread size	Pulling force	Stroke (mm)
16	M2.5 x 0.45 x 25ℓ or more	4.9	2

Bolt should be detached under normal operation, otherwise it may cause malfunction of the locking feature.



Air Cylinder: With End Lock

Series CBM2

ø20, ø25, ø32, ø40

How to Order

Without auto switch CBM2 **L 40 150 H N**

With auto switch CDBM2 **L 40 150 H N H7BW**

Built-in magnet

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
C	Single clevis style
D	Double clevis style
U	Rod side trunnion style
T	Head side trunnion style

Bore size

20	20 mm
25	25 mm
32	32 mm
40	40 mm

Cylinder stroke (mm)

(Refer to "Standard Stroke" on page 6-4-92.)

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.

Manual release type

N	Non-lock type
L	Lock type

Lock position

H	Head end lock
R	Rod end lock
W	Double end lock

Cushion

Nil	Rubber bumper
A	Air cushion

Rod boot

Nil	None
J	Nylon tarpaulin
K	Heat resistant tarpaulin

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for auto switch.
Example) CDBM2L40-100-HN

Applicable Auto Switch/Refer to page 6-16-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model	Lead wire length (m) * 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	C76	●	●	—	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	C73	●	●	●	—	—	—	Relay, PLC
							100 V, 200 V	B54 **	●	●	●	—	—		
		Connector					—	C73C	●	●	●	●	—		
		Terminal conduit					—	A33A **	—	—	—	●	—		PLC
							100 V, 200 V	A34A **	—	—	—	●	—		Relay, PLC
		DIN terminal						A44A **	—	—	—	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	B59W	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	H7A1	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				H7A2	●	●	○	—	○		
				2-wire		12 V		H7B	●	●	○	—	○	—	
		Connector						H7C	●	●	●	●	—		
		Terminal conduit		3-wire (NPN)		5 V, 12 V		G39A **	—	—	—	●	—	IC circuit	
				2-wire		12 V		K39A **	—	—	—	●	—	—	
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		H7NW	●	●	○	—	○	IC circuit	
				3-wire (PNP)				H7PW	●	●	○	—	○		
				2-wire		12 V		H7BW	●	●	○	—	○	—	
	Water resistant (2-color indication)							H7BA	—	●	○	—	○		
	Water Diagnostic output (2-color indication)			3-wire (NPN)		5 V, 12 V		H7NF	●	●	○	—	○	IC circuit	

* Lead wire length symbols: 0.5 m ·····Nil (Example) C73C
3 m ····· L (Example) C73CL
5 m ····· Z (Example) C73CZ
None ····· N (Example) C73CN

* Solid state switches marked with "○" are produced upon receipt of order.
* Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.
** D-A3□A/A44A/G39A/K39A/B54 cannot be mounted on bore sizes ø20 and ø25 cylinder with air cushion.

• Since there are other applicable auto switches than listed above, refer to page 6-4-24 for details.
• For details about auto switches with pre-wire connector, refer to page 6-16-60.

Holds the cylinder's home position even if the air supply is cut off.

When air is discharged at the stroke end position, the lock engages to maintain the rod in that position.

Non-lock type and lock type are standardized for manual release.

Auto switch is mountable.

Made to Order Specifications (For details, refer to page 6-17-1.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat resistant cylinder (150°C)
-XB9	Low speed cylinder (10 to 50 mm/s)
-XC3	Special port location
-XC4 *	With heavy duty scraper
-XC8 *	Adjustable stroke cylinder/Adjustable extension type
-XC13	Auto switch mounting rail style
-XC22	Fluoro rubber seals
-XC35	With coil scraper
-XC52	Mounting nut with set screw

* Available only for locking at head end

Specifications

Type	Pneumatic	
Action	Double acting, Single rod	
Fluid	Air	
Proof pressure	1.5 MPa	
Maximum operating pressure	1.0 MPa	
Minimum operating pressure	0.15 MPa *	
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)	
Cushion	Rubber bumper, Air cushion	
Lubrication	Not required (Non-lube)	
Thread tolerance	JIS Class 2	
Stroke length tolerance	$^{+1.4}_{0}$ mm	
Piston speed	Rubber bumper	50 to 750 mm/s
	Air cushion	50 to 1000 mm/s
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style	

* 0.05 MPa for other part than the lock unit

Lock Specifications

Lock position	Head end, Rod end, Double end			
Holding force (Max.) (N)	ø20	ø25	ø32	ø40
	215	330	550	860
Backlash	1 mm or less			
Manual release	Non-lock type, Lock type			

Allowable Kinetic Energy

Bore size (mm)		**20**	**25**	**32**	**40**
Rubber cushion	Allowable kinetic energy (J)	0.27	0.4	0.65	1.2
Air cushion	Effective cushion length (mm)	11.0	11.0	11.0	11.8
	Cushion sectional area (cm^2)	2.09	3.30	5.86	9.08
	Kinetic energy absorbable (J)	0.54	0.78	1.27	2.35

Standard Stroke

Bore size (mm)	Standard stroke (mm)	Long stroke * (mm)	Maximum manufacturable stroke (mm)
20	25, 50, 75, 100, 125, 150, 200, 250 300	400	1000
25		450	
32		450	
40		500	

* Long stroke applies to the axial foot style and the rod side flange style only.
When using other types of mounting brackets or exceeding the long stroke limit, the maximum allowable stroke will be determined by the stroke selection table listed on page 6-1-9.

Minimum Stroke for Auto Switch Mounting

(mm)

Auto switch model	No. of auto switches mounted				
	2		n		1
	Different sides	Same side	Different sides	Same side	
D-C7□ **D-C80**	15	50	15 + 45 $(\frac{n-2}{2})$ (n = 2, 4, 6...)	50 + 45 (n – 2)	10
D-H7□ **D-H7□W** **D-H7BAL** **D-H7NF**	15	60		60 + 45 (n – 2)	10
D-C73C **D-C80C** **D-H7C**	15	65	15 + 50 $(\frac{n-2}{2})$ (n = 2, 4, 6...)	65 + 50 (n – 2)	10
D-B5/B6 **D-G5NTL**	15	75	15 + 50 $(\frac{n-2}{2})$ (n = 2, 4, 6...)	75 + 55 (n – 2)	10
D-B59W	20	75	20 + 50 $(\frac{n-2}{2})$ (n = 2, 4, 6...)		15
D-A3□A **D-G39A** **D-K39A** **D-A44A**	35	100	35 + 30 (n – 2)	100 + 100 (n – 2)	10

Accessory/For details, refer to pages 6-4-21 to 22, since it is the same as Series CM2 standard type.

Standard equipment	Mounting nut, Rod end nut, Clevis pin, Lock release bolt (N type only)
Option	Single knuckle joint, Double knuckle joint (With pin)

∗ Mounting nuts are not equipped to single clevis and double clevis.

Rod Boot Material

Symbol	Rod boot material	Max. ambient temperature
J	Nylon tarpaulin	60°C
K	Heat resistant tarpaulin	110°C

∗ Maximum ambient temperature for the rod boot itself.

Weight

(kg)

Bore size (mm)		20	25	32	40
Basic weight	Basic style	0.14	0.21	0.28	0.56
	Axial foot style	0.29	0.37	0.44	0.83
	Flange style	0.20	0.30	0.37	0.68
	Single clevis	0.18	0.25	0.32	0.65
	Double clevis style	0.19	0.27	0.33	0.69
	Trunnion style	0.18	0.28	0.34	0.66
Additional weight per each 50 mm of stroke		0.04	0.06	0.08	0.13
Accessory	Clevis bracket (With pin)	0.07	0.07	0.14	0.14
	Single knuckle joint	0.06	0.06	0.06	0.23
	Double knuckle joint (With pin)	0.07	0.07	0.07	0.20

Lock Unit Additional Weight

(kg)

Bore size (mm)		20	25	32	40
Manual release non-lock type (N)	Head end lock (H)	0.02	0.02	0.02	0.04
	Rod end lock (R)	0.01	0.01	0.01	0.02
	Double end lock (W)	0.03	0.03	0.03	0.06
Manual release lock type (L)	Head end lock (H)	0.03	0.03	0.03	0.06
	Rod end lock (R)	0.02	0.02	0.02	0.04
	Double end lock (W)	0.05	0.05	0.05	0.10

Calculation: (Example) CBM2L32-100-HN
- Basic weight····· 0.44 (Foot style, ø32)
- Additional weight····· 0.08/50 stroke
- Cylinder stroke····· 100 stroke
- Locking weight····· 0.02 (Locking at head end, Manual release non-locking type)

0.44 + 0.08 x 100/50 + 0.02 = 0.62 kg

Auto Switch Mounting Bracket Part No.

Auto switch model	Bore size (mm)			
	20	25	32	40
D-C7□/C80 D-H7□	BM2-020	BM2-025	BM2-032	BM2-040
D-B5□/B64 D-G5NTL	BA2-020	BA2-025	BA2-032	BA2-040
D-A3□A/A44A D-G39A/K39A	BM3-020	BM3-025	BM3-032	BM3-040

Mounting screws set made of stainless steel
Use the following mounting screw set made of stainless steel according to operating environment.
(A switch mounting band is not included, so please order it separately.)
BBA4: For D-C7/C8/H7 BBA3: For D-B5/B6/G5
- "D-H7BAL" switch is set on the cylinder with the stainless steel screws above when shipped. When only a switch is shipped independently, "BBA4" screws are attached.

Mounting Bracket Part No.

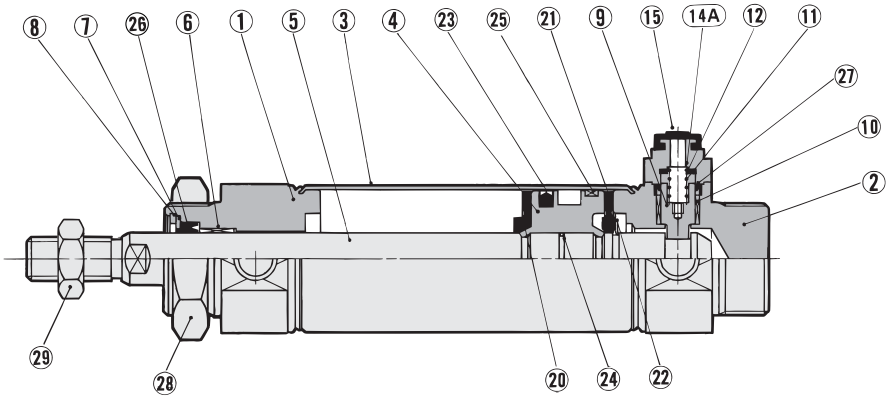
Bore size (mm)	20	25	32	40
Axial foot ∗	CM-L020B	CM-L032B		CM-L040B
Flange	CM-F020B	CM-F032B		CM-F040B
Single clevis	CM-C020B	CM-C032B		CM-C040B
Double clevis (With pin) ∗∗	CM-D020B	CM-D032B		CM-D040B
Trunnion (With nut)	CM-T020B	CM-T032B		CM-T040B

∗ Two foot brackets and a mounting nut are attached.
Order two foot brackets per cylinder.
∗∗ Clevis pin and snap ring are shipped together with double clevis style.

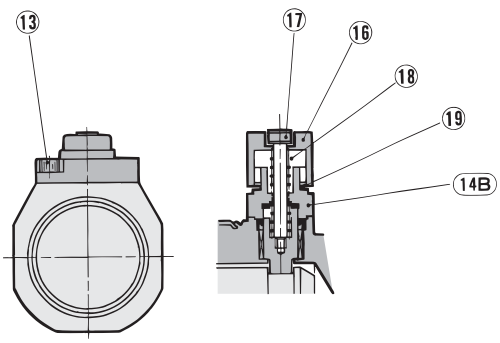
Construction

Head end lock

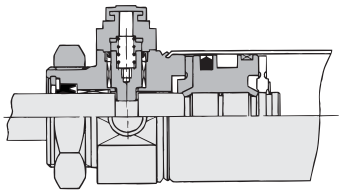
Manual release (Non-lock type): Suffix N



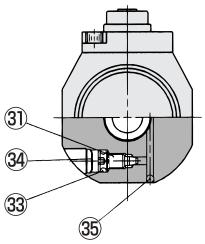
Manual release (Lock type): Suffix L

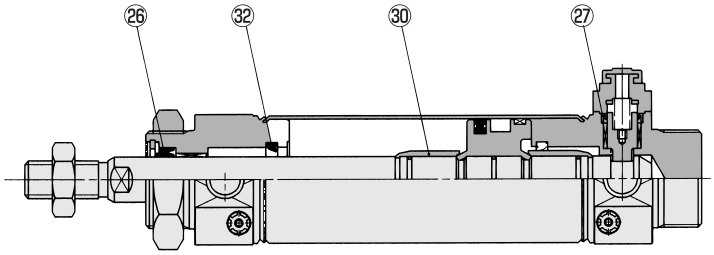


Rod end lock



With air cushion





Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Clear anodized
②	Head cover	Aluminum alloy	Clear anodized
③	Cylinder tube	Stainless steel	
④	Piston	Aluminum alloy	Chromated
⑤	Piston rod	Carbon steel	Hard chrome plated
⑥	Bushing	Oil-impregnated sintered alloy	
⑦	Seal retainer	Rolled steel plate	Nickel plated
⑧	Snap ring	Carbon steel	Nickel plated
⑨	Lock piston	Carbon steel	Hard chrome plated, Heat treated
⑩	Lock bushing	Lead-bronze casted	
⑪	Lock spring	Stainless steel	
⑫	Bumper	Urethane	
⑬	Hexagon socket head cap screw	Alloy steel	Black zinc chromated
14A	Cap A	Aluminum die-casted	Black painted
14B	Cap B	Carbon steel	Oxide film treated
⑮	Rubber cap	Synthetic rubber	
⑯	M/O knob	Zinc die-casted	Black painted
⑰	M/O bolt	Alloy steel	Black zinc chromated
⑱	M/O spring	Steel wire	Zinc chromated
⑲	Stopper ring	Carbon steel	Zinc chromated
⑳	Bumper A	Urethane	
㉑	Bumper B	Urethane	
㉒	Snap ring	Stainless steel	
㉓	Piston seal	NBR	
㉔	Piston gasket	NBR	
㉕	Wear ring	Resin	
㉘	Mounting nut	Carbon steel	Nickel plated
㉙	Rod end nut	Carbon steel	Nickel plated
㉚	Cushion ring	Rolled steel	Electroless nickel plated
㉛	Cushion valve	Rolled steel	Electroless nickel plated
㉜	Cushion seal	Urethane	

No.	Description	Material	Note
㉖	Rod seal	NBR	
㉗	Lock piston seal	NBR	
㉝	Cushion valve seal	NBR	
㉞	Snap ring	Stainless steel	
㉟	Steel balls	Stainless steel	

Replacement Parts: Seal Kit (With lock in single end)

Bore size (mm)	20	25	32	40
Kit no.	CBM2-20-PS	CBM2-25-PS	CBM2-32-PS	CBM2-40-PS

Double End Lock

Kit no.	CBM2-20-PS-W	CBM2-25-PS-W	CBM2-32-PS-W	CBM2-40-PS-W

∗ Seal kit includes ㉖ and ㉗. Order the seal kit, based on each bore size. (Except ㉝.)

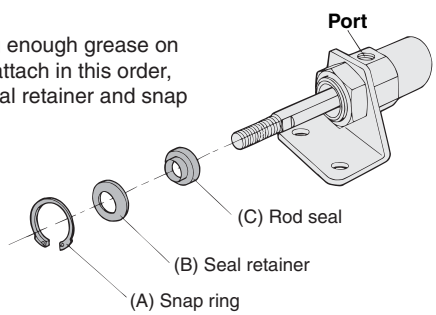
How to Change Seal Kit

<Removal>

- Remove the snap ring A by using a tool for installing a type C snap ring for hole. Shut off the port on the rod cover by finger and then pull out the piston rod, and the seal retainer B and the rod seal C are removed.

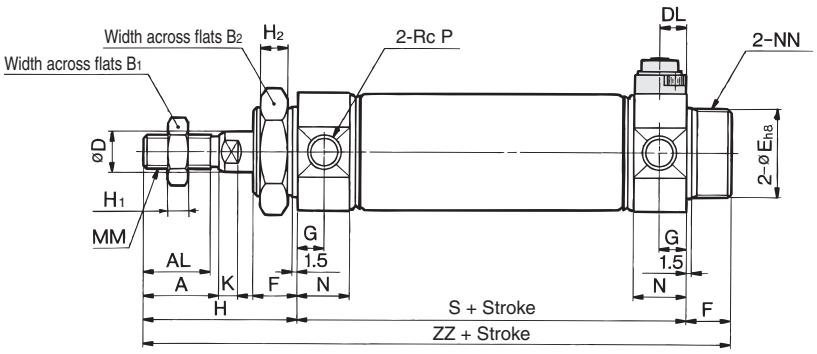
<Mounting>

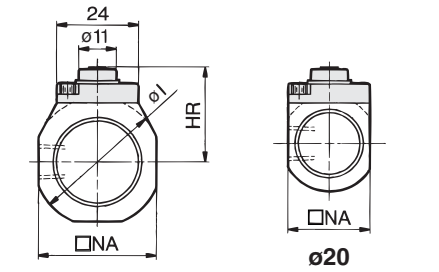
- After applying enough grease on the rod seal, attach in this order, rod seal C, seal retainer and snap ring.



Basic Style (Dimensions are common irrespective of the lock position; rod end, head end, or double end.)

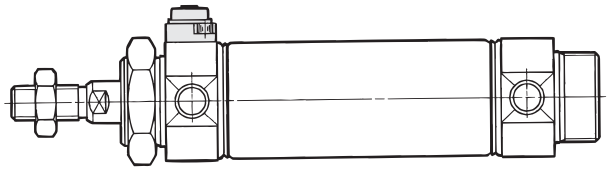
Head end lock: CBM2B Bore size – Stroke -HN

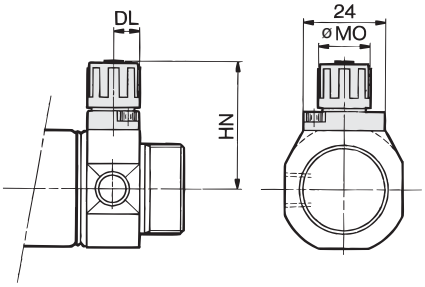




Manual release (Non-lock type): Suffix N

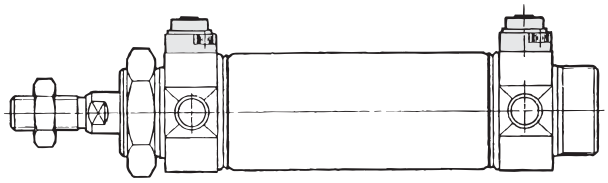
Rod end lock: CBM2B Bore size – Stroke -RN



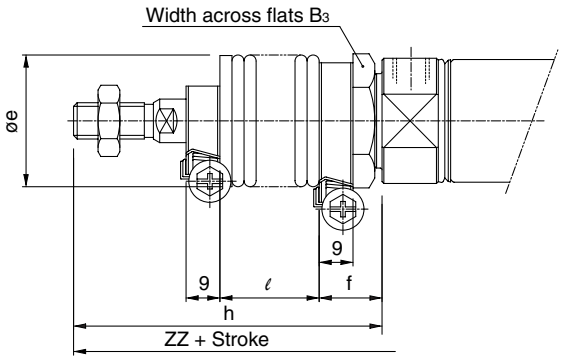


Manual release (Lock type): Suffix L

Double end lock: CBM2B Bore size – Stroke -WN



With rod boot



With Rod Boot

(mm)

ZZ						
1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
143	156	168	181	206	231	256
147	160	172	185	210	235	260
149	162	174	187	212	237	262
181	194	206	219	244	269	294

Symbol / Bore size (mm)	Stroke range	A	AL	B1	B2	D	DL	E	F	G	H	H1	H2	HR	HN (Max.)	I	K	MM	MO	N	NA	NN	P	S	ZZ
20	Up to 300	18	15.5	13	26	8	7.5	20 $^{0}_{-0.033}$	13	8	41	5	8	22.3	34	28	5	M8 x 1.25	15	15	24	M20 x 1.5	1/8	62	116
25	Up to 300	22	19.5	17	32	10	7.5	26 $^{0}_{-0.033}$	13	8	45	6	8	25.3	37	33.5	5.5	M10 x 1.25	15	15	30	M26 x 1.5	1/8	62	120
32	Up to 300	22	19.5	17	32	12	7.5	26 $^{0}_{-0.033}$	13	8	45	6	8	27.6	39.3	37.5	5.5	M10 x 1.25	15	15	34.5	M26 x 1.5	1/8	64	122
40	Up to 300	24	21	22	41	14	10.7	32 $^{0}_{-0.039}$	16	11	50	8	10	33.6	47.8	46.5	7	M14 x 1.5	19	21.5	42.5	M32 x 2	1/4	88	154

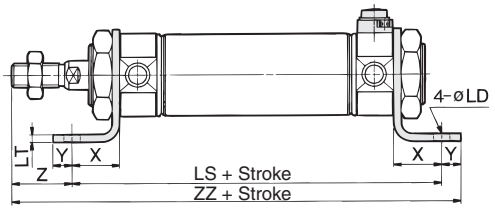
With Rod Boot

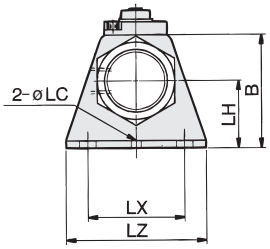
Symbol / Bore size (mm)	B3	e	f	h							ℓ						
				1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
20	30	36	17	68	81	93	106	131	156	181	12.5	25	37.5	50	75	100	125
25	32	36	17	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125
32	32	36	17	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125
40	41	46	19	77	90	102	115	140	165	190	12.5	25	37.5	50	75	100	125

∗ For details about the rod end nut and accessory, refer to pages 6-4-21 to 6-4-22.

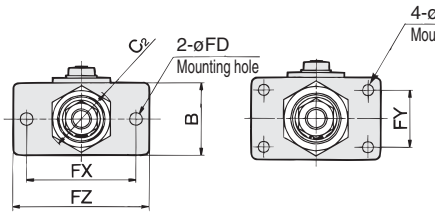
With Mounting Bracket (For dimensions not indicated below, refer to page 6-4-95.)

Axial foot style: CBM2L Bore size – Stroke -H -R -W N L



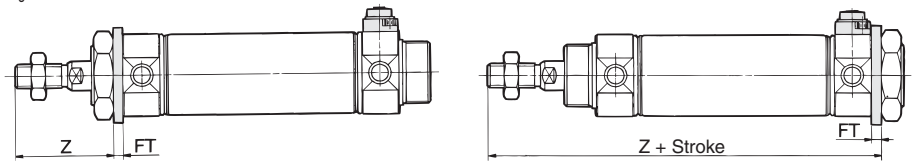


Rod side flange style: CBM2F Bore size – Stroke -H -R -W N L

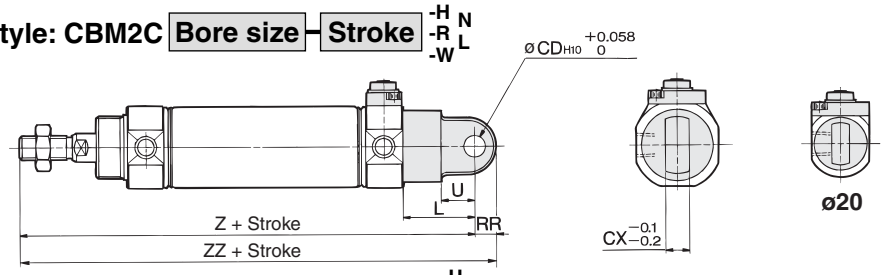


ø20 to ø32 ø40

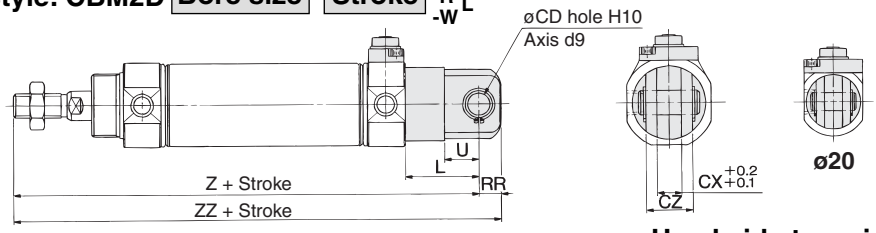
Head side flange style: CBM2G Bore size – Stroke -H -R -W N L



Single clevis style: CBM2C Bore size – Stroke -H -R -W N L

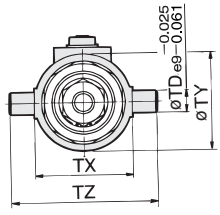


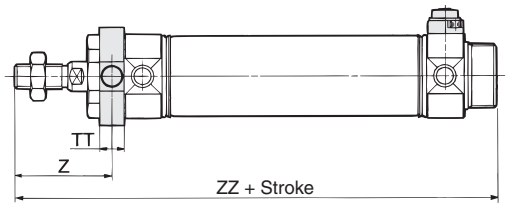
Double clevis style: CBM2D Bore size – Stroke -H -R -W N L



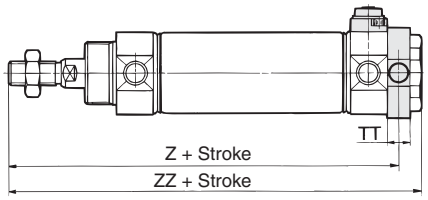
∗ Clevis pin and snap ring (cotter pin for bore size 40) are shipped together.

Rod side trunnion style: CBM2U Bore size – Stroke -H -R -W N L





Head side trunnion style: CBM2T Bore size – Stroke -H -R -W N L



Bore size (mm)	Axial foot style													Flange style										Clevis style									Trunnion style									
	Stroke range	B	LC	LD	LH	LS	LT	LX	LZ	X	Y	Z	ZZ	Stroke range		B	C2	FD	FT	FX	FY	FZ	Z		Stroke range	CD	CX	CZ	L	RR	U	Z	ZZ	Stroke range	TD	TT	TX	TY	TZ	Z		ZZ	
														Rod side	Head side								Rod side	Head side																	Rod side	Head side	Rod side	Head side
20	Up to 400	40	4	6.8	25	102	3.2	40	55	20	8	21	131	Up to 400	Up to 300	34	30	7	4	60	—	75	37	107	Up to 300	9	10	19	30	9	14	133	142	Up to 300	8	10	32	32	52	36	108	116	118
25	Up to 450	47	4	6.8	28	102	3.2	40	55	20	8	25	135	Up to 450	Up to 300	40	37	7	4	60	—	75	41	111	Up to 300	9	10	19	30	9	14	137	146	Up to 300	9	10	40	40	60	40	112	120	122
32	Up to 450	47	4	6.8	28	104	3.2	40	55	20	8	25	137	Up to 450	Up to 300	40	37	7	4	60	—	75	41	113	Up to 300	9	10	19	30	9	14	139	148	Up to 300	9	10	40	40	60	40	114	122	124
40	Up to 500	54	4	7	30	134	3.2	55	75	23	10	27	171	Up to 500	Up to 300	52	47.3	7	5	66	36	82	45	143	Up to 300	10	15	30	39	11	18	177	188	Up to 300	10	11	53	53	77	44.5	143.5	154	154

∗ Dimensions except mentioned above are the same as standard type.

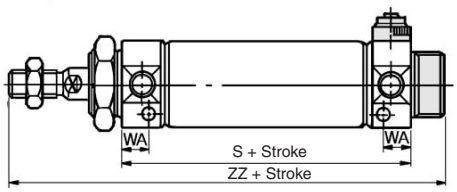
Precautions on Trunnion Style, Flange Style

1. Trunnion style
(1) With lock in rod side of the rod side trunnion style (2) With lock in head side of the head side trunnion style (3) With lock in both sides. For above cases, use caution since the trunnion pin and fittings may be interfered with each other because the trunnion pin and port are very closed to each other.

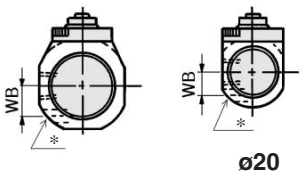
2. Flange style (ø20 to ø32)
(1) With lock in rod side of the rod side flange style (2) With lock in head side of the head side flange style (3) With lock in both sides. For above cases, use caution since the bolt for mounting a cylinder and fittings may be interfered with each other. Refer to "Special Port Position" in "Made to Order Specifications" on page 6-17-36.

With Air Cushion (Dimensions not mentioned in the below table are the same as the above table.)

Basic style
Head end lock: CBM2B Bore size – Stroke A-HN



∗ R Cushion valve
Width across hexagon socket hole 1.5



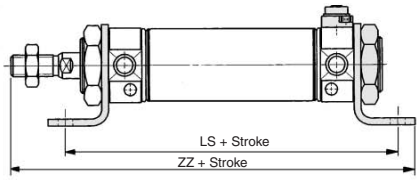
ø20

Manual release (Non-lock type): Suffix N

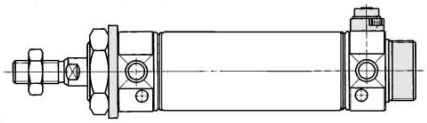
With Air Cushion

Bore size (mm)	S			WA	WB	ZZ		
	Head end lock	Rod end lock	Double end lock			Head end lock	Rod end lock	Double end lock
20	72	73	83	13	8.5	126	127	137
25	72	73	83	13	10.5	130	131	141
32	72	75	83	13	11.5	130	133	141
40	93	96	101	16	15	159	162	167

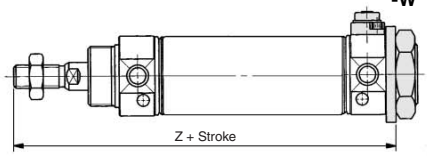
Axial foot style: CBM2L Bore size – Stroke A -H -R -W N L



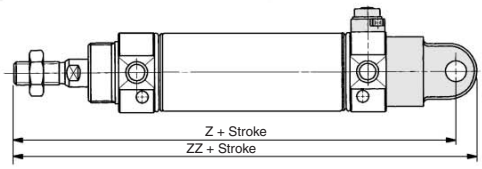
Rod side flange style: CBM2F Bore size – Stroke A -H -R -W N L



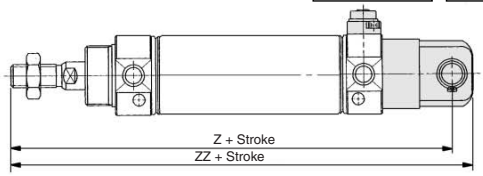
Head side flange style: CBM2G Bore size – Stroke A -H -R -W N L



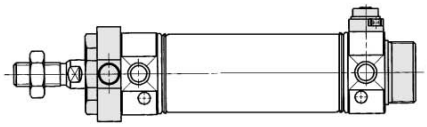
Single clevis style: CBM2C Bore size – Stroke A -H -R -W N L



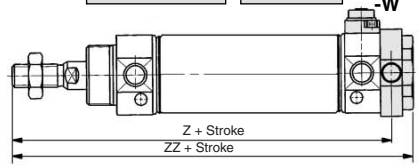
Double clevis style: CBM2D Bore size – Stroke A -H -R -W N L



Rod side trunnion style: CBM2U Bore size – Stroke A -H -R -W N L



Head side trunnion style: CBM2T Bore size – Stroke A -H -R -W N L



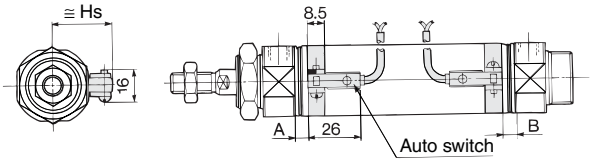
Bore size (mm)	Axial foot style						Head side flange style		
	LS			ZZ			Z		
	Head end lock	Rod end lock	Double end lock	Head end lock	Rod end lock	Double end lock	Head end lock	Rod end lock	Double end lock
20	112	113	123	141	142	152	117	118	128
25	112	113	123	145	146	156	121	122	132
32	112	115	123	145	148	156	121	124	132
40	139	142	147	176	179	184	148	151	156

Bore size (mm)	Clevis style						Head side trunnion style					
	Z			ZZ			Z			ZZ		
	Head end lock	Rod end lock	Double end lock	Head end lock	Rod end lock	Double end lock	Head end lock	Rod end lock	Double end lock	Head end lock	Rod end lock	Double end lock
20	143	144	154	152	153	163	118	119	129	128	129	139
25	147	148	158	156	157	167	122	123	133	132	133	143
32	147	150	158	156	159	167	122	125	133	132	135	143
40	182	185	190	193	196	201	148.5	151.5	156.5	159	162	167

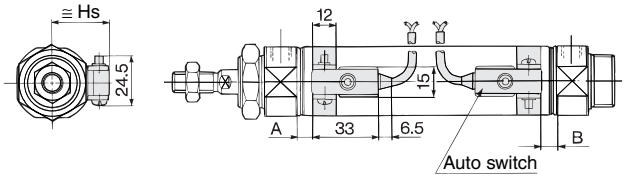
Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

Reed switch

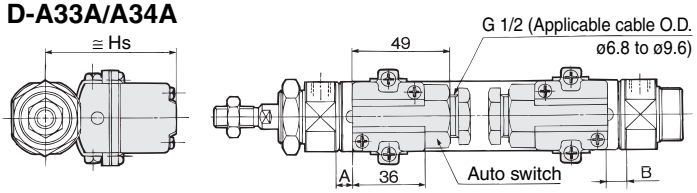
D-C7□/C80



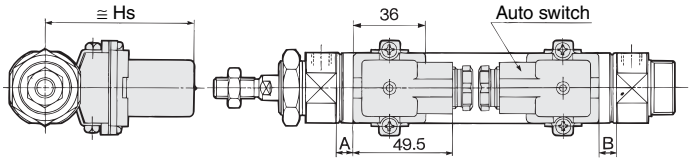
D-B5□/B64/B59W



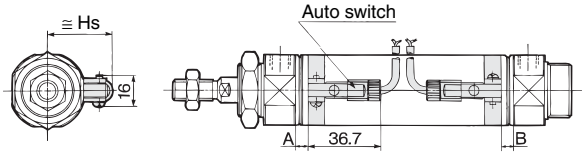
D-A33A/A34A



D-A44A

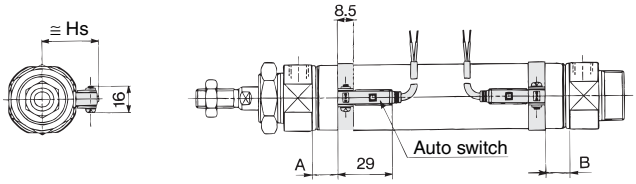


D-C73C/C80C

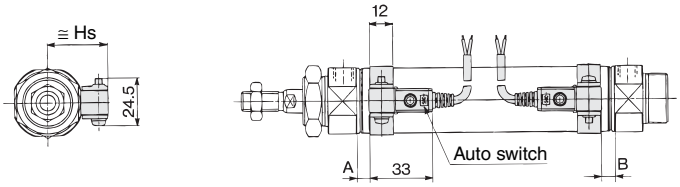


Solid state switch

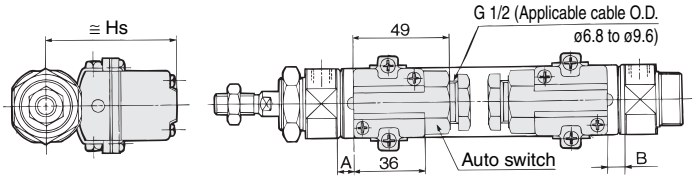
D-H7□/H7□W/H7NF/H7BAL



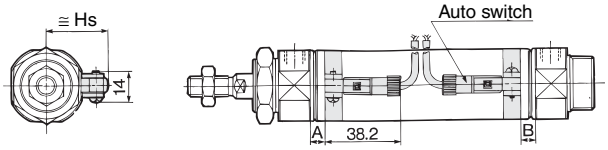
D-G5NTL



D-G39A/K39A



D-H7C



Proper Auto Switch Mounting Position

Auto switch model / Bore size (mm)	D-B5□ D-B64		D-C7□ D-C80 D-C73C D-C80C		D-B59W		D-A3□A D-G39A D-K39A D-A44A		D-H7□ D-H7C D-H7□W D-H7BAL D-H7NF		D-G5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B
20	1(—)	0(—)	7(5)	6(4)	4(2)	3(1)	0.5(—)	0(—)	6(4)	5(3)	2.5(0.5)	1.5(0)
25	1(—)	0(—)	7(5)	6(4)	4(2)	3(1)	0.5(—)	0(—)	6(4)	5(3)	2.5(0.5)	1.5(0)
32	2(0)	1(0)	8(6)	7(5)	5(3)	4(2)	1.5(0)	0.5(0)	7(5)	6(4)	3.5(1.5)	2.5(0.5)
40	7	6	13	12	10	9	6.5	5.5	12	11	8.5	7.5

∗ ( ): Denotes the values with air cushion "D-B5/B6/A3□A/A44A/G39A and K39A" cannot be mounted on bore size ø20 and ø25 cylinder with air cushion.

Auto Switch Mounting Height

D-B5□ D-B64 D-B59W D-G5NTL D-H7C	D-C7□ D-C80 D-H7□ D-H7□W D-H7BAL D-H7NF	D-C73C D-C80C	D-A3□A D-G39A D-K39A	D-A44A
Hs	Hs	Hs	Hs	Hs
25.5	22.5	25	60	69.5
28	25	27.5	62.5	72
31.5	28.5	31	66	75.5
35.5	32.5	35	70	79.5

Operating Range

Auto switch model	Bore size (mm)			
	20	**25**	**32**	**40**
D-C7□/C80 **D-C73C/C80C**	7	8	8	8
D-A3□A/A44A	8	8	9	9
D-B5□/B64				
D-B59W	12	12	13	13
D-H7BAL, D-H7□/H7□W/H7NF	4	4	4.5	4.5
D-H7C	7	8.5	9	10
D-G39A/K39A	8	9	9	9
D-G5NTL	4	4	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 applicable auto switches listed in "How to Order", the following auto switches can be mounted. For detailed specifications, refer to page 6-16-1.

Type	Model	Electrical entry	Features
Reed switch	D-C80	Grommet	Without indicator light
	D-C80C	Connector	
	D-B53	Grommet	—
	D-B64	Grommet	Without indicator light
Solid state switch	D-G5NTL	Grommet	With timer

∗ With pre-wire connector is available for D-G5NTL type, too. Refer to page 6-16-55 for details.
∗ Wide range detection type, solid state auto switch (D-G5NBL type) is also available. For details, refer to page 6-16-59.

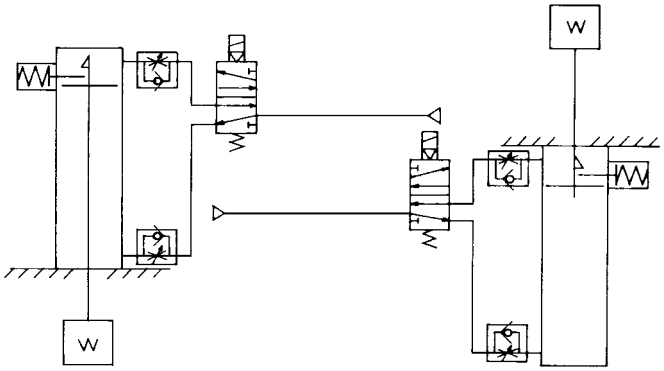
⚠ Precautions

Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to pages 6-20-3 to 6.

Use the Recommended Pneumatic Circuit

⚠ Caution

● **This is necessary for proper operation and release of the lock.**



Head end lock

Rod end lock

Operating Precautions

⚠ Caution

1. **Do not use 3 position solenoid valves.**
   Avoid use in combination with 3 position solenoid valves (especially closed center metal seal types). If pressure is trapped in the port on the lock mechanism side, the cylinder cannot be locked. Furthermore, even after being locked, the lock may be released after some time, due to air leaking from the solenoid valve and entering the cylinder.
2. **Back pressure is required to release end lock.**
   Be sure air is supplied to side of cylinder without the locking mechanism, as above, prior to supplying air pressure to the side with end lock or lock may not be released. (Refer to “Releasing the Lock”.)
3. **Release the lock when mounting or adjusting the cylinder.**
   If mounting or other work is performed when the cylinder is locked, the lock unit may be damaged.
4. **Operate with a load ratio of 50% or less.**
   If the load ratio exceeds 50%, this may cause problems such as failure of the lock to release, or damage to the lock unit.
5. **Do not operate multiple cylinders in synchronization.**
   Avoid applications in which two or more end lock cylinders are synchronized to move one workpiece, as one of the cylinder locks may not be able to release when required.
6. **Use a speed controller with meter-out control.**
   Lock cannot be released occasionally by meter-in control.
7. **Be sure to operate completely to the cylinder stroke end on the side with the lock.**
   If the cylinder piston does not reach the end of the stroke, locking might not work or locking might not be released.

Operating Pressure

⚠ Caution

1. Use pressures over 0.15 MPa at port with locking mechanism.

Exhaust Speed

⚠ Caution

1. Locking will occur automatically if the pressure applied to the port on the lock mechanism side falls to 0.05 MPa or less. In cases where the piping on the lock mechanism side is long and thin, or the speed controller is separated at some distance from the cylinder port, the exhaust speed will be reduced. Take note that some time may be required for the lock to engage. In addition, clogging of a silencer mounted on the solenoid valve exhaust port can produce the same effect.

Relation to Cushion

⚠ Caution

1. When cushion valve at side with locking mechanism is fully opened or closed, piston rod may reached at stroke end. Thus lock is not established. And when locking is done at cushion valve fully closed, adjust cushion valve since lock may not be released.

Releasing the Lock

⚠ Warning

1. Before releasing the lock, be sure to supply air to the side without the lock mechanism, so that there is no load applied to the lock mechanism when it is released. (Refer to the recommended pneumatic circuits.) If the lock is released when the port on the other side is in an exhaust state, and with a load applied to the lock unit, the lock unit may be subjected to an excessive force and be damaged. Furthermore, sudden movement of the piston rod is very dangerous.

⚠ Precautions

Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to pages 6-20-3 to 6.

Manual Release

⚠ Caution

1. Manual release (Non-lock type)

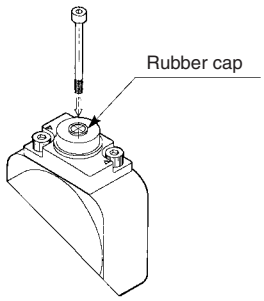
Insert the accessory bolt from the top of the rubber cap (it is not necessary to remove the rubber cap), and after screwing it into the lock piston, pull it to release the lock. If you stop pulling the bolt, the lock will return to an operational state.

Thread sizes, pulling forces and strokes are as shown below.

Bore size (mm)	Thread size	Pulling force	Stroke (mm)
20, **25**, **32**	M2.5 x 0.45 x 25ℓ or more	4.9 N	2
40, **50**, **63**	M3 x 0.5 x 30ℓ or more	10 N	3
80, **100**	M5 x 0.8 x 40ℓ or more	24.5 N	3

Remove the bolt for normal operation.

It can cause lock malfunction or faulty release.

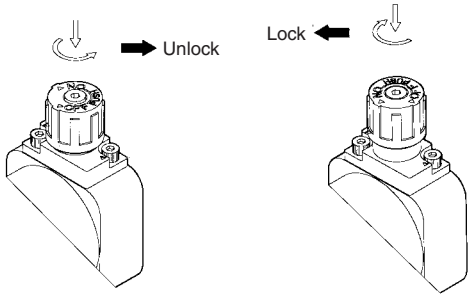


2. Manual release (Lock type)

While pushing the M/O knob, turn it 90° counterclockwise. The lock is released (and remains in a released state) by aligning the ▲ mark on the cap with the ▼ OFF mark on the M/O knob.

When locking is desired, turn M/O button clockwise 90° while pushing fully, correspond ▲ on cap and ▼ ON mark on M/O button. The correct position is confirmed by a click sound "click".

If not confirmed, locking is not done.

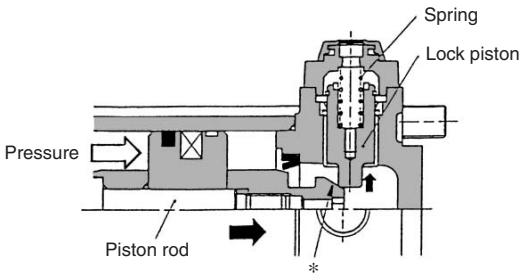


Locked Released

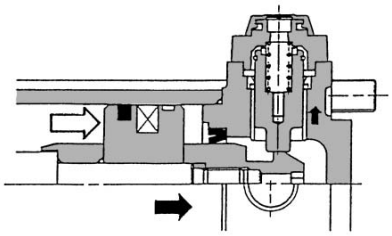
Working Principle

● **Head end lock (Rod end lock is the same, too.)**

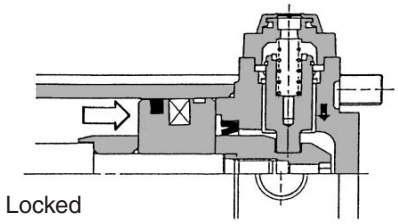
1. When the piston rod is getting closer to the stroke end, the taper part (*) of the piston rod edge will push the lock piston up.



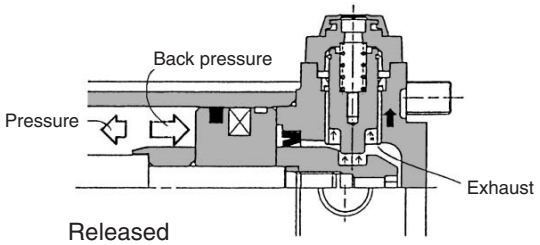
2. Lock piston is pushed up further.



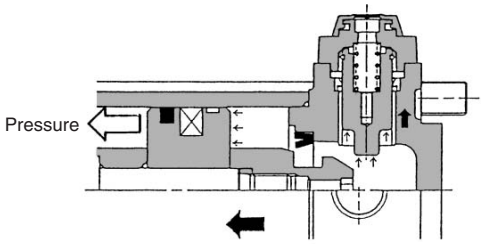
3. Lock piston is pushed up into the groove of piston rod to lock it. (Lock piston is pushed up by spring force.) At this time, it is exhausted from port in head side and introduced to atmosphere.



4. When pressure is supplied in the head side, lock piston will be pushed up to release the lock.



5. Lock will be released, then cylinder will move forward.



Compact Cylinder: With End Lock

Series CBQ2

ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch CBQ2 B 40 — 30 D C — H N

With auto switch CDBQ2 B 40 — 30 D C — H N — F9BW

Built-in magnet

Mounting style

ø20, ø25	
B	Through-hole/Both ends tapped common (Standard)
L	Foot style
F	Rod side flange style
G	Head side flange style
D	Double clevis style

∗ Mounting brackets are shipped together, (but not assembled).

ø32 to ø100	
B	Through-hole (Standard)(1)
A	Both ends tapped style
L	Foot style
F	Rod side flange style
G	Head side flange style
D	Double clevis style

Note 1) At the 75, and 100 strokes with ø80, ø100, both ends tapped (A) is the standard. Through-hole (B) is not available.
Note 2) Mounting brackets are shipped together, (but not assembled).

Bore size

20	20 mm	50	50 mm
25	25 mm	63	63 mm
32	32 mm	80	80 mm
40	40 mm	100	100 mm

Cylinder stroke (mm)
For "Standard Stroke" and "Manufacture of intermediate of Stroke", refer to page 7-6-143.

Action

D	Double acting

Body option

C	With rubber bumper, Rod end female thread (Standard)
CM	With rubber bumper, Rod end male thread

Lock position

H	Head end lock
R	Rod end lock

Manual release type

N	Non-lock type
L	Lock type

Auto switch

Nil	Without auto switch (Built-in magnet)

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

Number of auto switches

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

Applicable Auto Switch/Refer to page 7-9-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Rail mounting ø32 to ø100 Perpendicular	Rail mounting ø32 to ø100 In-line	Direct mounting ø20 to ø100 Perpendicular	Direct mounting ø20 to ø100 In-line	Lead wire length (m) ∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	A76H	A96V	A96	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	A72	A72H	—	—	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	A73	A73H	—	—	●	●	●	—	—		
								—	—	A93V	A93	●	●	—	—	—		
		Connector					—	A73C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet					—	A79W	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	F9NV	F9N	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				F7PV	F7P	F9PV	F9P	●	●	○	—	○		
				2-wire		12 V		F7BV	J79	F9BV	F9B	●	●	○	—	○	—	
		Connector						J79C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		F7NWV	F79W	F9NWV	F9NW	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	F7PW	F9PWV	F9PW	●	●	○	—	○		
				2-wire		12 V		F7BWV	J79W	F9BWV	F9BW	●	●	○	—	○		
	Water resistant (2-color indication)							—	F7BA	—	F9BA	—	●	○	—	○	—	
								F7BAV	—	—	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			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 7-6-23 for details.
• For details about auto switches with pre-wire connector, refer to page 7-9-36.

Cylinder Specifications

Fluid	Air
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.15 MPa *
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)
Lubrication	Non-lube
Cushion	Rubber bumper on both ends (Standard)
Rod end thread tolerance	JIS Class 2
Stroke length tolerance	$^{+1.0}_{0}$
Piston speed	50 to 500 mm/s

* 0.05 MPa except for the lock unit.

Lock Specifications

Lock position	Head end, Rod end							
Holding force (Max.) (N)	ø20	ø25	ø32	ø40	ø50	ø63	ø80	ø100
	215	330	550	860	1340	2140	3450	5390
Pressure for unlocking	0.15 MPa or less							
Backlash	2 mm or less							
Manual release	Non-lock type, Lock type							

Standard Stroke

Bore size (mm)	Standard stroke (mm)
20 to 63	10, 15, 20, 25, 50, 75, 100
80, 100	25, 50, 75, 100

Manufacture of Intermediate Stroke

Description	Spacer is installed in the standard stroke body.	
Part no.	Refer to “How to Order” for the standard model no. on page 7-6-142.	
Description	Dealing with the stroke by the 5 mm interval is available by installing spacer with standard stroke cylinder.	
Stroke range	Bore size (mm)	Stroke range
	20 to 100	5 to 95
Example	Part no.: CBQ2B40-45DC-HL CBQ2B40-50DC-HL with 5 mm width spacer inside.	

Mounting Bracket Part No.

Bore size (mm)	Foot (1)	Flange	Double clevis (2)
20	CQS-L020	CQS-F020	CQS-D020
25	CQS-L025	CQS-F025	CQS-D025
32	CQ-L032	CQ-F032	CQ-D032
40	CQ-L040	CQ-F040	CQ-D040
50	CQ-L050	CQ-F050	CQ-D050
63	CQ-L063	CQ-F063	CQ-D063
80	CQ-L080	CQ-F080	CQ-D080
100	CQ-L100	CQ-F100	CQ-D100

Note 1) When ordering foot bracket, order 2 pieces per cylinder.
Note 2) Parts belonging to each bracket are as follows. Foot or Flange style: Body mounting bolt, Double clevis style: Clevis pin, snap ring retainer, body mounting bolt.
Note 3) Clevis pin and snap ring are included with the double clevis style.

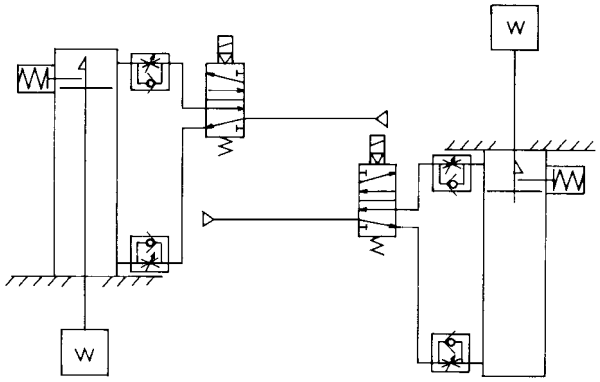
⚠ Precautions

Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to pages 7-13-3 to 7-13-6.

Use the Recommended Pneumatic Circuit

⚠ Caution

• This is necessary for the correct locking and unlocking actions.



Head end lock **Rod end lock**

Operating Precautions

⚠ Caution

1. Do not use 3 position solenoid valves.
Avoid use in combination with 3 position solenoid valves (especially closed center metal seal types). If pressure is trapped in the port on the lock mechanism side, the cylinder cannot be locked. Furthermore, even after being locked, the lock may be released after some time, due to air leaking from the solenoid valve and entering the cylinder.

2. Back pressure is required when releasing the lock.
Before starting operation, be sure to control the system so that air is supplied to the side without the lock mechanism as shown in the figure above. There is a possibility that the lock may not be released. (Refer to the section on releasing the lock.)

3. Release the lock when mounting or adjusting the cylinder.
If mounting or other work is performed when the cylinder is locked, the lock unit may be damaged.

4. Operate with a load ratio of 50% or less.
If the load ratio exceeds 50%, this may cause problems such as failure of the lock to release, or damage to the lock unit.

5. Do not operate multiple cylinders in synchronization.
Avoid applications in which two or more end lock cylinders are synchronized to move one workpiece, as one of the cylinder locks may not be able to release when required.

6. Use a speed controller with meter-out control.
Lock cannot be released occasionally by meter-in control.

7. Be sure to operate completely to the cylinder stroke end on the side with the lock.
If the cylinder piston does not reach the end of stroke, locking and unlocking may not be possible.

8. Adjust the position of an auto switch, so that it could work at the both positions where it is distanced from the stroke and a backlash (2 mm) .
When a 2-color indication switch is adjusted for green indication at the stroke end, it may change to red for the backlash return, but this is not abnormal.

Operating Pressure

⚠ Caution

1. Supply air pressure of 0.15 MPa or higher to the port on the side that has the lock mechanism, as it is necessary for disengaging the lock.

Exhaust Speed

⚠ Caution

1. When the pressure on the side with the lock mechanism drops to 0.05 MPa or below, the lock engages automatically. If the piping on the side with the lock mechanism is thin and long, or if the speed controller is away from the cylinder port, the lock engagement may take some due to decline of the exhaust speed. The same result will be caused by clogging of the silencer installed at the EXH port of the solenoid valve.

Releasing the Lock

⚠ Caution

1. Before releasing the lock, be sure to supply air to the side without the lock mechanism, so that there is no load applied to the lock mechanism when it is released. If the lock is released when the port on the other side is in an exhaust state, and with a load applied to the lock unit, the lock unit may be subjected to an excessive force and be damaged. Also, it is very dangerous because the piston rod will be rushed to move.

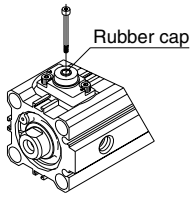
Manual Release

⚠ Caution

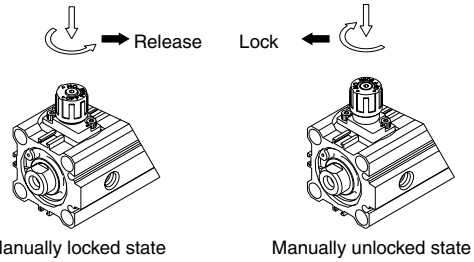
1. Manual release (Non-lock type)
Insert the accessory bolt from the top of the rubber cap (it is not necessary to remove the rubber cap), and after screwing it into the lock piston, pull it to release the lock. If you stop pulling the bolt, the lock will return to an operational state.
Thread sizes, pulling forces and strokes are as shown below.

Bore size (mm)	Thread size	Pulling force (N)	Stroke (mm)
20, 25, 32	M2.5 x 0.45 x 25ℓ or more	4.9	2
40, 50, 63	M3 x 0.5 x 30ℓ or more	10	3
80, 100	M5 x 0.8 x 40ℓ or more	24.5	3

Remove the bolt for normal operation.
It can cause lock malfunction or faulty release.



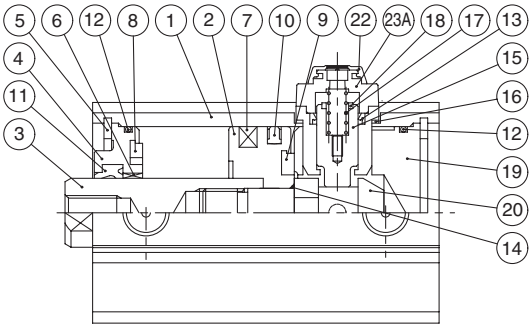
2. Manual release (Lock type)
While pushing the M/O knob, turn it 90° counterclockwise. The lock is released (and remains in a released state) by aligning the ▲ mark on the cap with the ▼ OFF mark on the M/O knob. When locking is desired, turn M/O button clockwise 90° while pushing fully, correspond ▲ on cap and ▼ ON mark on M/O button. The correct position is confirmed by a click sound “click”. If not confirmed, locking is not done.



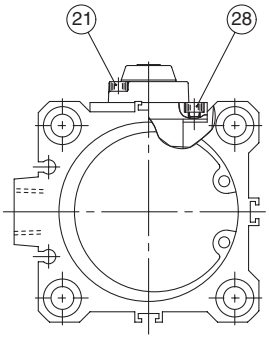
Manually locked state Manually unlocked state

Construction

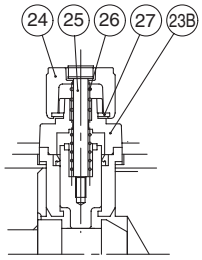
ø32 to ø63



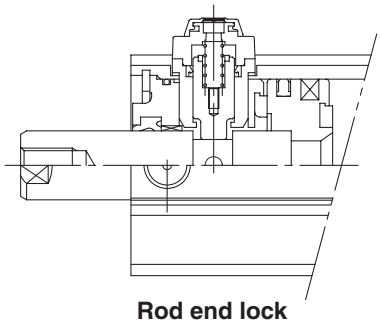
Head end lock



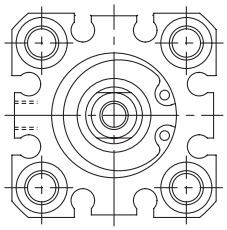
Cylinder tube form for ø32 to ø63



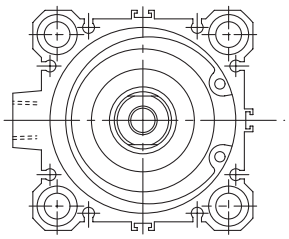
Manual release (Lock type): Suffix L



Rod end lock

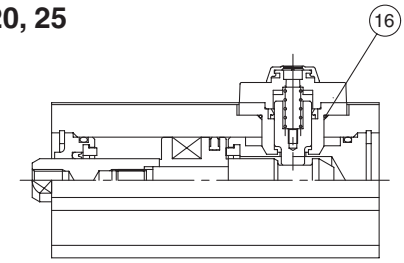


Cylinder tube form for ø25 or less

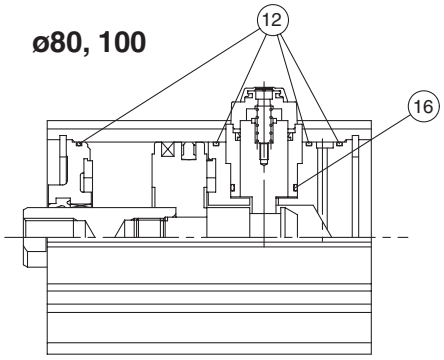


Cylinder tube form for ø63 or more

ø20, 25



ø80, 100



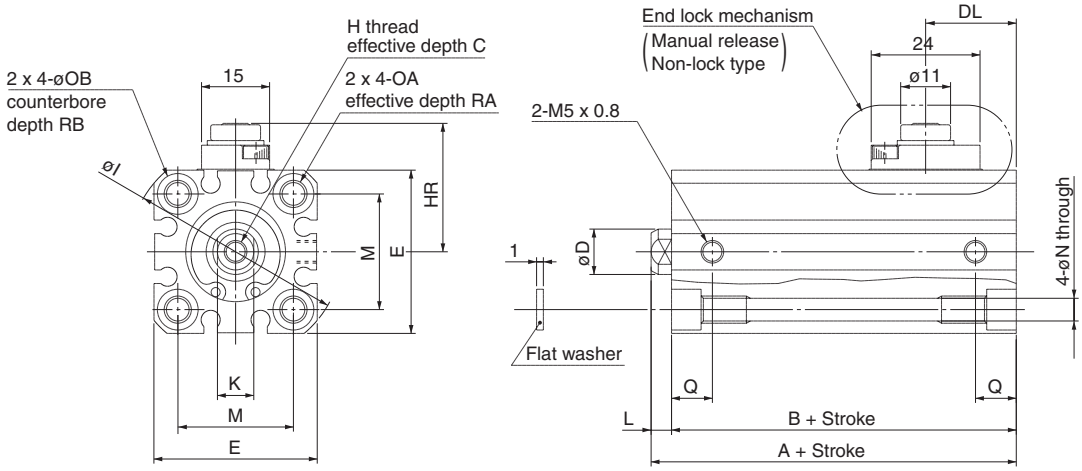
Component Parts

No.	Part	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Piston	Aluminum alloy	Chromated
③	Piston rod	Carbon steel	Hard chrome plated
④	Collar	R□ Aluminum alloy	Anodized
		H□ Aluminum bearing alloy	ø 40 or less, Anodized
		H□ Aluminum alloy casting	ø50 or more, Painted after chromated
⑤	Snap ring	Carbon tool steel	Phosphate coated
⑥	Bushing	Lead-bronze casted	R□ Used for all bore sizes
			H□ Used for ø40 and larger
⑦	Magnet	—	With auto switch
⑧	Bumper A	Urethane	
⑨	Bumper B	Urethane	
⑩	Piston seal	NBR	
⑪	Rod seal	NBR	
⑫	Tube gasket	NBR	Using 4 pcs. for ø80, 100
⑬	Lock piston seal	NBR	
⑭	Piston gasket	NBR	Nothing for ø20, 25
⑮	Lock piston	Carbon steel	Quenched, hard chrome plated
⑯	Gasket	NBR	
⑰	Lock spring	Stainless steel	
⑱	Bumper	Urethane	
⑲	Head cover	Aluminum alloy	Anodized
⑳	Lock bolt	Carbon steel	Quenched, Electroless nickel plated
㉑	Hexagon socket head cap screw	Alloy steel	Black zinc chromated
㉒	Rubber cap	Synthetic rubber	
㉓A	Cap A	Aluminum casted	Black painted
㉓B	Cap B	Carbon steel	Oxide film treated
㉔	M/O knob	Zinc die-casted	Black painted
㉕	M/O bolt	Alloy steel	Red painted
㉖	M/O spring	Steel wire	Zinc chromated
㉗	Stopper ring	Rolled steel	Zinc chromated
㉘	Hexagon socket head cap screw	Alloy steel	Nickel plated

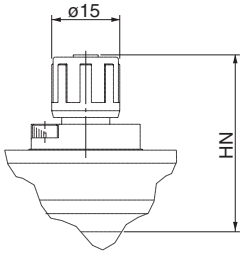
Dimensions: ø20, ø25

Basic style (Through-hole/Both ends tapped common): CBQ2B/CDBQ2B

With head end lock



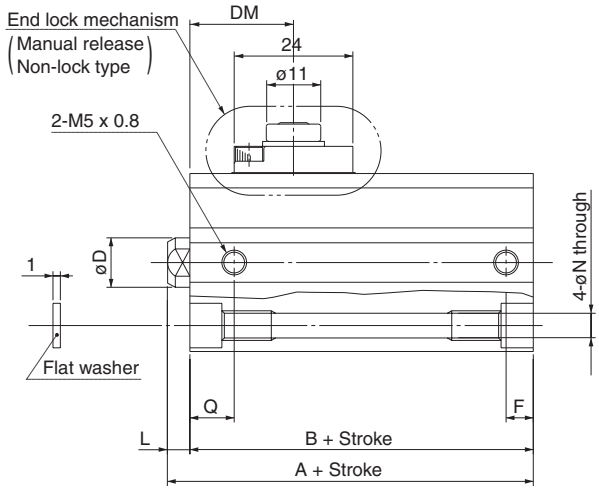
End lock mechanism
(Manual release lock type)



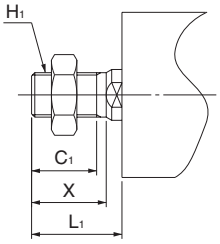
End Lock Mechanism Dimensions

Bore size (mm)	DL	DM	HR	HN (Max.)
20	20	21	28.5	40
25	21	21	29.5	41

With rod end lock



Rod end male thread

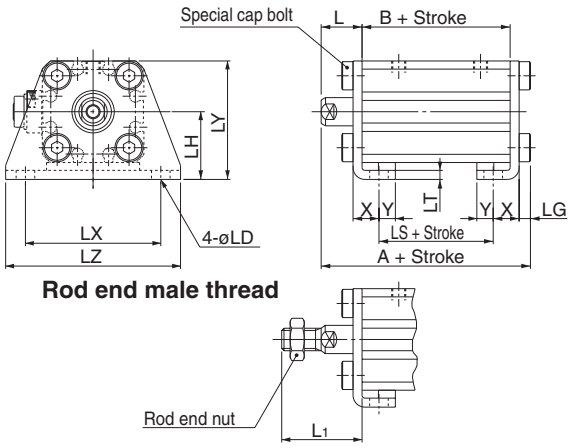


Bore size (mm)	Standard stroke	C_1	X	H_1	L_1
20	10, 15, 20, 25	12	14	M8 x 1.25	18.5
	50, 75, 100				28.5
25	10, 15, 20, 25	15	17.5	M10 x 1.25	22.5
	50, 75, 100				32.5

Bore size (mm)	Standard stroke	With head end lock			With rod end lock				C	D	E	H	I	K	M	N	OA	OB	Q	RA	RB
		A	B	L	A	B	F	L													
20	10, 15, 20, 25	65.5	61	4.5	59	54.5	5.5	4.5	7	10	36	M5 x 0.8	47	8	25.5	5.4	M6 x 1.0	9	9	10	7
	50, 75, 100	80.5	66	14.5	80.5	66	9	14.5													
25	10, 15, 20, 25	69	64	5	62.5	57.5	5.5	5	12	12	40	M6 x 1.0	52	10	28	5.4	M6 x 1.0	9	11	10	7
	50, 75, 100	84	69	15	84	69	11	15													

Dimensions: ø20, ø25

Foot style: CBQ2L/CDBQ2L

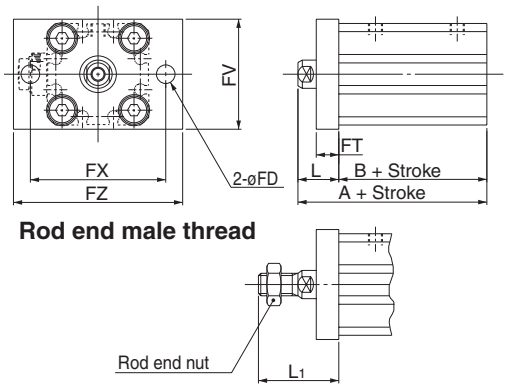


Foot Style

Bore size (mm)	Standard stroke	With head end lock			With rod end lock		
		A	B	LS	A	B	LS
20	10, 15, 20, 25	82.7	61	49	76.2	54.5	42.5
	50, 75, 100	87.7	66	54	87.7	66	54
25	10, 15, 20, 25	86.2	64	49	79.7	57.5	42.5
	50, 75, 100	91.2	69	54	91.2	69	54

Bore size (mm)	Standard stroke	L	L1	LD	LG	LH	LT	LX	LY	LZ	X	Y
20	10, 15, 20, 25, 50, 75, 100	14.5	28.5	6.6	4	24	3.2	48	42	62	9.2	5.8
25		15	32.5	6.6	4	26	3.2	52	46	66	10.7	5.8

Rod side flange style: CBQ2F/CDBQ2F

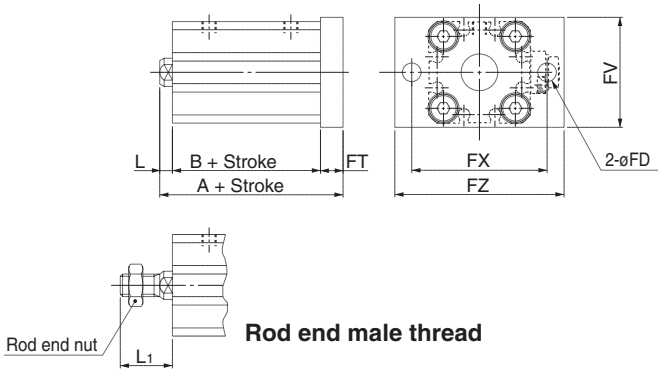


Rod Side Flange Style

Bore size (mm)	Standard stroke	With head end lock		With rod end lock	
		A	B	A	B
20	10, 15, 20, 25	75.5	61	69	54.5
	50, 75, 100	80.5	66	80.5	66
25	10, 15, 20, 25	79	64	72.5	57.5
	50, 75, 100	84	69	84	69

Bore size (mm)	Standard stroke	FD	FT	FV	FX	FZ	L	L1
20	10, 15, 20, 25, 50, 75, 100	6.6	8	39	48	60	14.5	28.5
25		6.6	8	42	52	64	15	32.5

Head side flange style: CBQ2G/CDBQ2G

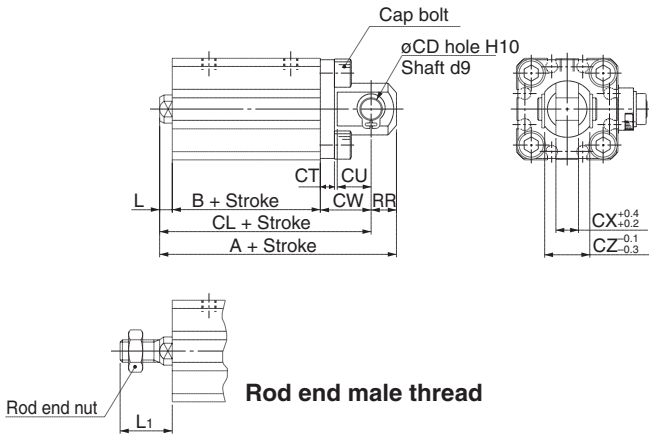


Head Side Flange Style

Bore size (mm)	Standard stroke	With head end lock				With rod end lock			
		A	B	L	L1	A	B	L	L1
20	10, 15, 20, 25	73.5	61	4.5	18.5	67	54.5	4.5	18.5
	50, 75, 100	88.5	66	14.5	28.5	88.5	66	14.5	28.5
25	10, 15, 20, 25	77	64	5	22.5	70.5	57.5	5	22.5
	50, 75, 100	92	69	15	32.5	92	69	15	32.5

Bore size (mm)	Standard stroke	FD	FT	FV	FX	FZ
20	10, 15, 20, 25, 50, 75, 100	6.6	8	39	48	60
25		6.6	8	42	52	64

Double clevis style: CBQ2D/CDBQ2D



Double Clevis Style

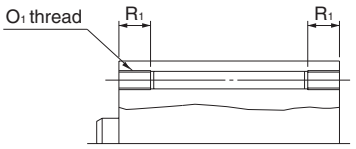
Bore size (mm)	Standard stroke	With head end lock					With rod end lock				
		A	B	CL	L	L1	A	B	CL	L	L1
20	10, 15, 20, 25	92.5	61	83.5	4.5	18.5	86	54.5	77	4.5	18.5
	50, 75, 100	107.5	66	98.5	14.5	28.5	107.5	66	98.5	14.5	28.5
25	10, 15, 20, 25	99	64	89	5	22.5	92.5	57.5	82.5	5	22.5
	50, 75, 100	114	69	104	15	32.5	114	69	104	15	32.5

Bore size (mm)	Standard stroke	CD	CT	CU	CW	CX	CZ	RR
20	10, 15, 20, 25, 50, 75, 100	8	5	12	18	8	16	9
25		10	5	14	20	10	20	10

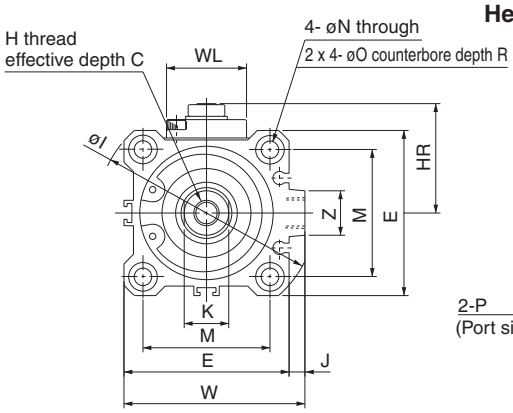
Dimensions: ø32 to ø100

Basic style (Through-hole): CBQ2B/CDBQ2B

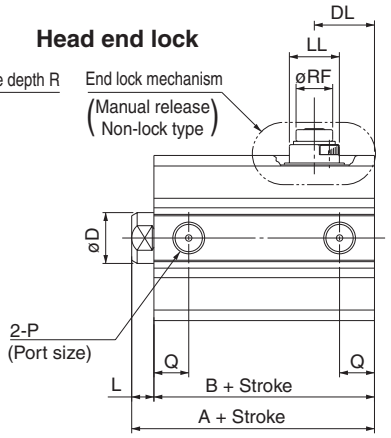
Both ends tapped style: CBQ2A/CDBQ2A



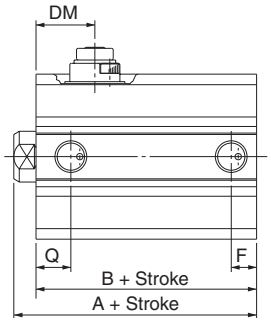
Bore size (mm)	O_1	R_1
32	M6 x 1.0	10
40	M6 x 1.0	10
50	M8 x 1.25	14
63	M10 x 1.5	18
80	M12 x 1.75	22
100	M12 x 1.75	22



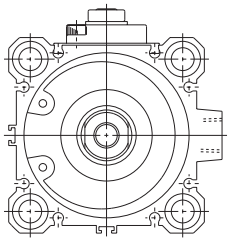
Head end lock



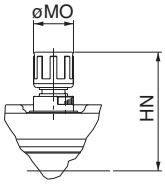
Rod end lock



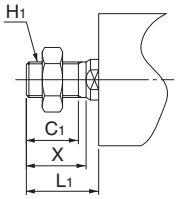
ø63, ø80, ø100
Cylinder tube form



End lock mechanism
(Manual release lock type)



Rod end male thread



End Lock Mechanism Dimensions

Bore size (mm)	DL	DM	HR	HN (Max.)	LL	MO	WL	RF
32	25	22	33.5	45	15	15	24	11
40	29	26	38.5	52.5	21	19	24	11
50	29.5	24	45	59	21	19	24	11
63	28.5	25	50	64	21	19	24	11
80	45	45.5	62	76.5	30	23	40	21
100	48	49	71.5	86	30	23	40	21

Bore size (mm)	Standard stroke	C_1	X	H_1	L_1
32	10, 15, 20, 25 50, 75, 100	20.5	23.5	M14 x 1.5	28.5
40		20.5	23.5	M14 x 1.5	28.5
50		26	28.5	M18 x 1.5	33.5
63		26	28.5	M18 x 1.5	33.5
80	25, 50	32.5	35.5	M22 x 1.5	43.5
	75, 100				53.5
100	25, 50	32.5	35.5	M26 x 1.5	43.5
	75, 100				53.5

Bore size (mm)	Standard stroke	C	D	E	H	I	J	K	M	N	O	P	R	W	Z
32	10, 15, 20, 25 50, 75, 100	13	16	45	M8 x 1.25	60	4.5	14	34	5.5	9	Rc 1/8	7	49.5	14
40		13	16	52	M8 x 1.25	69	5	14	40	5.5	9	Rc 1/8	7	57	14
50		15	20	64	M10 x 1.5	86	7	17	50	6.6	11	Rc 1/4	8	71	19
63		15	20	77	M10 x 1.5	103	7	17	60	9	14	Rc 1/4	10.5	84	19
80	25, 50, 75, 100	21	25	98	M16 x 2.0	132	6	22	77	11	17.5*	Rc 3/8	13.5*	104	26
100		27	30	117	M20 x 2.5	156	6.5	27	94	11	17.5*	Rc 3/8	13.5*	123.5	26

* At the 75, and 100 strokes with ø80, 100, both ends tapped (A) is the standard. Through-hole (B) is not available.

With Head End Lock

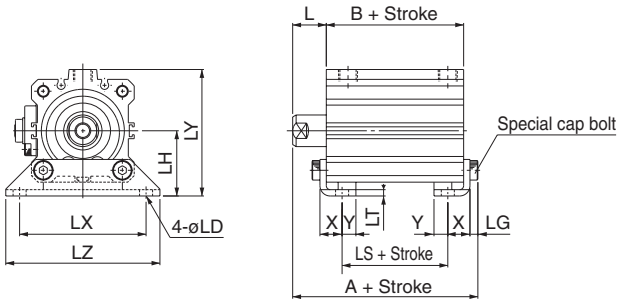
Bore size (mm)	Standard stroke	A	B	L	Q
32	10, 15, 20, 25 50, 75, 100	72.5	65.5	7	12.5
40		82	75	7	14
50		83.5	75.5	8	14
63		85	77	8	15.5
80	25, 50	121	111	10	18
	75, 100	136	116	20	19
100	25, 50	132.5	120.5	12	22
	75, 100	147.5	125.5	22	23

With Rod End Lock

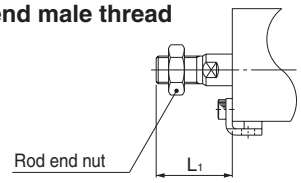
Bore size (mm)	Standard stroke	A	B	F	L	Q
32	10, 15, 20, 25 50, 75, 100	65	58	7.5	7	10.5
40		71.5	64.5	8	7	11
50		73.5	65.5	10.5	8	10.5
63		79	71	10.5	8	15
80	25, 50	113.5	103.5	12.5	10	16
	75, 100	136	116	19	20	19
100	25, 50	125	113	13	12	23
	75, 100	147.5	125.5	23	22	23

Dimensions: ø32 to ø100

Foot style: CBQ2L/CDBQ2L



Rod end male thread

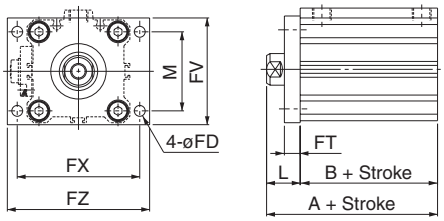


Foot Style

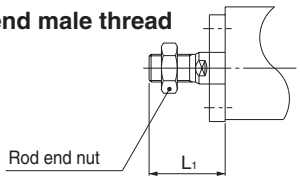
Bore size (mm)	Standard stroke	With head end lock			With rod end lock			L	L1	LD
		A	B	LS	A	B	LS			
32	10, 15, 20, 25 50, 75, 100	89.7	65.5	49.5	82.2	58	42	17	38.5	6.6
40		99.2	75	59	88.7	64.5	48.5	17	38.5	6.6
50		101.7	75.5	52.5	91.7	65.5	42.5	18	43.5	9
63		103.2	77	51	97.2	71	45	18	43.5	11
80	25, 50	142.5	111	81	135	103.5	73.5	20	53.5	13
	75, 100	147.5	116	86	147.5	116	86			
100	25, 50	155.5	120.5	86.5	148	113	79	22	53.5	13
	75, 100	160.5	125.5	91.5	160.5	125.5	91.5			

Bore size (mm)	Standard stroke	LG	LH	LT	LX	LY	LZ	X	Y
32	10, 15, 20, 25 50, 75, 100	4	30	3.2	57	57	71	11.2	5.8
40		4	33	3.2	64	64	78	11.2	7
50		5	39	3.2	79	78	95	14.7	8
63		5	46	3.2	95	91.5	113	16.2	9
80	25, 50, 75, 100	7	59	4.5	118	114	140	19.5	11
100		7	71	6	137	136	162	23	12.5

Rod side flange style: CBQ2F/CDBQ2F



Rod end male thread



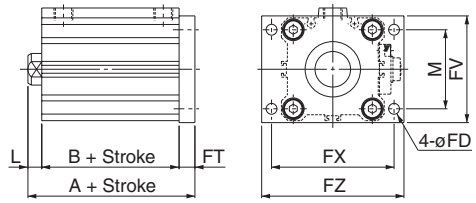
Rod Side Flange Style

Bore size (mm)	Standard stroke	With head end lock		With rod end lock		FD	FT	FV	FX	FZ
		A	B	A	B					
32	10, 15, 20, 25 50, 75, 100	82.5	65.5	75	58	5.5	8	48	56	65
40		92	75	81.5	64.5	5.5	8	54	62	72
50		93.5	75.5	83.5	65.5	6.6	9	67	76	89
63		95	77	89	71	9	9	80	92	108
80	25, 50	131	111	123.5	103.5	11	11	99	116	134
	75, 100	136	116	136	116					
100	25, 50	142.5	120.5	135	113	11	11	117	136	154
	75, 100	147.5	125.5	147.5	125.5					

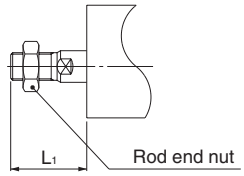
Bore size (mm)	Standard stroke	L	L1	M
32	10, 15, 20, 25 50, 75, 100	17	38.5	34
40		17	38.5	40
50		18	43.5	50
63		18	43.5	60
80	25, 50, 75, 100	20	53.5	77
100		22	53.5	94

Dimensions: ø32 to ø100

Head side flange style: CBQ2G/CDBQ2G



Rod end male thread

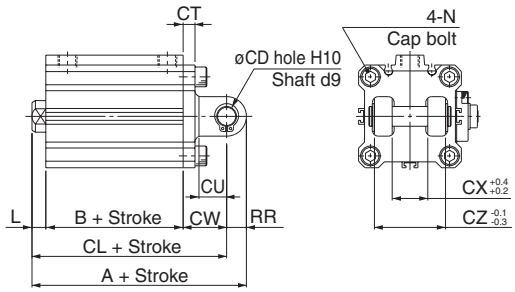


Head Side Flange Style

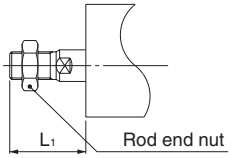
Bore size (mm)	Standard stroke	With head end lock				With rod end lock			
		A	B	L	L1	A	B	L	L1
32	10, 15, 20, 25 50, 75, 100	80.5	65.5	7	28.5	73	58	7	28.5
40		90	75	7	28.5	79.5	64.5	7	28.5
50		92.5	75.5	8	33.5	82.5	65.5	8	33.5
63		94	77	8	33.5	88	71	8	33.5
80	25, 50	132	111	10	43.5	124.5	103.5	10	43.5
	75, 100	147	116	20	53.5	147	116	20	53.5
100	25, 50	143.5	120.5	12	43.5	136	113	12	43.5
	75, 100	158.5	125.5	22	53.5	158.5	125.5	22	53.5

Bore size (mm)	Standard stroke	M	FD	FT	FV	FX	FZ
32	10, 15, 20, 25, 50, 75, 100	34	5.5	8	48	56	65
40		40	5.5	8	54	62	72
50		50	6.6	9	67	76	89
63		60	9	9	80	92	108
80		77	11	11	99	116	134
100		94	11	11	117	136	154

Double clevis style: CBQ2D/CDBQ2D



Rod end male thread



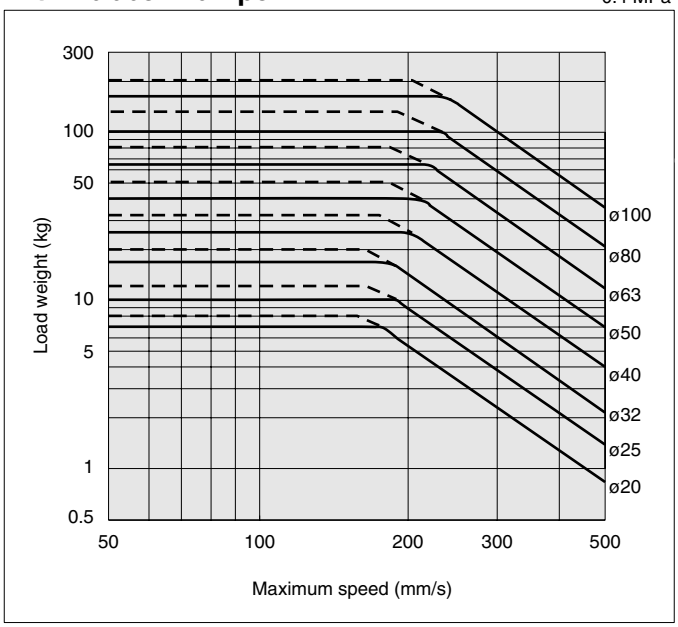
Double Clevis Style

Bore size (mm)	Standard stroke	With head end lock			With rod end lock			CD	CT	CU	L	L1
		A	B	CL	A	B	CL					
32	10, 15, 20, 25 50, 75, 100	102.5	65.5	92.5	95	58	85	10	5	14	7	28.5
40		114	75	104	103.5	64.5	93.5	10	6	14	7	28.5
50		125.5	75.5	111.5	115.5	65.5	101.5	14	7	20	8	33.5
63		129	77	115	123	71	109	14	8	20	8	33.5
80	25, 50	177	111	159	169.5	103.5	151.5	18	10	27	10	43.5
	75, 100	192	116	174	192	116	174				20	53.5
100	25, 50	199.5	120.5	177.5	192	113	170	22	13	31	12	43.5
	75, 100	214.5	125.5	192.5	214.5	125.5	192.5				22	53.5

Bore size (mm)	Standard stroke	CW	CX	CZ	N	RR
32	10, 15, 20, 25 50, 75, 100	20	18	36	M6 x 1.0	10
40		22	18	36	M6 x 1.0	10
50		28	22	44	M8 x 1.25	14
63		30	22	44	M10 x 1.5	14
80	25, 50, 75, 100	38	28	56	M12 x 1.75	18
100		45	32	64	M12 x 1.75	22

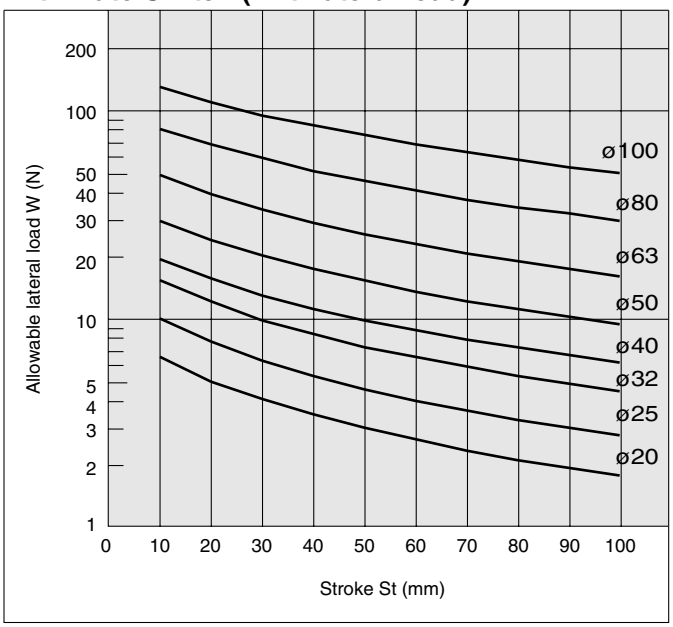
Allowable Kinetic Energy

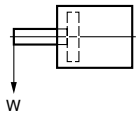
With Rubber Bumper



Allowable Lateral Load at Rod End

With Auto Switch (Anti-lateral load)





(Mounting orientation: Horizontal)

Air Cylinder: With End Lock

Series CBG1

ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

CBG1 **L** **N** **25** — **100** **[ ]** — **H** **N**

CDBG1 **L** **N** **25** — **100** **[ ]** — **H** **N** — **H7BW** **[ ]**

Built-in magnet

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
U *	Rod side trunnion style
T *	Head side trunnion style
D	Clevis style

* Not available for bore size ø80 and ø100.
Besides, trunnion cannot be attached in the side to which an end lock is attached.

Note) Mounting brackets are shipped together, (but not assembled).

Type

N	Rubber bumper
A	Air cushion

Bore size

20	20 mm	**50**	50 mm
25	25 mm	**63**	63 mm
32	32 mm	**80**	80 mm
40	40 mm	**100**	100 mm

Cylinder stroke (mm)

Refer to "Standard Stroke" on page 6-5-56.

With rod boot

Nil	Without rod boot
J	Nylon tarpaulin
K	Heat resistant tarpaulin

* In the case of w/ rod boot, and a foot bracket or rod side flange as a bracket, those parts are to be assembled at the time of shipment.

Lock position

H	Head end lock
R	Rod end lock
W	Double end lock

Manual release type

N	Non-lock type
L	Lock type

Auto switch

Nil	Without auto switch (Built-in magnet)

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

Number of auto switches

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

Applicable Auto Switch/Refer to page 6-16-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model: Applicable bore size (mm) 20 to 63	Auto switch model: Applicable bore size (mm) 80, 100	Lead wire length (m) * 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**C76**	—	●	●	—	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V, 200 V	**B54**		●	●	●	—	—	—	Relay, PLC
		Connector					100 V	**C73**	—	●	●	●	—	—		
							—	**C73C**	—	●	●	●	●	—	—	
	Diagnostic indication (2-color indication)	Grommet				—		**B59W**		●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**H7A1**	**G59**	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				**H7A2**	**G5P**	●	●	○	—	○		
				2-wire		12 V		**H7B**	**K59**	●	●	○	—	○	—	
		Connector						**H7C**	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		**H7NW**	**G59W**	●	●	○	—	○	IC circuit	
				3-wire (PNP)				**H7PW**	**G5PW**	●	●	○	—	○		
								H7BW	**K59W**	●	●	○	—	○		
	Water resistant (2-color indication)			2-wire		12 V		**H7BA**	**G5BA**	—	●	○	—	○	—	
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		**H7NF**	**G59F**	●	●	○	—	○	IC circuit	

* Lead wire length symbols: 0.5 m ····· Nil (Example) C73C
3 m ····· L (Example) C73CL
5 m ····· Z (Example) C73CZ
None ····· N (Example) C73CN

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

• Since there are other applicable auto switches than listed, refer to page 6-5-64 for details.
• For details about auto switches with pre-wire connector, refer to page 6-16-60.

Specifications

Bore size (mm)	20	25	32	40	50	63	80	100
Action	Double acting, Single rod							
Type	Non-lube							
Fluid	Air							
Proof pressure	1.5 MPa							
Maximum operating pressure	1.0 MPa							
Minimum operating pressure	0.15 MPa *							
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)							
Piston speed	50 to 1000 mm/s						50 to 700 mm/s	
Stroke length tolerance	Up to $1000^{st\ +1.4}_{\ 0}$ mm, Up to $1200^{st\ +1.8}_{\ 0}$ mm						Up to $1000^{st\ +1.4}_{\ 0}$ mm Up to $1500^{st\ +1.8}_{\ 0}$ mm	
Thread tolerance	JIS Class 2							
Cushion	Rubber bumper, Air cushion							
Mounting **	Basic style, Axial foot style, Rod side flange style Head side flange style, Rod side trunnion style Head side trunnion style, Clevis style (Used for changing the port location by 90°.)							

* 0.05 MPa except locking parts.
** Rod/Head side trunnion styles are not available for bore sizes ø80 and ø100. Trunnion is not attached for a cover on which lock mechanism is equipped.

Lock Specifications

Lock position	Head end, Rod end, Double end							
Holding force (Max.) (N)	ø20	ø25	ø32	ø40	ø50	ø63	ø80	ø100
	215	330	550	860	1340	2140	3450	5390
Backlash	2 mm or less							
Manual release	Non-lock type, Lock type							

Adjust the switch position so that it operates upon movement to both the stroke end and backlash (2 mm) positions.

Made to Order Specifications (For details, refer to page 6-17-1.)

Symbol	Specifications
-XA□	Change of rod end shape

Standard Stroke

Bore size (mm)	Standard stroke (mm) (1)	Long stroke (mm)	Maximum manufacturable stroke (mm)
20	25, 50, 75, 100, 125, 150, 200	201 to 350	1500
25	25, 50, 75, 100, 125, 150, 200, 250, 300	301 to 400	
32		301 to 450	
40		301 to 800	
50, **63**		301 to 1200	
80		301 to 1400	
100		301 to 1500	

Note 1) Intermediate strokes other than the above are produced upon receipt of order. Spacers are not used for intermediate strokes.
Note 2) Long stroke applies to the axial foot style and the rod side flange style. If other mounting brackets are used, or the length exceeds the long stroke limit, the stroke should be determined based on the stroke selection table in the technical data.

Minimum Stroke for Auto Switch Mounting

Model	No. of auto switches mounted	
	2	1
D-C7/C8 **D-B5/B6** **D-H7** **D-G5/K5**	15 mm	10 mm
D-B59W	20 mm	15 mm
D-H7LF	20 mm	10 mm

Rod Boot Material

Symbol	Rod boot material	Maximum operating temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C *

* Maximum ambient temperature for the rod boot itself.

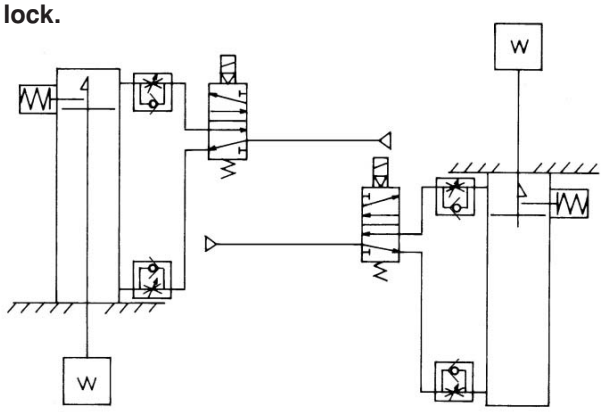
⚠ Precautions

Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to pages 6-20-3 to 6-20-6.

Use the Recommended Pneumatic Circuit

⚠ Caution

• **This is necessary for proper operation and release of the lock.**



Head end lock **Rod end lock**

Operating Precautions

⚠ Caution

1. **Do not use 3 position solenoid valves.**
   Avoid use in combination with 3 position solenoid valves (especially closed center metal seal types). If pressure is trapped in the port on the lock mechanism side, the cylinder cannot be locked. Furthermore, even after being locked, the lock may be released after some time, due to air leaking from the solenoid valve and entering the cylinder.
2. **Back pressure is required when releasing the lock.**
   Be sure air is supplied to side of cylinder without the locking mechanism, as above, prior to supplying air pressure to the side with end lock or lock may not be released. (⇨ Refer to "Releasing the Lock".)
3. **Release the lock when mounting or adjusting the cylinder.**
   If mounting or other work is performed when the cylinder is locked, the lock unit may be damaged.
4. **Operate with a load ratio of 50% or less.**
   If the load ratio exceeds 50%, this may cause problems such as failure of the lock to release, or damage to the lock unit.
5. **Do not operate multiple cylinders in synchronization.**
   Avoid applications in which two or more end lock cylinders are synchronized to move one workpiece, as one of the cylinder locks may not be able to release when required.
6. **Use a speed controller with meter-out control.**
   Lock cannot be released occasionally by meter-in control.
7. **Be sure to operate completely to the cylinder stroke end on the side with the lock.**
   If the cylinder piston does not reach the end of the stroke, locking and unlocking may not be possible.
8. **Do not use an air cylinder as an air-hydro cylinder. This could result in leakage of oil.**
9. **Install a rod boot without twisting.**
   If the cylinder is installed with its bellows twisted, it could damage the bellows.
10. **Adjust an auto switch position so that it operates for movement to both the stroke end and backlash (2 mm) positions.**
    When a 2-color indication switch is adjusted for green indication at the stroke end, it may change to red for the backlash return, but this is not abnormal.

Operating Precautions

⚠ Warning

1. **Do not operate the cushion valve in the fully closed or fully opened state.**
   Using it in the fully closed state will cause the cushion seal to be damaged. Using it in the fully opened state will cause the piston rod assembly or the cover to be damaged.
2. **Operate within the specified cylinder speed.**
   Otherwise, cylinder and seal damage may occur.

Operating Pressure

⚠ Caution

1. Use pressures over 0.15 MPa at port with locking mechanism.

Exhaust Speed

⚠ Caution

1. Locking will occur automatically if the pressure applied to the port on the lock mechanism side falls to 0.05 MPa or less. In cases where the piping on the lock mechanism side is long and thin, or the speed controller is separated at some distance from the cylinder port, the exhaust speed will be reduced. Take note that some time may be required for the lock to engage. In addition, clogging of a silencer mounted on the solenoid valve exhaust port can produce the same effect.

Relation to Cushion

⚠ Caution

1. When cushion valve at side with locking mechanism is fully opened or closed, piston rod may reached at stroke end. Thus lock is not established. And when locking is done at cushion valve fully closed, adjust cushion valve since lock may not be released.

Releasing the Lock

⚠ Warning

1. Before releasing the lock, be sure to supply air to the side without the lock mechanism, so that there is no load applied to the lock mechanism when it is released. (Refer to the recommended pneumatic circuits.) If the lock is released when the port on the other side is in an exhaust state, and with a load applied to the lock unit, the lock unit may be subjected to an excessive force and be damaged. Furthermore, sudden movement of the piston rod is very dangerous.

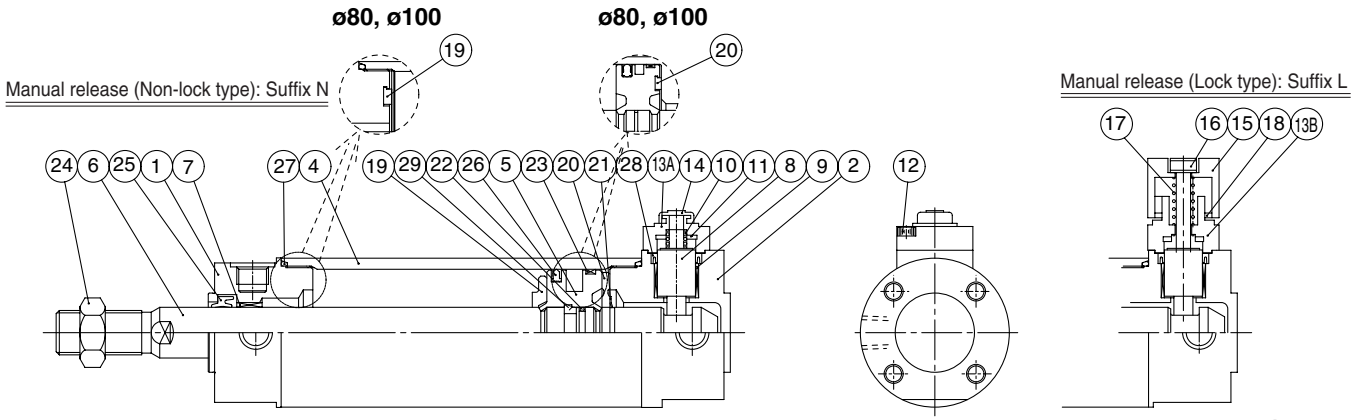
Disassembly/Replacement

⚠ Caution

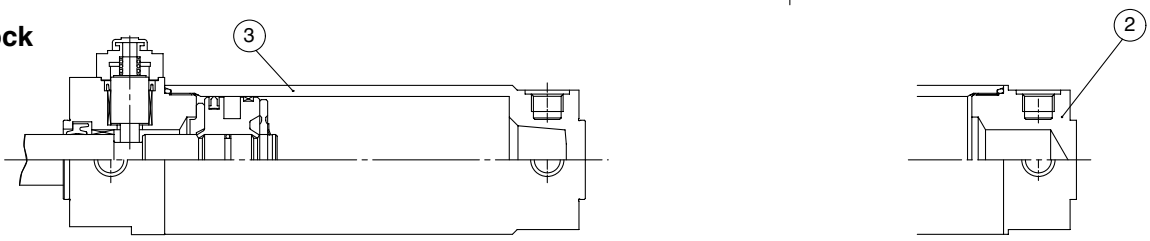
1. **Do not replace the bushings or the cushion seals.**
   The bushings and the cushion seals are press-fit. To replace them, they must be replaced together with the cover assembly.
2. **To replace a seal, apply grease to the new seal before installing it.**
   If the cylinder is put into operation without applying grease to the seal, it could cause the seal to wear significantly, leading to premature air leakage.
3. **Those with a bore of ø50 or more cannot be disassembled.**
   When disassembling cylinders with bore sizes of ø20 through ø40, grip the double flat part of either the head cover or the rod cover with a vise and loosen the other side with a wrench or a monkey wrench, etc., and then remove the cover. When re-tightening, tighten approximately 2 degrees more than the original position. (Cylinders with ø50 or larger bore sizes are tightened with a large tightening torque and cannot be disassembled. Please contact SMC when disassembly is required.)

Construction: With Rubber Bumper

Head end lock



Rod end lock



Long stroke

Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Clear hard anodized
②	Head cover	Aluminum alloy	Clear hard anodized
③	Tube cover	Aluminum alloy	Clear hard anodized
④	Cylinder tube	Aluminum alloy	Hard anodized
⑤	Piston	Aluminum alloy	Chromated
⑥	Piston rod	Carbon steel *	Hard chrome plated
⑦	Bushing	Oil-impregnated sintered alloy	ø40 and larger are lead-bronze casted
⑧	Lock piston	Carbon steel	Hard chrome plated, Heat treated
⑨	Lock bushing	Copper alloy	
⑩	Lock spring	Stainless steel	
⑪	Bumper	Urethane	
⑫	Hexagon socket head cap screw	Alloy steel	Black zinc chromated
⑬A	Cap A	Aluminum die-casted	Black painted
⑬B	Cap B	Carbon steel	Oxide film treated
⑭	Rubber cap	Synthetic rubber	
⑮	M/O knob	Zinc die-casted	Black painted
⑯	M/O bolt	Alloy steel	Black zinc chromated, Red painted
⑰	M/O spring	Steel wire	Zinc chromated
⑱	Stopper ring	Carbon steel	Zinc chromated
⑲	Bumper A	Urethane	
⑳	Bumper B	Urethane	ø40 or larger: the same as bumper A

No.	Description	Material	Note
㉑	Snap ring	Stainless steel	None for ø80, ø100
㉒	Piston gasket	NBR	
㉓	Wear ring	Resin	
㉔	Rod end nut	Rolled steel	Nickel plated
㉕	Rod seal	NBR	
㉖	Piston seal	NBR	
㉗	Cylinder tube gasket	NBR	1 pc. when using tube cover
㉘	Lock piston seal	NBR	2 pcs. for with locks in both sides
㉙	Piston holder	Urethane	ø40 to ø100 only

Note) In the case of cylinders with auto switches, magnets are installed in the piston.

* The material is stainless steel on auto switch equipped styles ø20 and ø25.

Replacement Parts: Seal Kit (With lock at single end)

Series	Bore size (mm)	Kit no.	Contents
CBG1□N Rubber bumper type	20	CBG1N20-PS	Set of nos. above ㉕, ㉖, ㉗, ㉘ and grease pack
	25	CBG1N25-PS	
	32	CBG1N32-PS	
	40	CBG1N40-PS	
	50	CBG1N50-PS	
	63	CBG1N63-PS	
	80	CBG1N80-PS	
	100	CBG1N100-PS	

Order seal kit in accordance with the bore size.

Replacement Parts: Seal Kit (With lock at double end)

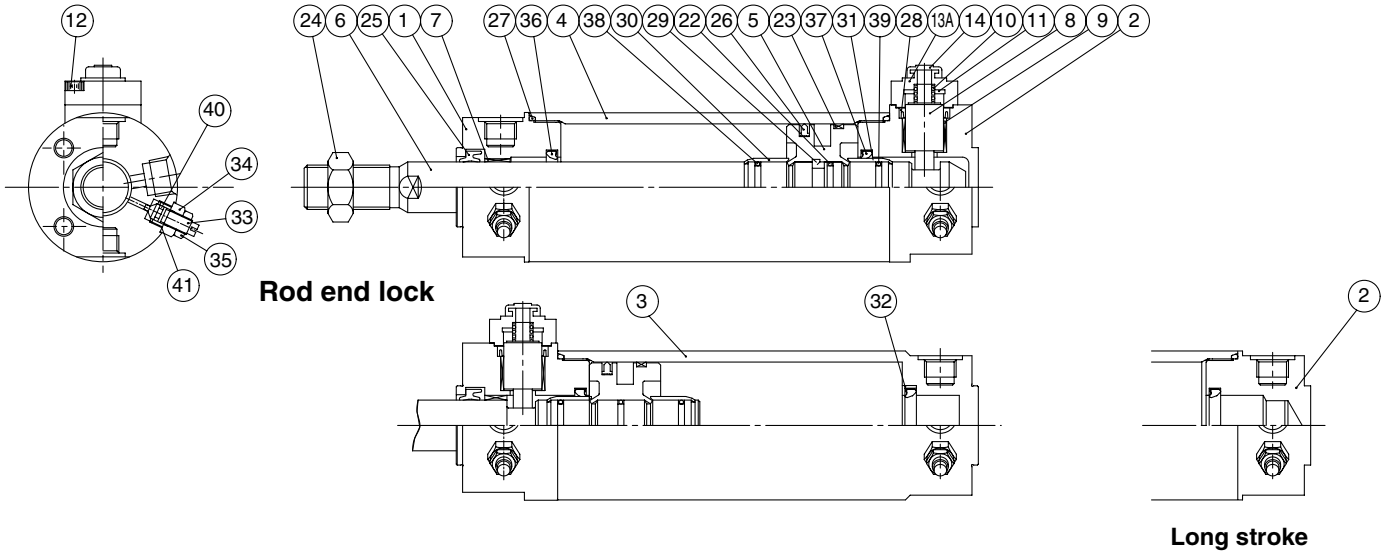
Series	Bore size (mm)	Kit no.	Contents
CBG1□N Rubber bumper type	20	CBG1N20-PS-W	Set of nos. above ㉕, ㉖, ㉗, ㉘ and grease pack
	25	CBG1N25-PS-W	
	32	CBG1N32-PS-W	
	40	CBG1N40-PS-W	
	50	CBG1N50-PS-W	
	63	CBG1N63-PS-W	
	80	CBG1N80-PS-W	
	100	CBG1N100-PS-W	

Order seal kit in accordance with the bore size.

Construction: With Air Cushion

With air cushion
Head end lock

Manual release (Non-lock type): Suffix N



Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Clear hard anodized
②	Head cover	Aluminum alloy	Clear hard anodized
③	Tube cover	Aluminum alloy	Clear hard anodized
④	Cylinder tube	Aluminum alloy	Hard anodized
⑤	Piston	Aluminum alloy	Chromated
⑥	Piston rod	Carbon steel *	Hard chrome plated
⑦	Bushing	Oil-impregnated sintered alloy	ø40 and larger are lead-bronze casted
⑧	Lock piston	Carbon steel	Hard chrome plated, Heat treated
⑨	Lock bushing	Copper alloy	
⑩	Lock spring	Stainless steel	
⑪	Bumper	Urethane	
⑫	Hexagon socket head cap screw	Alloy steel	Black zinc chromated
⑬A	Cap A	Aluminum die-casted	Black painted
⑬B	Cap B	Carbon steel	Oxide film treated
⑭	Rubber cap	Synthetic rubber	
⑮	M/O knob	Zinc die-casted	Black painted
⑯	M/O bolt	Alloy steel	Black zinc chromated, Red painted
⑰	M/O spring	Steel wire	Zinc chromated
⑱	Stopper ring	Carbon steel	Zinc chromated

Note) In the case of cylinders with auto switches, magnets are installed in the piston.

* The material is stainless steel on auto switch equipped styles ø20 and ø25.

No.	Description	Material	Note
㉒	Piston gasket	NBR	
㉓	Wear ring	Resin	
㉔	Rod end nut	Rolled steel	Nickel plated
㉕	Rod seal	NBR	1 pc. when using tube cover
㉖	Piston seal	NBR	2 pcs. for with locks in both sides
㉗	Cylinder tube gasket	NBR	
㉘	Lock piston seal	NBR	
㉙	Piston holder	Urethane	ø40 to ø100 only
㉚	Cushion ring A	Brass	
㉛	Cushion ring B	Brass	Only when using nickel plated, tube cover
㉜	Seal retainer	Rolled steel	
㉝	Cushion valve	Rolled steel	Electroless nickel plated
㉞	Valve retainer	Rolled steel	Electroless nickel plated
㉟	Lock nut	Rolled steel	Nickel plated
㊱	Cushion seal A	Urethane	
㊲	Cushion seal B	Urethane	ø32 or larger: The same as A
㊳	Cushion ring gasket A	NBR	
㊴	Cushion ring gasket B	NBR	ø32 or larger: The same as A
㊵	Valve seal	NBR	
㊶	Valve retaining gasket	NBR	

Replacement Parts: Seal Kit (With lock at single end)

Series	Bore size (mm)	Kit no.	Contents
CBG1□A Rubber bumper type	20	CBG1A20-PS	Set of nos. above ㉕, ㉖, ㉗, ㉘, ㊵ and grease pack
	25	CBG1A25-PS	
	32	CBG1A32-PS	
	40	CBG1A40-PS	
	50	CBG1A50-PS	
	63	CBG1A63-PS	
	80	CBG1A80-PS	
	100	CBG1A100-PS	

Order seal kit in accordance with the bore size.

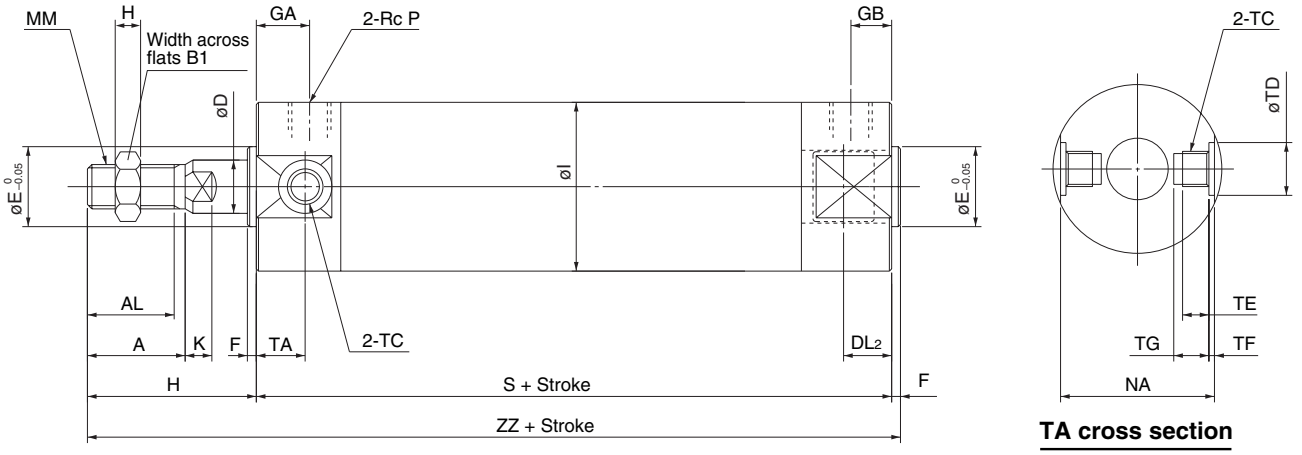
Replacement Parts: Seal Kit (With lock at double end)

Series	Bore size (mm)	Kit no.	Contents
CBG1□A Rubber bumper type	20	CBG1A20-PS-W	Set of nos. above ㉕, ㉖, ㉗, ㉘, ㊵ and grease pack
	25	CBG1A25-PS-W	
	32	CBG1A32-PS-W	
	40	CBG1A40-PS-W	
	50	CBG1A50-PS-W	
	63	CBG1A63-PS-W	
	80	CBG1A80-PS-W	
	100	CBG1A100-PS-W	

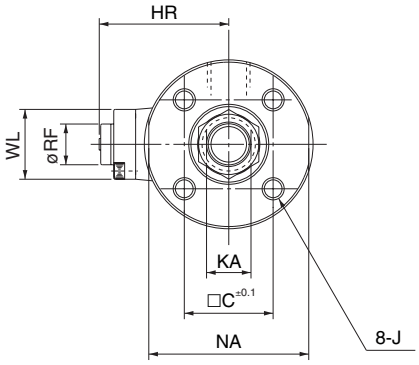
Order seal kit in accordance with the bore size.

Rubber Bumper Type: CBG1BN

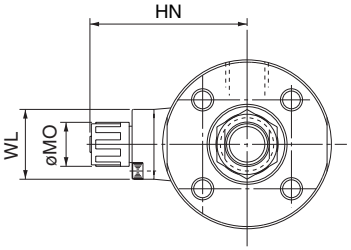
Head end lock: CBG1BN Bore size – Stroke – H□



Manual release (Non-lock type): Suffix N



Manual release (Lock type): Suffix L

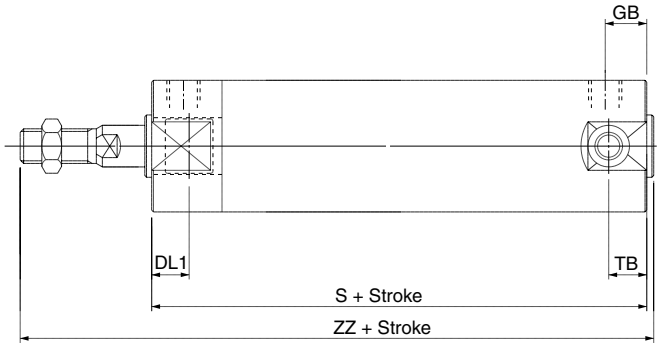


Bore size (mm)	Stroke range	A	AL	B1	C	D	DL2	E	F	GA	GB	H	H1	HR	HN (Max.)	I	J
20	Up to 350	18	15.5	13	14	8	12.5	12	2	12	12	35	5	25.3	37	26	M4 x 0.7 depth 7
25	Up to 400	22	19.5	17	16.5	10	12.5	14	2	12	12	40	6	28.3	40	31	M5 x 0.8 depth 7.5
32	Up to 450	22	19.5	17	20	12	12	18	2	12	12	40	6	31.3	43	38	M5 x 0.8 depth 8
40	Up to 800	30	27	19	26	16	15	25	2	13	13	50	8	38.3	52.5	47	M6 x 1 depth 12
50	Up to 1200	35	32	27	32	20	16.5	30	2	14	14	58	11	44.5	58.5	58	M8 x 1.25 depth 16
63	Up to 1200	35	32	27	38	20	16.5	32	2	14	14	58	11	45	59	72	M10 x 1.5 depth 16
80	Up to 1400	40	37	32	50	25	19	40	3	20	20	71	13	53.5	68	89	M10 x 1.5 depth 22
100	Up to 1500	40	37	41	60	30	20	50	3	20	20	71	16	64.5	79	110	M12 x 1.75 depth 22

Bore size (mm)	K	KA	MM	MO	NA	P	RF	S	TA	TC	TDH9	TE	TF	TG	WL	ZZ
20	5	6	M8 x 1.25	15	24	1/8	11	81	11	M5 x 0.8	$8^{+0.08}_{0}$	4	0.5	5.5	15	118
25	5.5	8	M10 x 1.25	15	29	1/8	11	81	11	M6 x 0.75	$10^{+0.08}_{0}$	5	1	6.5	15	123
32	5.5	10	M10 x 1.25	15	35.5	1/8	11	81	11	M8 x 1.0	$12^{+0.08}_{0}$	5.5	1	7.5	24	123
40	6	14	M14 x 1.5	19	44	1/8	11	92	12	M10 x 1.25	$14^{+0.08}_{0}$	6	1.25	8.5	24	144
50	7	18	M18 x 1.5	19	55	1/4	11	107	13	M12 x 1.25	$16^{+0.08}_{0}$	7.5	2	10	24	167
63	7	18	M18 x 1.5	19	69	1/4	11	107	13	M14 x 1.5	$18^{+0.08}_{0}$	11.5	3	14.5	24	167
80	10	22	M22 x 1.5	23	80	3/8	21	130	—	—	—	—	—	—	40	204
100	10	26	M26 x 1.5	23	100	1/2	21	130	—	—	—	—	—	—	40	204

Rubber Bumper Type: CBG1BN

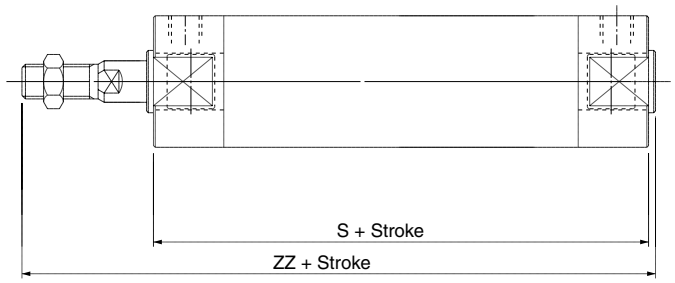
Rod end lock: CBG1BN Bore size – Stroke – R□



Bore size (mm)	DL_1	GB	S	TB	ZZ
20	19.5	10(12)	80(88)	11	117(125)
25	19.5	10(12)	80(88)	11	122(130)
32	20	10(12)	81(89)	10(11)	123(131)
40	19	10(13)	87(96)	10(12)	139(148)
50	23.5	12(14)	102(114)	12(13)	162(174)
63	23.5	12(14)	102(114)	12(13)	162(174)
80	27	16(20)	124(138)	—	198(212)
100	30	16(20)	124(138)	—	198(212)

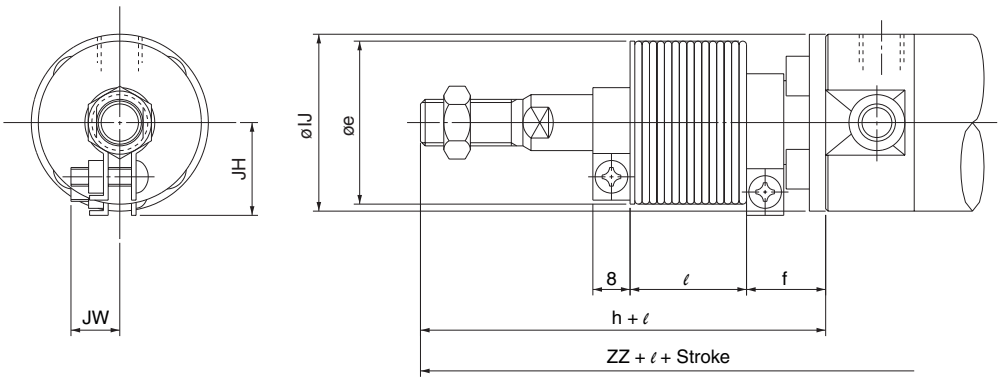
∗ ( ): Denotes the dimensions for long stroke.

Double end lock: CBG1BN Bore size – Stroke – W□



Bore size (mm)	S	ZZ
20	92	129
25	92	134
32	91	133
40	101	153
50	119	179
63	119	179
80	146	220
100	146	220

With rod boot

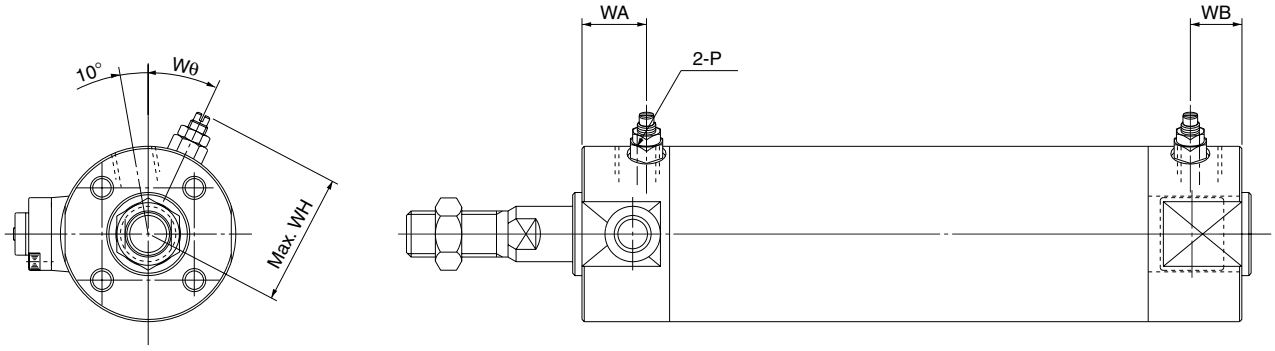


Bore size (mm)	e	f	h	IJ	JH	JW	ℓ	Head end lock (-H□) ZZ	Rod end lock (-R□) ZZ	Double end lock (-W□) ZZ
20	30	16	55	27	(14.5)	(11.5)	0.25 stroke	138	137(145)	149
25	30	17	62	32	(17.5)	(11.5)		145	144(152)	156
32	35	17	62	38	(19.5)	(11.5)		145	145(153)	155
40	35	17	70	48	(22.5)	(13)		164	159(168)	173
50	40	17	78	59	(25)	(13)		187	182(194)	199
63	40	18	78	72	(25)	(13)		187	182(194)	199
80	52	10	80	59	—	—		213	207(221)	229
100	62	7	80	71	—	—		213	207(221)	229

∗ ( ): Denotes the dimensions for long strokes.
∗∗ The minimum stroke with rod boot is 20 mm.

Air Cushion Type: CBG1BA

Head end lock: CBG1BA Bore size – Stroke – H□
Rod end lock: CBG1BA Bore size – Stroke – R□



Head End Lock: -H□

Bore size (mm)	P	WA	WB	WH	Wθ
20	M5 x 0.8	16	16	23	30°
25	M5 x 0.8	16	16	25	30°
32	Rc 1/8	16	16	28.5	25°
40	Rc 1/8	16	16	33	20°
50	Rc 1/4	18	18	40.5	20°
63	Rc 1/4	18	18	47.5	20°
80	Rc 3/8	22	22	60.5	20°
100	Rc 1/2	22	22	71	20°

∗ For dimensions other than listed above, refer to the dimensions with rubber bumper.

Rod End Lock: -R□

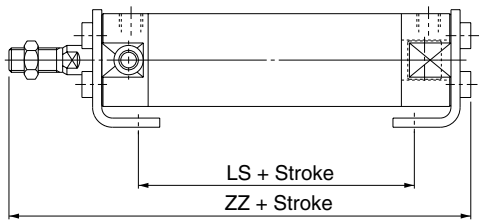
Bore size (mm)	P	WA	WB	WH	Wθ
20	M5 x 0.8	16	15(16)	23	30°
25	M5 x 0.8	16	15(16)	25	30°
32	Rc 1/8	16	15(16)	28.5	25°
40	Rc 1/8	16	15(16)	33	20°
50	Rc 1/4	18	17(18)	40.5	20°
63	Rc 1/4	18	17(18)	47.5	20°
80	Rc 3/8	22	22	60.5	20°
100	Rc 1/2	22	22	71	20°

∗ ( ): Denotes the dimensions for long strokes.
∗∗ For dimensions other than the listed above, refer to the dimensions with rubber bumper.

With Mounting Bracket

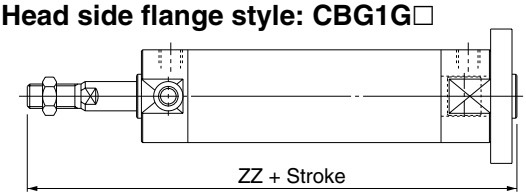
(For dimensions other than listed below, refer to pages 6-55-60 to 62, 9 and 10.)

Axial foot style: CBG1L□



Rod side flange style: CBG1F□

Head side flange style: CBG1G□



Foot Style

Bore size (mm)	Head end lock: -H□			Rod end lock: -R□			Double end lock: -W□		
	LS	ZZ		LS	ZZ		LS	ZZ	
	—	Without rod boot	With rod boot	—	Without rod boot	With rod boot	—	Without rod boot	With rod boot
20	57	122	142 + ℓ	56(64)	121(129)	141(149) + ℓ	68	133	153 + ℓ
25	57	127.5	149.5 + ℓ	56(64)	126.5(134.5)	148.5(156.5) + ℓ	68	138.5	160.5 + ℓ
32	55	127.5	149.5 + ℓ	55(63)	127.5(135.5)	149.5(157.5) + ℓ	65	137.5	159.5 + ℓ
40	65	149	169 + ℓ	60(69)	144(153)	164(173) + ℓ	74	158	178 + ℓ
50	72	174.5	194.5 + ℓ	67(79)	169.5(181.5)	189.5(201.5) + ℓ	84	186.5	206.5 + ℓ
63	72	174.5	194.5 + ℓ	67(79)	169.5(181.5)	189.5(201.5) + ℓ	84	186.5	206.5 + ℓ
80	82	210.5	219.5 + ℓ	76(90)	204.5(218.5)	213.5(227.5) + ℓ	98	226.5	235.5 + ℓ
100	82	214	223 + ℓ	76(90)	208(222)	217(231) + ℓ	98	230	239 + ℓ

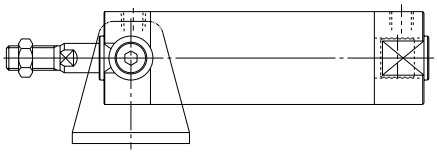
∗ ( ): Denotes the dimensions for long stroke.

Rod Side Flange Style ···· Overall length is the same as basic style.
Head Side Flange Style

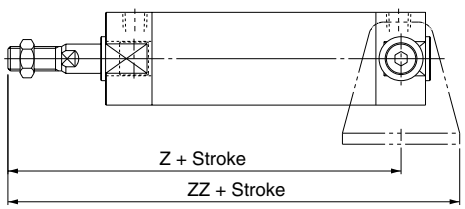
Bore size (mm)	Head end lock: -H□		Rod end lock/-R□		Double end lock/-W□	
	ZZ (Head side flange)					
	Without rod boot	With rod boot	Without rod boot	With rod boot	Without rod boot	With rod boot
20	124	144 + ℓ	123	143 + ℓ	135	155 + ℓ
25	130	152 + ℓ	129	151 + ℓ	141	163 + ℓ
32	130	152 + ℓ	130	152 + ℓ	140	162 + ℓ
40	152	172 + ℓ	147(156)	167(176) + ℓ	161	181 + ℓ
50	176	196 + ℓ	171(183)	191(203) + ℓ	188	208 + ℓ
63	176	196 + ℓ	171(183)	191(203) + ℓ	188	208 + ℓ
80	215	224 + ℓ	209(223)	218(232) + ℓ	231	240 + ℓ
100	218	227 + ℓ	212(226)	221(235) + ℓ	234	243 + ℓ

∗ ( ): Denotes the dimensions for long stroke.

Rod side trunnion style: CBG1U□ (Rod end lock-H□ only)



Head side trunnion style: CBG1T□ (Rod end lock -R□ only)



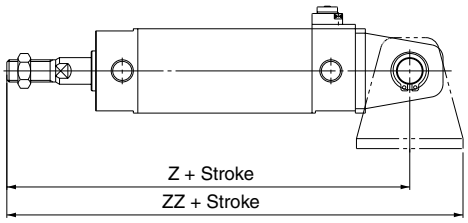
Rod Side Trunnion Style ···· Overall length is the same as basic style.
Head Side Trunnion Style

Bore size (mm)	Rod end lock/-R□			
	Z (Head side trunnion)		ZZ (Head side trunnion)	
	Without rod boot	With rod boot	Without rod boot	With rod boot
20	104	124 + ℓ	125	145 + ℓ
25	109	131 + ℓ	130	152 + ℓ
32	111	133 + ℓ	135	157 + ℓ
40	127(134)	147(154) + ℓ	155(162)	175(182) + ℓ
50	148(159)	168(179) + ℓ	180(191)	200(211) + ℓ
63	148(159)	168(179) + ℓ	185(196)	205(216) + ℓ

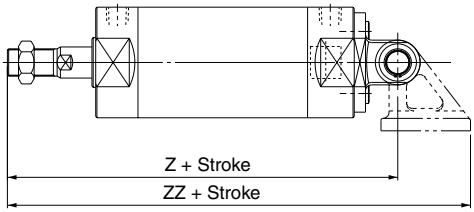
∗ ( ): Denotes the dimensions for long stroke.

With Mounting Bracket

Clevis style: CBG1D□ ø20 to ø63



Clevis style: CBG1D□ ø80 to ø100



Clevis Style

Bore size (mm)	Head end lock: -H□				Rod end lock: -R□			
	Z		ZZ		Z		ZZ	
	Without rod boot	With rod boot	Without rod boot	With rod boot	Without rod boot	With rod boot	Without rod boot	With rod boot
20	130	150 + ℓ	151	171 + ℓ	129	149 + ℓ	150	170 + ℓ
25	137	159 + ℓ	158	180 + ℓ	136	158 + ℓ	157	179 + ℓ
32	141	163 + ℓ	165	187 + ℓ	141	163 + ℓ	165	187 + ℓ
40	164	184 + ℓ	192	212 + ℓ	159(168)	179(188) + ℓ	187(196)	207(216) + ℓ
50	190	210 + ℓ	222	242 + ℓ	185(197)	205(217) + ℓ	217(229)	237(249) + ℓ
63	195	215 + ℓ	232	252 + ℓ	190(202)	210(222) + ℓ	227(239)	247(259) + ℓ
80	236	245 + ℓ	294.5	303.5 + ℓ	230(244)	239(253) + ℓ	288.5(302.5)	297.5(311.5) + ℓ
100	244	253 + ℓ	320.5	329.5 + ℓ	238(252)	247(261) + ℓ	314.5(328.5)	323.5(337.5) + ℓ

Bore size (mm)	Double end lock/-W□			
	Z		ZZ	
	Without rod boot	With rod boot	Without rod boot	With rod boot
20	141	161 + ℓ	162	182 + ℓ
25	148	170 + ℓ	169	191 + ℓ
32	151	173 + ℓ	175	197 + ℓ
40	173	193 + ℓ	201	221 + ℓ
50	202	222 + ℓ	234	254 + ℓ
63	207	227 + ℓ	244	264 + ℓ
80	252	261 + ℓ	310.5	319.5 + ℓ
100	260	269 + ℓ	336.5	345.5 + ℓ

∗ ( ): Denotes the dimensions for long stroke.

Other than the applicable auto switches listed in “How to Order”, the following auto switches can be mounted. For detailed specifications, refer to page 6-16-1.

Type	Model	Electrical entry	Features	Applicable bore size (mm)
Reed switch	D-C80	Grommet	Without indicator light	20 to 63
	D-C80C	Connector		
	D-B53	Grommet	—	20 to 100
	D-B64	Grommet	Without indicator light	
Solid state switch	D-G5NTL	Grommet	With timer	

∗ With pre-wire connector is available for D-G5NTL type, too. Refer to page 6-16-55 for details.
∗ Wide range detection type, solid state auto switch (D-G5NBL type) is also available. For details, refer to page 6-16-59.

Air Cylinder: With End Lock

Series MBB

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch MBB L 32 □ 50 □ H N

With auto switch MDBB L 32 □ 50 □ H N Y7BW □

Built-in magnet

Mounting

B	Basic/Without bracket
L	Axial foot
F	Rod side flange
G	Head side flange
C	Single clevis
D	Double clevis
T	Center trunnion

Bore size

32	32 mm
40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm

Port thread type

Symbol	Type
Nil	Rc
TN	NPT
TF	G

Stroke (mm)

Refer to "Standard Stroke" on page 6-6-33.

Locking position

H	Locking at head end
R	Locking at rod end
W	Locking at both ends

Manual release

N	Non-locking
L	Locking

Auto switch

Nil	Without auto switch

∗ For applicable auto switches, refer to tha table below.

∗ The auto switches for D-Z7□/Z80/Y59□/Y69□/Y7□□ are included but unmounted.
(Only the switch mounting brackets for the above models are mounted.)

Number of auto switches

Nil	2
S	1
3	3
n	n

Rod boot

Rod boot	Nil	None
	J	Nylon tarpaulin
	K	Heat resistant tarpaulin

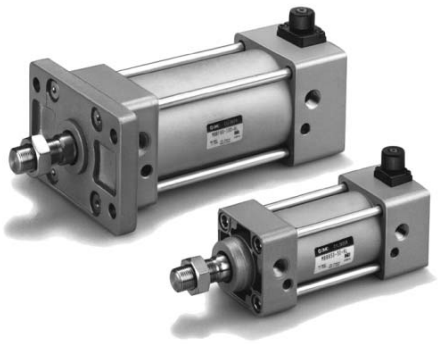
Applicable Auto Switch/Refer to page 6-16-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model: Tie-rod mounting	Auto switch model: Band mounting	Lead wire length∗(m): 0.5 (Nil)	3 (L)	5 (Z)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	—	5 V	—	Z76	—	●	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	Z73	—	●	●	●	—		Relay PLC
							100 V, 200 V	A54	—	●	●	●	—		
		Terminal conduit					—	—	A33	—	—	—	—		PLC
		DIN terminal					100 V, 200 V	—	A34	—	—	—	—	—	Relay PLC
	Diagnostic indication (2-color indication)	Grommet						—	A44	—	—	—	—		
						—	—	A59W	—	●	●	—	—		
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	—	—	100 V, 200 V	J51	—	●	●	○	—	—	
					24 V	12 V	—	Y59B	—	●	●	○	○		
		Terminal conduit		3-wire (NPN)		5 V, 12 V		—	G39	—	—	—	—	IC circuit	
				2-wire		12 V		—	K39	—	—	—	—	—	
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		Y7NW	—	●	●	○	○	IC circuit	
				3-wire (PNP)				Y7PW	—	●	●	○	○		
				2-wire		12 V		Y7BW	—	●	●	○	○	—	
	Water resistant (2-color indication)							Y7BA	—	—	●	○	○		
	Diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		F59F	—	●	●	○	○	IC circuit	
	Magnetic field resistant			2-wire		—		P5DW	—	—	●	●	○	—	

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) A54
3 m ·····L (Example) A54L
5 m ·····Z (Example) A54Z

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

• Besides the above models, there are some other auto switches that are applicable. For detailed information, please refer to page 6-6-14.



Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting, Single rod					
Fluid	Air					
Proof pressure	1.5 MPa					
Max. operating pressure	1.0 MPa					
Min. operating pressure	0.15 MPa*					
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)					
Lubrication	Not required (Non-lube)					
Operating piston speed	50 to 1000 mm/s					
Allowable stroke tolerance	up to 250: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$, 1001 to 1500: $^{+1.8}_{0}$					
Cushion	Both ends (Air cushion)					
Thread tolerance	JIS Class 2					
Port size (Rc, NPT, G)	1/8	1/4	1/4	3/8	3/8	1/2
Mounting	Basic, Foot, Rod side flange, Head side flange, Single clevis, Double clevis, Center trunnion					

∗ 0.05 MPa except locking parts.

Made to Order Specifications (For details, refer to 6-6-39.)

Symbol	Specifications
-XA□	Change of rod end shape
-XC7	Tie rod, cushion valve, tie rod nut, etc. made of stainless steel
-XC10	Dual stroke cylinder/Double rod
-XC14	Change of trunnion bracket mounting position
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC29	Double knuckle joint with spring pin
-XC30	Front trunnion

Locking Specifications

Locking position	Head end, rod end, both ends					
Holding force (Max.) N	**ø32**	**ø40**	**ø50**	**ø63**	**ø80**	**ø100**
	550	860	1340	2140	3450	5390
Back lash	1.5 mm or less					
Manual release	Non-locking type, locking type					

Accessory

Mounting		Basic	Foot	Rod side flange	Head side flange	Single clevis	Double clevis	Center trunnion
Standard	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
	Locking release bolt (N type only)	●	●	●	●	●	●	●
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●	●

Standard Stroke

Bore (mm)	Standard stroke (mm)
32	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
50	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600
63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600
80	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800
100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800

Intermediate strokes are available. (No spacer is used.)

Weight/Aluminum Tube

(kg)

Bore size (mm)		32	40	50	63	80	100
Basic weight	Basic	0.50	0.69	1.19	1.47	2.73	3.70
	Foot	0.68	0.93	1.56	1.93	3.61	4.8
	Flange	0.79	1.06	1.64	2.26	4.18	7.01
	Single clevis	0.75	0.92	1.53	2.1	3.84	6.87
	Double clevis	0.76	0.96	1.62	2.26	4.13	7.39
	Trunnion	0.79	1.05	1.67	2.27	4.28	7.37
Additional weight per each 50 mm stroke	All mounting bracket	0.11	0.16	0.26	0.27	0.42	0.56
Accessory	Single knuckle	0.15	0.23	0.26	0.26	0.60	0.83
	Double knuckle (with pin)	0.22	0.37	0.43	0.43	0.87	1.27

Additional Weight of Locking Part

(kg)

Bore size (mm)		32	40	50	63	80	100
Manual release non-locking (N)	Locking at head end (H)	0.08	0.13	0.21	0.30	0.75	1.10
	Locking at rod end (R)	0.08	0.13	0.20	0.29	0.71	1.03
	Locking at both ends (W)	0.16	0.26	0.41	0.59	1.46	2.13
Manual release locking (L)	Locking at head end (H)	0.09	0.15	0.23	0.32	0.78	1.13
	Locking at rod end (R)	0.09	0.15	0.22	0.31	0.74	1.06
	Locking at both ends (W)	0.18	0.30	0.45	0.63	1.52	2.19

Calculation example: MBBL32-100-HN
- Basic weight ····· 0.68
- Additional weight ····· 0.11/50 stroke
- Cylinder stroke ····· 100 stroke
- Locking weight ····· 0.08 (Locking at head end, manual release non-locking type)

0.68 + 0.11 x 100/50 + 0.08 = 0.98 kg

Auto Switch Mounting Bracket Part No.

(mm)

Auto switch	Bore size					
	32	40	50	63	80	100
D-A3□/A44 **D-G39/K39**	BMB2-032	BMB2-040	BMB1-050	BMB1-063	BMB1-080	BMB1-100
D-A5□/A6□ **D-A59W** **D-F5□/J5□** **D-F5□W/J59W** **D-F59F** **D-F5BAL** **D-F5NTL**	BT-03	BT-03	BT-05	BT-05	BT-06	BT-06
D-P5DWL	BMB3T-040	BMB3T-040	BMB3T-050	BMB3T-050	BMB3T-080	BMB3T-080
D-Z7□/Z80 **D-Y59□/Y69□** **D-Y7P/Y7PV** **D-Y7□W** **D-Y7□WV** **D-Y7BAL**	BMB4-032	BMB4-032	BMB4-050	BMB4-050	BA4-063	BA4-063

[A set of stainless steel mounting screws]
A set of following stainless steel mounting screws is attached. (A mounting bracket itself is not attached. Please order it separately.)

BBA1: D-A5/A6/F5/J5 types

∗ "D-F5BAL" switch is set on the cylinder with the screws above when shipped. When a switch only is shipped,

Mounting Bracket Part No.

Bore size (mm)	32	40	50	63	80	100
Foot Note 1)	MB-L03	MB-L04	MB-L05	MB-L06	MB-L08	MB-L10
Flange	MB-F03	MB-F04	MB-F05	MB-F06	MB-F08	MB-F10
Single clevis	MB-C03	MB-C04	MB-C05	MB-C06	MB-C08	MB-C10
Double clevis	MB-D03	MB-D04	MB-D05	MB-D06	MB-D08	MB-D10

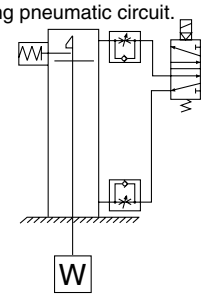
Note 1) Two foot brackets required for one cylinder.
Note 2) Accessories for each mounting bracket are as follows.
Foot, Flange, Single clevis: Mounting bolts
Double clevis: Clevis pin, Cotter pin
→ Refer to page 6-6-11 for details.

Cautions for Using

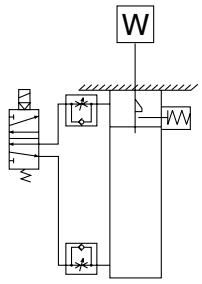
1. Use recommended pneumatic circuit

⚠Caution

For correct operation of the locking and release mechanism, please use the following pneumatic circuit.



With locking at head side



With locking at rod side

① Do not use a 3 position solenoid valve.

Avoid using circuit with 3 position solenoid valve (especially closed center). When pressure is trapped in the port with locking mechanism, end lock is free. When utilizing a 3 position closed center valve, even if the lock is engaged, it may become unlocked due to pressure leakage either across the piston or the valve spool.

② Back pressure is required to release end lock.

Be sure air is supplied to side of cylinder without the locking mechanism, as above, prior to supplying air pressure to the side with end lock or lock may not be released. (Refer to "Release of lock".)

③ Release lock when mounting or adjusting the cylinder.

If mounting is done with lock engaged, lock mechanism may be damaged.

④ Use with load 50% or less of rated capacity.

If cylinder is used at 50% load capacity or more, lock may be damaged.

⑤ Do not use two cylinders in parallel at same time.

Avoid to using 2 or more end lock cylinders at same time to perform a single task because binding may occur and one of the cylinders end lock may not release.

⑥ Use a speed controller as meter-out.

Meter-in control may not allow lock to release.

⑦ Use complete stroke or cylinder at side with end lock.

If cylinder piston does not reached end of stroke, end lock may not lock or release.

2. Operating pressure

⚠Caution

Use pressures over 0.15 MPa at port with locking mechanism.

3. Exhaust speed

⚠Caution

When pressures at port with locking mechanism is decrease to 0.05 MPa or less, it is automatically locked. When exhaust pipe at port with locking mechanism is thin and long or speed controller is separated from cylinder port, exhaust speed is slow and will require additional time for lock engagement. Clogging the silencer mounted on exhaust port of solenoid valve leads to same result.

4. Relationship with cushion

⚠Caution

When cushion valve at side with locking mechanism is fully opened or closed, piston rod may reached at stroke end. Thus lock is not established. And when locking is done at cushion valve fully closed, adjust cushion valve since lock may not be released.

5. Release of lock

⚠Warning

When lock is to be released, supply air pressure to the port without the locking mechanism, this relieves the load from the lock mechanism. Then supply pressure to the port with lock, releasing the lock and changing cylinder direction.
(Refer to recommended pneumatic circuit.) When port without lock mechanism is exhausted and locking mechanism is loaded, the lock may be damaged due to excessive force on lock during release. Piston rod will operate immediately.

6. Manual release

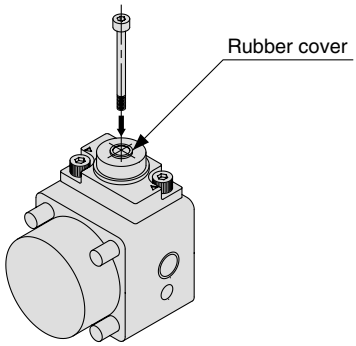
⚠Caution

Non-locking type

Insert attached bolt from upper side of rubber cover (no need to remove rubber cover), tighten locking piston and pull bolt, locking will be released. When bolt is released, locking begins to take place. Thread size, required pulling force and stroke are listed below.

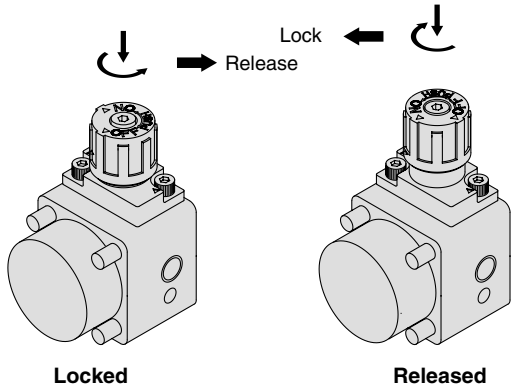
Bore size (mm)	Thread size	Pulling force	Stroke (mm)
32	≥ M2.5 x 0.45 x 25 ℓ	4.9 N	2
40, 50, 63	≥ M3 x 0.5 x 30 ℓ	10 N	3
80, 100	≥ M5 x 0.8 x 40 ℓ	24.5 N	3

∗ Remove bolt under normal operations.
It may cause malfunction of locking and release.



Locking style

Turn 90° to counterclockwise pushing M/O button. Lock is released when ▲ on cap and ▼ OFF mark on M/O button correspond. (Lock remains released.)
When locking is desired, turn M/O button clockwise 90° while pushing fully, correspond ▲ on cap and ▼ ON mark on M/O button. The correct position is confirmed by click sound "click".
If not confirmed, locking is not done.

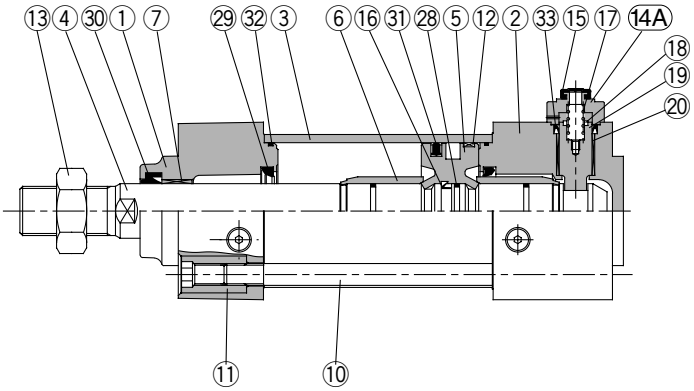


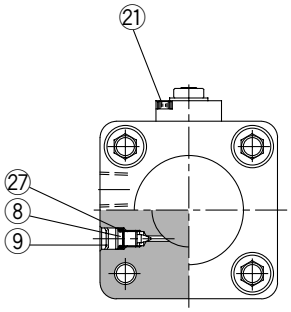
Locked **Released**

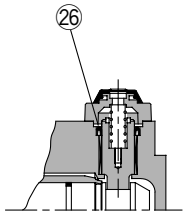
Construction

Locking at head end

Manual release non-locking type: N

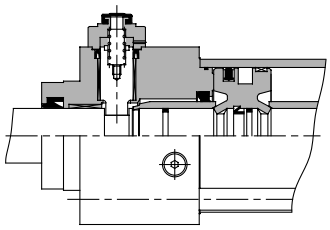


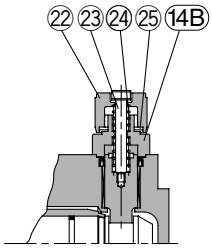




ø80, ø100

Locking at rod end





Manual release non-locking type: L

Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Metallic painted
②	Head cover	Aluminum alloy	Metallic painted
③	Cylinder tube	Aluminum alloy	Hard anodized
④	Piston rod	Carbon steel	Hard chrome plated
⑤	Piston	Aluminum alloy	Chromated
⑥	Cushion ring	Brass	
⑦	Bushing	Lead bronze casted	
⑧	Cushion valve	Steel wire	Nickel plated
⑨	Snap ring	Steel for spring	ø40 to ø100
⑩	Tie rod	Carbon steel	Chromated
⑪	Tie rod nut	Carbon steel	Nickel plated
⑫	Wear ring	Resin	
⑬	Rod end nut	Carbon steel	Nickel plated
⑭A	Cover A	Aluminum alloy	Painted black
⑭B	Cover B	Carbon steel	Tufftride
⑮	Rubber cover	Synthetic rubber	
⑯	Piston holder	Urethane	

No.	Description	Material	Note
⑰	Lock spring	Steel wire	
⑱	Bumper	Urethane	
⑲	Lock piston	Carbon steel	Hardened, Hard chrome plated
⑳	Lock bushing	Copper allow	
㉑	Bolt with hex. hole	Alloyed steel	Black zinc chromated
㉒	M/O knob	Zinc alloy	Painted black
㉓	M/O bolt	Alloyed steel	Black zinc chromated, Painted red
㉔	M/O spring	Steel wire	Zinc chromated
㉕	Stopper ring	Carbon steel	Zinc chromated
㉖	Seal retainer	Rolled steel	ø80, ø100 only
㉗	Cushion valve seal	NBR	
㉘	Piston gasket	NBR	
㉙ *	Cushion seal	Urethane	
㉚ *	Rod seal	NBR	
㉛ *	Piston seal	NBR	
㉜ *	Cylinder tube gasket	NBR	
㉝ *	Lock piston seal	NBR	

Replacement Parts: Seal Kit (Locking at head or rod end)

Bore size (mm)	Kit no.	Contents
32	MBB32-PS	Set of the No. ㉙, ㉚, ㉛, ㉜ and ㉝.
40	MBB40-PS	
50	MBB50-PS	
63	MBB63-PS	
80	MBB80-PS	
100	MBB100-PS	

Replacement Parts: Seal Kit (Locking at both ends)

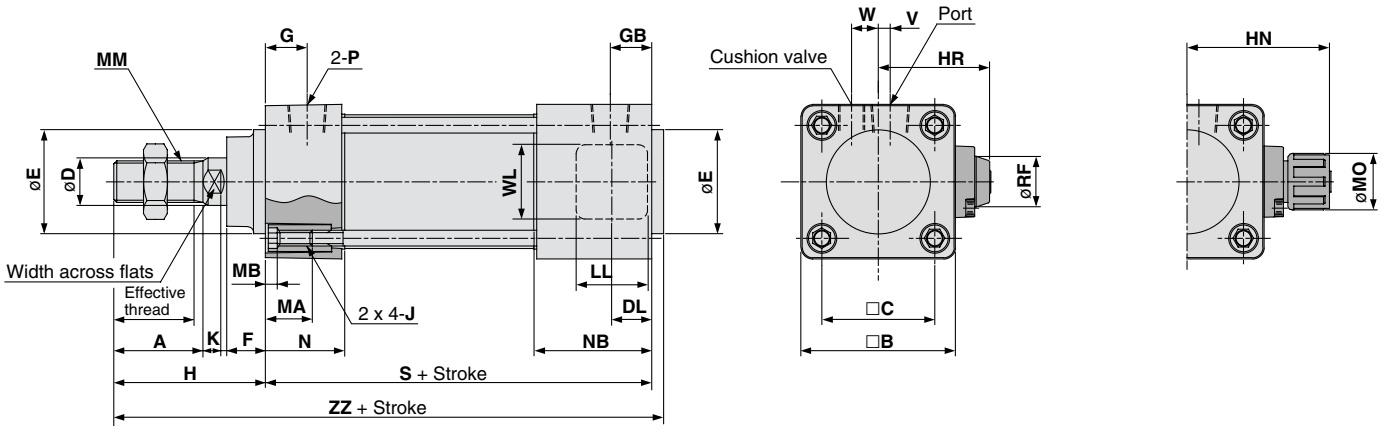
Bore size (mm)	Kit no.	Contents
32	MBB32-PS-W	Set of the No. ㉙, ㉚, ㉛, ㉜ and ㉝.
40	MBB40-PS-W	
50	MBB50-PS-W	
63	MBB63-PS-W	
80	MBB80-PS-W	
100	MBB100-PS-W	

* Seal kits consist of items ㉙ to ㉝, and can be ordered by using the seal kit number corresponding to each bore size.

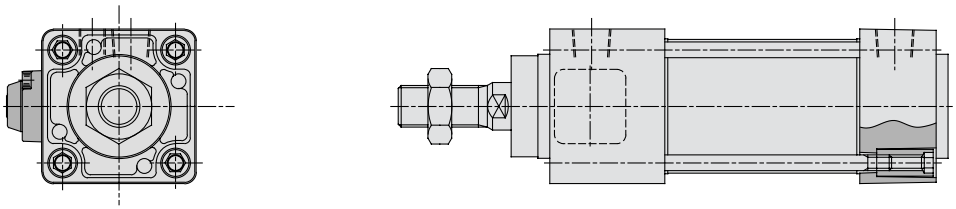
Basic: (B)

Locking at head end: MBBB Bore size — Stroke — H□

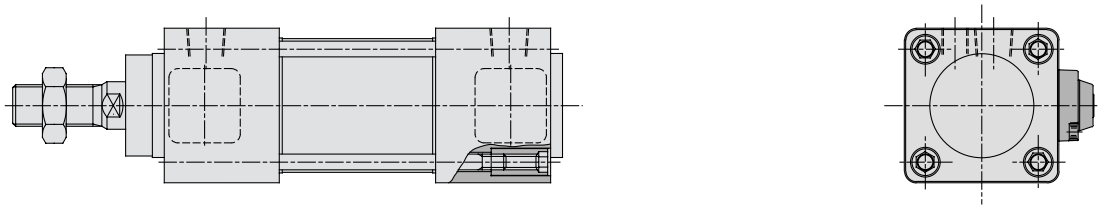
Manual release non-locking type: N **Manual release locking type: L**



Locking at rod end: MBBB Bore size — Stroke — R□



Locking at both ends: MBBB Bore size — Stroke — W□



-H□/-R□

(mm)

Bore size (mm)	Stroke range (mm)	Effective thread length	Width across flats	A	B	C	D	DL	E	F	G	GB	H	HR	HN	J	K	LL	MA	MB	MM
32	to 500	19.5	10	22	46	32.5	12	9	30	13	13	21	47	33.5	45	M6 x 1.0	6	15	16	4	M10 x 1.25
40	to 500	27	14	30	52	38	16	12	35	13	14	27	51	38.5	52.5	M6 x 1.0	6	21	16	4	M14 x 1.5
50	to 600	32	18	35	65	46.5	20	13	40	14	15.5	27.5	58	45	59	M8 x 1.25	7	21	16	5	M18 x 1.5
63	to 600	32	18	35	75	56.5	20	13	45	14	16.5	28.5	58	50	64	M8 x 1.25	7	21	16	5	M18 x 1.5
80	to 800	37	22	40	95	72	25	16	45	20	19	37	72	62	76.5	M10 x 1.5	10	30	16	5	M22 x 1.5
100	to 800	37	26	40	114	89	30	16	55	20	19	37	72	71.5	86	M10 x 1.5	10	30	16	5	M26 x 1.5

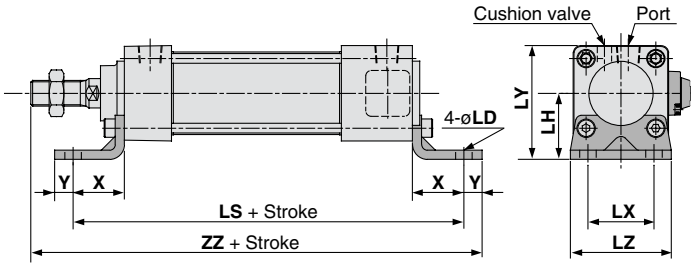
Bore size (mm)	Stroke range (mm)	MO	N	NB	P	RF	S	V	W	WL	ZZ
32	to 500	19	27	35	1/8	11	92	4	6.5	24	143
40	to 500	19	27	40	1/4	11	97	4	9	24	152
50	to 600	19	31.5	43.5	1/4	11	106	5	10.5	24	168
63	to 600	19	31.5	43.5	3/8	11	106	9	12	24	168
80	to 800	23	38	56	3/8	21	132	11.5	14	40	208
100	to 800	23	38	56	1/2	21	132	17	15	40	208

-W□

S	ZZ
100	151
110	165
118	180
118	180
118	180
150	226
150	226

With Mounting Bracket

Foot(L)/Locking at head end (-H□)



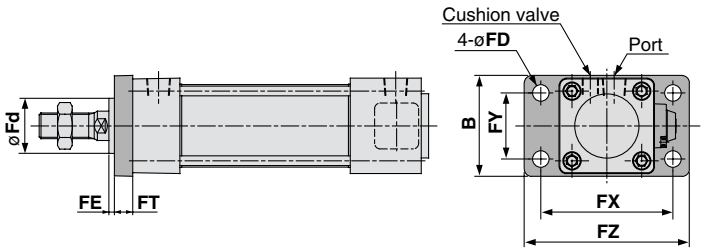
-H□/ -R□ (mm)

Bore size (mm)	Stroke range	X	Y	LD	LH	LS	LT	LX	LY	LZ	ZZ
32	to 700	22	9	7	30	136	3.2	32	53	50	170
40	to 800	24	11	9	33	145	3.2	38	59	55	183
50	to 1000	27	11	9	40	160	3.2	46	72.5	70	202
63	to 1000	27	14	12	45	160	3.6	56	82.5	80	205
80	to 1000	30	14	12	55	192	4.5	72	102.5	100	248
100	to 1000	32	16	14	65	196	4.5	89	122	120	252

-W□

LS	ZZ
144	178
158	196
172	214
172	217
210	266
214	270

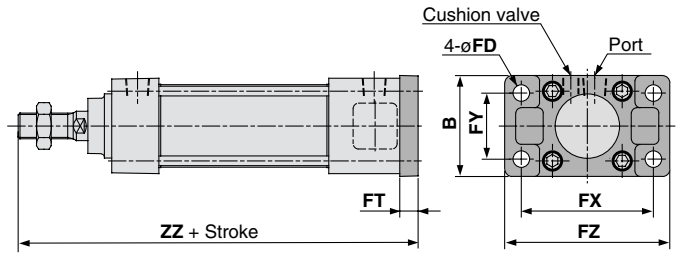
Front flange(F)/Locking at head end (-H□)



-H□/ -R□/ -W□ (mm)

Bore size (mm)	Stroke range	B	FD	FE	FT	FX	FY	FZ	Fd
32	to 700	50	7	3	10	64	32	79	25
40	to 800	55	9	3	10	72	36	90	31
50	to 1000	70	9	2	12	90	45	110	38.5
63	to 1000	80	9	2	12	100	50	120	39.5
80	to 1000	100	12	4	16	126	63	153	45.5
100	to 1000	120	14	4	16	150	75	178	54

Rear flange(G)/Locking at head end (-H□)



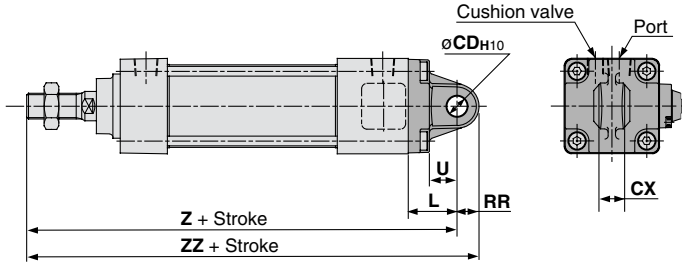
-H□/ -R□ (mm)

Bore size (mm)	Stroke range	B	FD	FT	FX	FY	FZ	ZZ
32	to 500	50	7	10	64	32	79	149
40	to 500	55	9	10	72	36	90	158
50	to 600	70	9	12	90	45	110	176
63	to 600	80	9	12	100	50	120	176
80	to 800	100	12	16	126	63	153	220
100	to 800	120	14	16	150	75	178	220

-W□

ZZ
157
171
188
188
238
238

Single clevis(C)/Locking at head end (-H□)



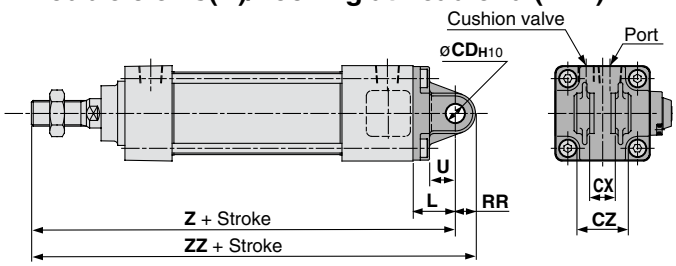
-H□/ -R□ (mm)

Bore size (mm)	Stroke range	L	RR	U	CDH10	CX-0.1 -0.3	Z	ZZ
32	to 500	23	10.5	13	10	14	162	172.5
40	to 500	23	11	13	10	14	171	182
50	to 600	30	15	17	14	20	194	209
63	to 600	30	15	17	14	20	194	209
80	to 800	42	23	26	22	30	246	269
100	to 800	42	23	26	22	30	246	269

-W□

Z	ZZ
170	180.5
184	195
206	221
206	221
264	287
264	287

Double clevis(D)/Locking at head end (-H□)



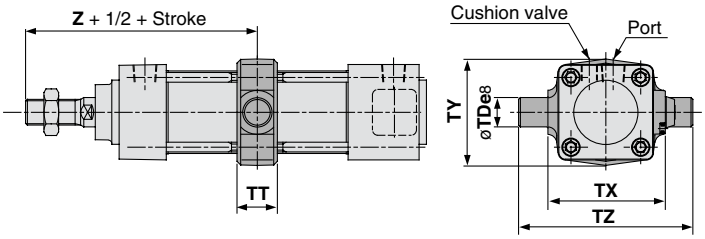
-H□/ -R□ (mm)

Bore size (mm)	Stroke range	L	RR	U	CDH10	CX+0.3 +0.1	CZ	Z	ZZ
32	to 500	23	10.5	13	10	14	28	162	172.5
40	to 500	23	11	13	10	14	28	171	182
50	to 600	30	15	17	14	20	40	194	209
63	to 600	30	15	17	14	20	40	194	209
80	to 800	42	23	26	22	30	60	246	269
100	to 800	42	23	26	22	30	60	246	269

-W□

Z	ZZ
170	180.5
184	195
206	221
206	221
264	287
264	287

Center trunnion(T)/Locking at head end (-H□)



-H□ (mm)

Bore size (mm)	Stroke range	TDe8	TT	TX	TY	TZ	Z
32	to 500	12	17	50	49	74	89
40	to 500	16	22	63	58	95	93
50	to 600	16	22	75	71	107	105
63	to 600	20	28	90	87	130	105
80	to 800	20	34	110	110	150	129
100	to 800	25	40	132	136	182	129

-R□/ -W□

Z
97
106
117
117
147
147