

# Lock-up Cylinder Double Acting, Single Rod Series **CL1**

ø40, ø50, ø63, ø80, ø100, ø125, ø140, ø160

The CL1 series lock-up cylinder is a self-locking type that contains a ring that is tilted by a spring force, which is further tilted by the load that is applied to the cylinder, thus locking the piston rod. This cylinder is suitable for intermediate stops, emergency stops, or for drop prevention.

## How to Order

**Without auto switch** CL1 L [ ] 100 200 F JN

**With auto switch** CDL1 L [ ] 100 200 F JN Y7BW [ ]

**Built-in magnet** (points to CDL1)

**Lock-up cylinder** (points to L)

**Mounting style** (points to [ ])

<b>B</b>	Basic style	<b>C</b>	Single clevis style
<b>L</b>	Foot style	<b>D</b>	Double clevis style
<b>F</b>	Rod side flange style	<b>T</b>	Center trunnion style
<b>G</b>	Head side flange style		

**Symbol**   **Bore size**   **Tubing material**

Nil	40 to 100	Aluminum tube
	125 to 160	Aluminum tube
F*	40 to 160	Steel tube

Note) Auto switches are not available with steel tube.

**Bore size (mm)**

40	40 mm	100	100 mm
50	50 mm	125	125 mm
63	63 mm	140	140 mm
80	80 mm	160	160 mm

**Cylinder stroke (mm)**  
For details, refer to page 9-3-2.

**Number of auto switches**

Nil	2 pcs.
3	3 pcs.
S	1 pc.
n	"n" pcs.

**Auto switch**

Nil	Without auto switch (Built-in magnet)
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\* For the applicable auto switch model, refer to the table below.  
\* D-Z7□/Z80/Y59□/Y69□/Y7□□ types are shipped together, (but not assembled). (But, only the mounting bracket for the above models is assembled when shipping.)

**With rod boot/cushion**

Rod boot	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	N	Without cushion
	R	With rod bumper
	H	With head cushion
	Nil	With cushion on both ends

\* Indicate alphabetically when 2 or more symbols are applicable.

**Locked-up direction**

F	Extension locking
B	Retraction locking

\* For both sides lock, refer to Made to Order "-X51".

## Applicable Auto Switch/Refer to page 9-15-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)*			Pre-wire connector	Applicable load																														
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	3 (L)	5 (Z)		IC circuit	Relay, PLC																													
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	Z76	40 to 160	—	—	●	●	—	—	—																											
																	2-wire	24 V	12 V	100 V	Z73	40 to 100	—	●	●	●	—	—	—	—	—												
																				—	—											B53	40 to 160	—	—	—	—	—					
																				100 V, 200 V	A54											B54							40 to 100	—	—	—	—
																				—	A33C											A33											
																	DIN terminal	—	—	100 V	A34C	40 to 100	—	—	—	—	—	—	—	—													
200 V	A44C	A44	40 to 100	—	—	—	—																																				
Diagnostic indication (2-color indication)	Grommet	—						—	—	A59W	40 to 160	B59W	40 to 100	●	●	—	—	—	—	—																							
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	Y59A	40 to 160	G59	40 to 100	●	●	○	○	—	—																										
																		3-wire (PNP)	—	—	100 V, 200 V	J51	40 to 100	—	—	—	—	—	—	—	—	—											
																																	2-wire	—	—	—	—	—	—	—	—	—	—
																		Terminal conduit	—	—	—	—	—	—	—	—	—	—	—	—	—												
																																3-wire (NPN)	24 V	5 V, 12 V	—	G39C	40 to 100	—	—	—	—	—	—
																		2-wire	—	—	—	K39	40 to 160	—	—	—	—	—	—														
		Diagnostic indication (2-color indication)	Grommet	Yes	3-wire (NPN)	24 V	5 V	—	Y7NW	40 to 160	G59W	40 to 100	●	●	○	○	—	—																									
																			3-wire (PNP)	—	—	—	Y7PW	40 to 100	—	—	—	—	—	—	—												
																																2-wire	—	—	—	Y7BW	40 to 100	—	—	—	—	—	
																			Terminal conduit	—	—	—	—	—	—	—	—	—	—	—													
																															3-wire (NPN)	24 V	5 V, 12 V	—	Y7BA	40 to 160	—	—	—	—	—	—	—
																			3-wire (PNP)	—	—	—	G59F	40 to 100	—	—	—	—	—	—													
Water resistant (2-color indication)	Grommet	Yes	2-wire	—	—	—	P59F	40 to 100	G59F	40 to 100	●	●	○	○	—	—																											
With diagnostic output (2-color indication)																	—	—	—	—	—	—	—	—	—	—	—																
Magnetic field resistant (2-color indication)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—																											

\* 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.

• Since there are other applicable auto switches than listed, refer to page 9-3-3 for details.  
• For details about auto switches with pre-wire connector, refer to page 9-15-66.

CL

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

MLGP

RLQ

MLU

ML1C

D-

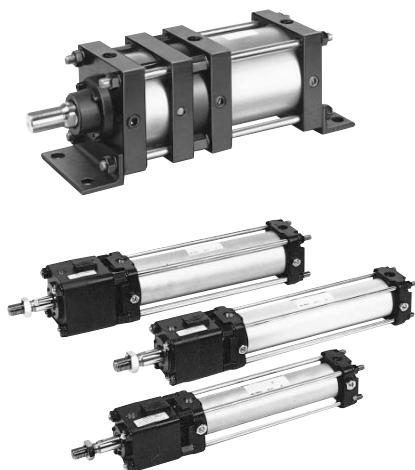
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Data

# Series CL1

**Provided with a compact lock mechanism, it is suitable for intermediate stop, emergency stop, and drop prevention.**



**Made to Order Specifications**  
(For details, refer to page 9-16-1.)

Symbol	Specifications
-XA□	Change of rod end shape
-XC3	Special port location
-XC14	Change of trunnion bracket mounting position
-XC18	NPT finish piping port
-X50	Large bore lock-up cylinder
-X51	Both-directions lock-up cylinder

## Model

Series	Applicable air cylinder	Bore size (mm)	Action	Lock operation
CL1	CA1□N*	40, 50, 63, 80, 100	Double acting	Spring lock
	CS1□N	125, 140, 160		

\* The Series CA1 has been changed to the Series CA2.

## Specifications

Bore size (mm)	40 to 100	125 to 160
Fluid	Air	
Proof pressure	1.5 MPa	1.57 MPa
Maximum operating pressure	1.0 MPa	0.97 MPa
Minimum operating pressure	0.08 MPa	
Piston speed	50 to 200 mm/s *	
Ambient and fluid temperature	Without auto switch -10 to 70°C With auto switch -10 to 60°C (No freezing)	Without auto switch -0 to 70°C With auto switch -0 to 60°C (No freezing)
Lubrication	Non-lube	
Cushion	Air cushion	
Thread tolerance	JIS class 2	
Stroke length tolerance	Up to 250 <sup>+1.0</sup> <sub>0</sub> , 251 to 1000 <sup>+1.4</sup> <sub>0</sub> , 1001 to 1500 <sup>+1.8</sup> <sub>0</sub> , 1501 to 1600 <sup>+2.2</sup> <sub>0</sub>	
Mounting	Basic style, Axial foot style, Rod side flange style Head side flange style, Single clevis style Double clevis style, Center trunnion style	



\* Make sure to operate the cylinder in such a way that the piston speed does not exceed 200 mm/s during locking.

\* The maximum speed of 500 mm/s can be accommodated if the piston is to be locked in the stationary state for the purpose of drop prevention.

## Max. Load and Lock Holding Force (Max. static load)

Bore size (mm)		40	50	63	80	100	125	140	160
Max. load (N)	Horizontal Mounting	588	981	1470	2450	3820	6010	7540	9850
	Vertical Mounting	294	490	735	1230	1910	3000	3770	4920
Holding force (N) *		1230	1920	3060	4930	7700	12100	15100	19700

\* The cylinder can be used to 1/2 or less of its holding force, if only a static load is applied, such as for drop prevention.

## Stopping Accuracy

(Not including tolerance of control system)

Piston speed	Bore size (mm)	
	40 to 100	125 to 160
50 mm/s	±0.6 mm	±1 mm
100 mm/s	±1.2 mm	±2 mm
200 mm/s	±2.3 mm	±3 mm

## Lock-up Unit Specifications

Lock-up direction release pressure	0.2 MPa (at no load)
Lock-up direction start pressure	0.05 MPa or less
Lock-up direction direction	One direction (Lock direction can be changed.)

## Lock-up Unit Model

Applicable bore size (mm)	40	50	63	80	100
Lock-up unit part no.	CL-40	CL-50	CL-63	CL-80	CL-100

## 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

## Maximum Stroke

For the maximum stroke of the CA1 series  $\phi 40$  to  $\phi 100$ , and CS1 series  $\phi 120$  to  $\phi 160$ , refer to Best Pneumatics Vol. 6.  
Note) The Series CA1 has been changed to the Series CA2.

## Minimum Stroke for Auto Switch Mounting

Regarding the minimum stroke for auto switch mounting, refer to the following pages by bore size.

- Bore size/ $\phi 40$  to  $\phi 100$ ...Refer to page of the CA2 series.
- Bore size/ $\phi 125$  to  $\phi 160$ ...Refer to page of the CS1 series.

# Lock-up Cylinder Double Acting, Single Rod Series CL1

## Accessory

Mounting		Basic style	Foot style	Rod side flange style	Head side flange style	Single clevis style	Double clevis style	Center trunnion style
Standard products	Rod end nut *	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●	●

\* ø125 to ø160: Option

## Weight

Tubing Material		Aluminum tube							
Bore size (mm)		40	50	63	80	100	125	140	160
Locked-up unit weight		0.76	1.23	2.05	3.04	4.40	16.93	21.46	32.31
Basic weight	Basic style	1.66	2.55	4.12	6.56	9.49	30.88	38.25	55.72
	Foot style	1.83	2.75	4.42	7.36	10.43	32.21	40.83	59.09
	Rod side flange style	2.06	3.15	5.08	8.40	11.81	33.65	43.28	60.95
	Head side flange style	2.09	3.29	5.16	8.51	12.06	34.35	44.32	62.98
	Single clevis style	1.93	3.00	4.88	7.94	11.80	36.02	45.46	65.45
	Double clevis style	1.92	2.98	4.90	7.94	11.82	35.83	45.17	64.28
Trunnion style		2.26	3.30	5.47	8.90	13.02	35.77	46.09	63.86
Additional weight per each 100 mm of stroke		0.44	0.56	0.74	1.04	1.30	1.77	1.90	2.39
Accessory bracket	Single knuckle	0.23	0.26	0.26	0.66	0.83	0.91	1.16	1.56
	Double knuckle (with pin)	0.37	0.43	0.43	0.87	1.27	1.37	1.81	2.48

## Auto Switch Mounting Bracket Part No.

Auto switch model	Bore size (mm)							
	40	50	63	80	100	125	140	160
D-A5/A6/A59W D-F5□/J5□/F5NTL D-F5□W/J59W D-F5BAL/F59F	BT-04	BT-04	BT-06	BT-08	BT-08	BT-12	BT-12	BT-16
D-A3/A44 D-G39/K39 D-B5/B6/B59W D-G5□/K59/G5BAL D-G5□W/K59W D-G59F/G5NTL	BD1-04M	BD1-05M	BD1-06M	BD1-08M	BD1-10M	BS1-125	BS1-140	BS1-160
D-A3□C/A44C D-G39C/K39C	BA-04	BA-05	BA-06	BA-08	BA-10	—	—	—
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W D-Y7□VW D-Y7BAL	BA4-040	BA4-040	BA4-063	BA4-080	BA4-080	BS4-125	BS4-125	BS4-160
D-P5DWL	BAP2-040	BAP2-040	BAP2-063	BAP2-080	BAP2-080	—	—	—



\* Mounting brackets are provided with D-A3□C, A44C, G39C, and K39C.

To order, indicate as shown below, according to the cylinder size.  
Example) ø40-D-A3□C-4, ø50-D-A3□C-5, ø63-D-A3□C-6,  
ø80-D-A3□C-8, ø100-D-A3□C-10

To order the mounting brackets separately, use the part number shown above.

[Mounting screws set made of stainless steel]

The following set of mounting screws made of stainless steel is also available. Use it in accordance with the operating environment.

(Please order the mounting band separately, since it is not included.)

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

BBA3: For D-B5/B6/G5/K5

"D-F5BAL/G5BAL" switch is set on the cylinder with the stainless steel screws above when shipped.

When only a switch is shipped independently, "BBA1" or "BBA3" screws are attached.

## Rod Boot Material

Symbol	Rod boot material	Max. ambient temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C

\* Maximum ambient temperature for the rod boot itself.

Calculation: (Example) CL1L125-500F

• Basic weight.....32.21 (ø125, Foot style)

• Additional weight....1.77/100 st  
32.21 + 1.77/100 x 500 = 41.06 kg

\* When steel tubes measuring ø40 to ø100, and ø125 to ø160 are used, the lock-up unit weight must be added to the respective cylinder weight as in the individual cylinder weight tables on page in Best Pneumatics Vol. 6.

## Mounting Bracket Part No.

Bore size (mm)		40	50	63	80	100	125	140	160
Foot style *	Rod side	CA-L04	CA-L05	CA-L06	CA-L08	CA-L10	CS1-L12	CS1-L14	CS1-L16
	Head side	CA1-L04	CA1-L05	CA1-L06	CA1-L08	CA1-L10			
Rod side flange style **		CA-F04	CA-F05	CA-F06	CA-F08	CA-F10	CS1-F12	CS1-F14	CS1-F16
Head side flange style		CA1-F04	CA1-F05	CA1-F06	CA1-F08	CA1-F10	CS1-F12	CS1-F14	CS1-F16
Single clevis		CA1-C04	CA1-C05	CA1-C06	CA1-C08	CA1-C10	CS1-C12	CS1-C14	CS1-C16
Double clevis ***		CA1-D04	CA1-D05	CA1-D06	CA1-D08	CA1-D10	CS1-D12	CS1-D14	CS1-D16

\* When ordering foot bracket for 1 cylinder, order 1 foot bracket each for the rod side and the head side for ø40 to ø100 (with different part no.) and 2 foot brackets for ø125 to ø160.

\*\* The ø125 to ø160 rod side flange styles use the long stroke flanges of the CS1 series.

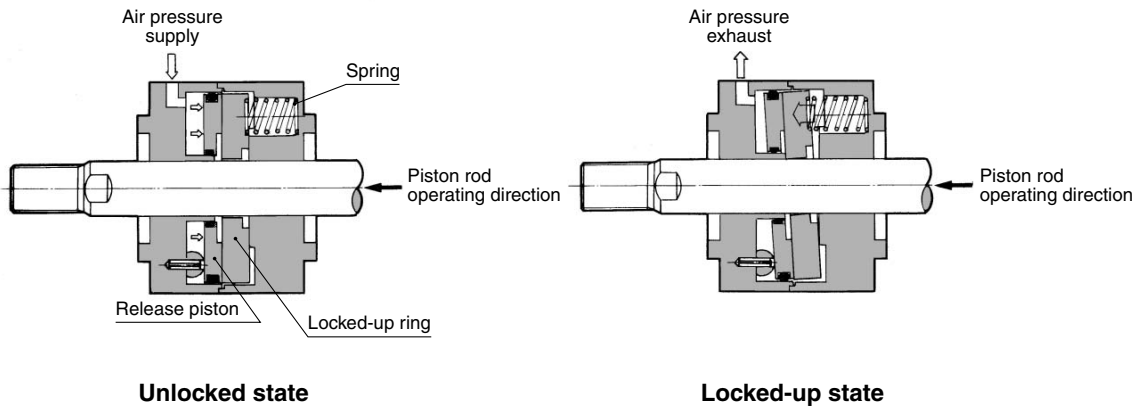
\*\*\* Clevis pin, plain washer and cotter pin are shipped together with double clevis style.

Regarding the installation position and the mounting height of the auto switch,  
• Bore sizes ø40 to ø100 are the same as Series CDA1. Bore sizes ø125 to ø160 are the same as Series CDS1.

Note) The Series CA1 has been changed to the Series CA2.

CL  
CL1  
MLGC  
CNG  
MNB  
CNA  
CNS  
CLS  
CLQ  
MLGP  
RLQ  
MLU  
ML1C  
D-  
-X  
20-  
Data

## Construction Principle



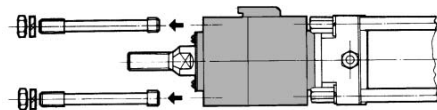
### ⚠ Caution Caution on Changing the Lock-up Direction

#### ø40 to ø100

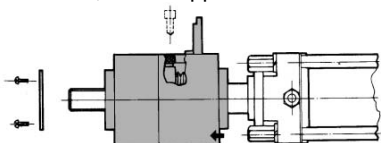
The lock-up is unidirectional. However, the lock-up direction can be changed easily. To change the direction, pay particular attention to the following steps:

Loosening the tie-rods for the purpose of changing the direction could also loosen the nuts on the cylinder side. Therefore, before assembling the unit, make sure to verify that the nuts on the cylinder are not loose. Retighten the nuts if they are loose, and while turning the piston rod, apply a low pressure of 0.08 MPa to make sure that it operates smoothly in both the extending and retracting directions.

1. Loosen the tie-rod nuts and pull out the four tie-rods.



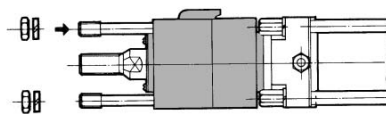
2. Open the rubber cap and screw in the unlocking bolt, which is provided as an accessory part. At this time, apply air pressure of 0.2 MPa to 0.3 MPa to disengage the lock and insert the bolt. (The operation to follow can be performed properly and easily with the application of air pressure.) After verifying that the bolt has been inserted properly, pull out the unit from the rod. Then, loosen the three screws in the scraper presser plate to remove the presser plate and the scraper. Install the scraper and the presser plate, in that order, on the opposite side.



### ⚠ Caution

When the lock-up unit is not secured by the tie-rods, the air pressure applied to the lock-up port should be between 0.2 MPa and 0.3 MPa. Never supply a higher air pressure as it could lead to equipment damage.

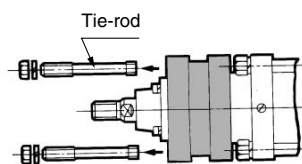
3. Turn the unit to the opposite end so that the end without the scraper is facing the cylinder rod cover. Then, securely insert the unit into the end boss portion of the rod cover.
4. Install four tie-rods, with their shorter threaded portion oriented towards the rod cover, and tighten them with uniform torque. Until the installation and adjustment have been completed, never pull out the unlocking bolt (or release the air pressure).



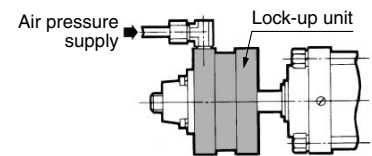
The processes described above complete the changing of the locked-up direction. Before using the cylinder, make sure that the lock-up operates properly.

#### ø125 to ø160

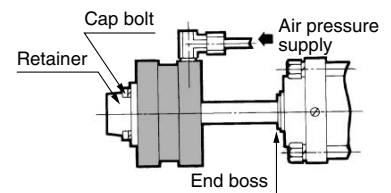
1. Loosen the tie-rod nuts and pull out the four tie-rods.



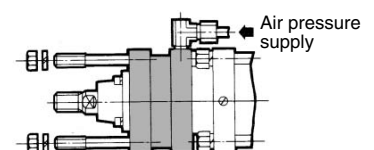
2. Apply air pressure of 0.2 MPa to 0.3 MPa to disengage the lock and pull out the lock-up unit from the piston rod.



3. Remove the retainer plate from the lock-up unit and install the retainer plate on the opposite end. Reapply the air pressure, and with the end on which the retainer plate had, until now, been facing towards the cylinder, insert the locked-up unit into the piston rod and fit it into the end boss portion of the rod cover.



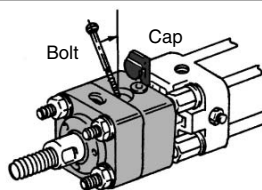
4. Install the four tie-rods, with their shorter threaded portion oriented towards the rod cover, and tighten them with uniform torque. Maintain the application of air pressure until the installation and adjustment have been completed, and never actuate the lock in the meantime.



## Manual Lock Release (ø40 to ø100)

To manually disengage the lock, perform the following steps:

1. Open the rubber cap.
2. Apply 0.2 MPa to 0.3 MPa of air pressure to the locking port, and bring the tilted ring upright.
3. Screw a bolt of an appropriate length into the ring tap.  
The bolt size is M5 for ø40 and ø50, and M6 for ø63, ø80, and ø100.



**ø40 to ø100**  
(On cylinders ø125 to ø160, the lock cannot be disengaged manually.)

### ⚠ Caution

During installation adjustment, perform the operation by applying air pressure only to the lock-up port.

## ⚠ Caution Recommended Pneumatic Circuit/Caution on Handling

For recommended pneumatic circuit, stopping accuracy and caution on handling, refer to pages 9-2-6 to 9-2-7.

### ⚠ Caution

#### Stopping Accuracy

1. Load fluctuations during the reciprocal movement of the piston could cause the piston speed to change. A change in the piston speed could greatly increase the variance in the piston's stopping position. Therefore, perform the installation and adjustment operations so as not to create any load fluctuations during the piston's reciprocal movement, particularly just before stopping.
2. During a cushioning stroke, or when the piston is in the acceleration region following the start of its travel, there is a large change in speed. Thus, the variance in the stopping position will also be large. Therefore, to effect a step movement in which the stroke from the start of the operation to the next position is short (approximately 30 mm, although it could vary according to conditions) be aware of the possibility of being unable to attain the level of accuracy shown in the specifications column.
3. Precautions regarding lock-up after the piston has been stopped with an external stopper:  
To apply the lock-up after the piston has been stopped by an external stopper other than the locked-up mechanism, including stoppage by the stroke end of the cylinder, be aware of the matters described below.  
Due to the nature of the lock-up mechanism, there is an axial play of about 0.5 to 1.0 mm. Furthermore, due to pipe routing conditions, if it takes longer for the air to discharge through the lock-up port than for the balance pressure to stabilize, causing a delay in locking, the piston rod will move for an amount that is equivalent to the "play + delay".

### Piston speed over 200 mm/s (When locking)

4. Immediately before a lock stop, drop the piston speed to 200 mm/s or lower by switching the speed controller (to the bypass circuit). Then, operate the lock-up.

### ⚠ Caution

#### Caution on Handling

1. Flushing  
Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove cutting chip, cutting oil and other debris from inside the pipe.
2. The load on the piston rod  
Use the cylinder in the state in which the load to the piston rod is always applied in the axial direction. This must be more strictly adhered to than with ordinary air cylinders. Furthermore, use a guide to control the movement of the load so as not to cause chatter or twist.
3. A rotational force against the piston rod  
Avoid applying a rotational force against the piston rod. In particular, the application of a rotational force must be prevented when in a lock-up state.
4. Protecting the sliding portion of the rod  
Use caution that no scratch or dent will be given to the slide part of the guide rod, as this could damage the seals and lead to leaks or faulty lock-up.
5. Lubrication  
It is not necessary to lubricate the CL series because it is the non-lube style. Never lubricate it because doing so will cause faulty lock-up.

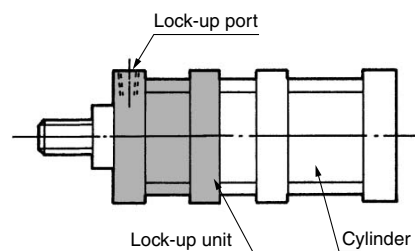
### Recommended Pneumatic Circuit

For recommended pneumatic circuits, refer to page 9-2-6.

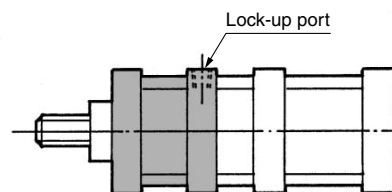
1. Operating the pneumatic circuit  
Instead of the conventional reciprocal air cylinder circuit, use an pneumatic circuit, such as the recommended circuit, in which measures are taken to prevent the piston from lurching after the lock-up has been disengaged.

2. Lock-up direction

The lock-up is unidirectional. The locking direction is in accordance with the position of the lock-up port, as shown in the figure below.



**Extension locking**



**Retraction locking**

ø125 to ø160

For cylinders ø40 to ø100, verify the ← portion that is stamped on the cap of the lock.

3. Maximum speed and maximum load  
Never lock up a cylinder that involves a kinetic energy that exceeds the maximum speed or the maximum load indicated in the specifications.
4. After completing the installation adjustment, do not forget to remove the bolt that was used for disengaging the lock. (ø40 to ø100 only)

CL

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

MLGP

RLQ

MLU

ML1C

D-

-X

20-

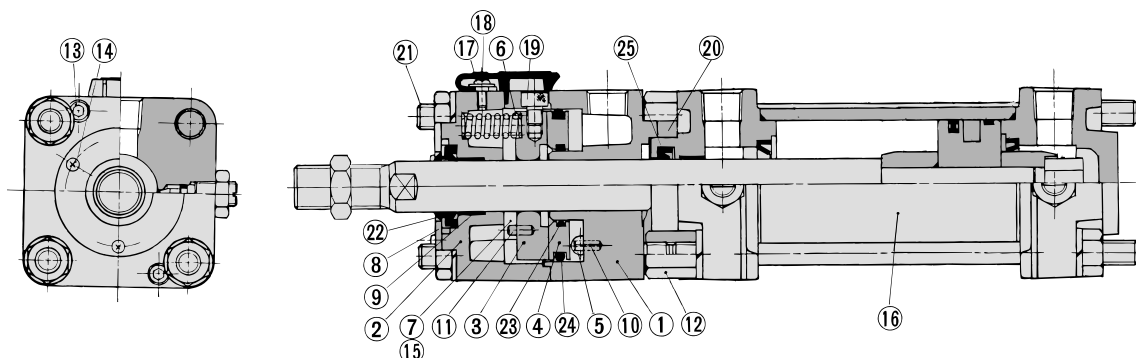
Data



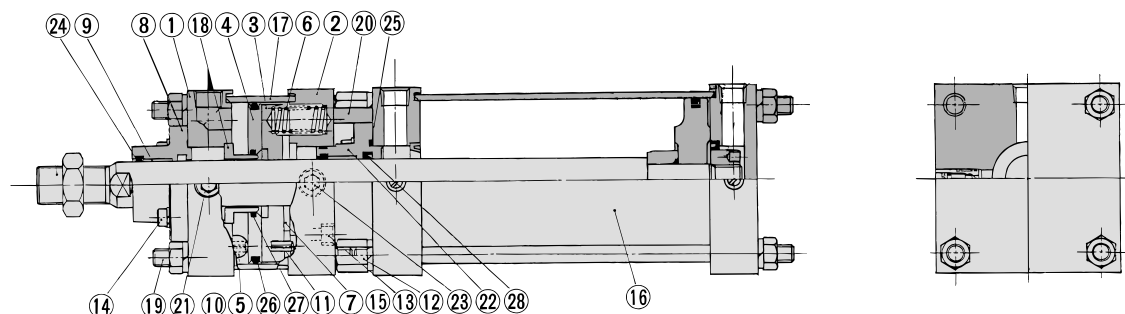
# Series CL1

## Construction

### CL1 $\phi$ 40 to $\phi$ 100



### CL1 $\phi$ 125 to $\phi$ 160



### Component Parts: CL1 $\phi$ 40 to $\phi$ 100

No.	Description	Material	Note
①	Body	Aluminum alloy	Black painted
②	Cover	Aluminum alloy	Black painted
③	Locked-up ring	Carbon steel	Heat treated
④	Release piston	Rolled steel	Zinc chromated
⑤	Pivot	Carbon steel	Heat treated, zinc chromated
⑥	Spring	Steel wire	Zinc chromated
⑦	Stopper	Urethane	
⑧	Retaining plate	Rolled steel	Black zinc chromated
⑨	Bushing	Lead-bronze casted	
⑩	Spring pin	Carbon steel	JIS B 2808
⑪	Spring pin for non-rotating	Carbon steel	JIS B 2808
⑫	Wing nut	Rolled steel	Black zinc chromated
⑬	Unit fixing hex. socket head cap screw	Chromium molybdenum steel	
⑭	Retainer machine screw	Rolled steel	
⑮	Hexagon socket countersunk head screw	Chromium molybdenum steel	
⑯	Non lube air cylinder		Series CA1□N
⑰	cap	Nylon	
⑱	Cap screw	Rolled steel	
⑲	release bolt	Chromium molybdenum steel	
⑳	Spacer	Aluminum alloy	Black painted
㉑	Unit holding tie-rod	Carbon steel	Chromated
㉒	Scraper	NBR	
㉓	O-ring	NBR	
㉔	O-ring	NBR	
㉕	Rod seal	NBR	

Note) Please consult with SMC when disassembling fine locked-up unit.

### Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Bore size (mm)	Kit no.
40	CL40-PS	100	CL100-PS
50	CL50-PS	125	CL125-PS
63	CL63-PS	140	CL140-PS
80	CL80-PS	160	CL160-PS

\* Since the lock section for Series CL1 is normally replaced as a unit, kits are for the cylinder section only. These can be ordered using the order number for each bore size.

### Component Parts: CL1 $\phi$ 125 to $\phi$ 160

No.	Description	Material	Note
①	Body	Rolled steel plate	Black painted
②	Cover	Rolled steel plate	Black painted
③	Locked-up ring	Carbon steel	Heat treated
④	Release piston	Rolled steel plate	Zinc chromated
⑤	Pivot	Carbon steel	Heat treated
⑥	Spring	Steel wire	Zinc chromated
⑦	Stopper	Urethane	
⑧	Retaining plate	Cast iron	Black painted
⑨	Bushing	Lead-bronze casted	—
⑩	Spring pin	Carbon steel	JIS B 2808
⑪	Spring pin	Carbon steel	JIS B 2808
⑫	Wing nut	Rolled steel	Black zinc chromated
⑬	Unit fixing hex. socket head cap screw	Chromium molybdenum steel	Zinc chromated
⑭	Hex. socket head cap screw	Chromium molybdenum steel	Black zinc chromated
⑮	Hexagon socket countersunk head screw	Chromium molybdenum steel	Zinc chromated
⑯	Non lube air cylinder	—	Serie CS1□N
⑰	Brake tube	Carbon steel tube	Inside: Hard chrome plated
⑱	Sleeve	Rolled steel	Zinc chromated
⑲	Unit holding tie-rod	Carbon steel	Chromated
⑳	Spacer	Rolled steel	Black painted
㉑	Hexagon socket head plug	Rolled steel	Black zinc chromated
㉒	Retaining plate	Cast iron	Black painted
㉓	Element	Sintered metallic BC	—
㉔	Wiper ring	NBR	
㉕	Retaining plate gasket	NBR	
㉖	O-ring	NBR	
㉗	O-ring	NBR	
㉘	Rod seal	NBR	

Note) Please consult with SMC when disassembling fine lock-up unit.

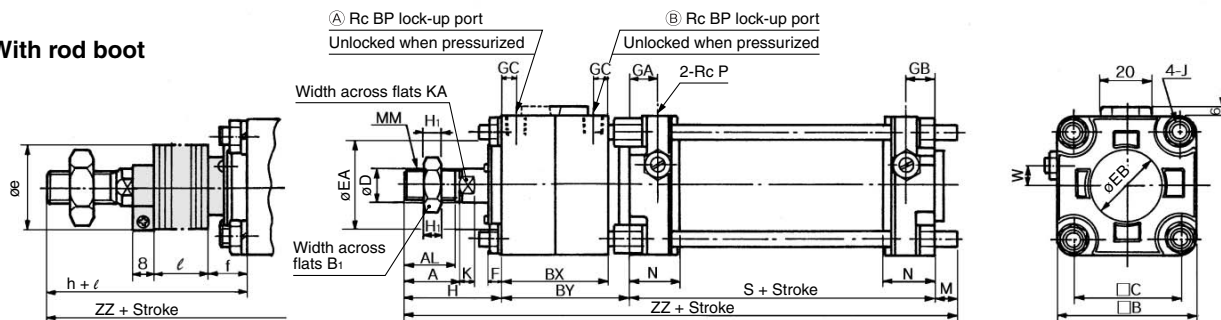
# Lock-up Cylinder Double Acting, Single Rod Series CL1

## Basic Style (B)

ø40 to ø100

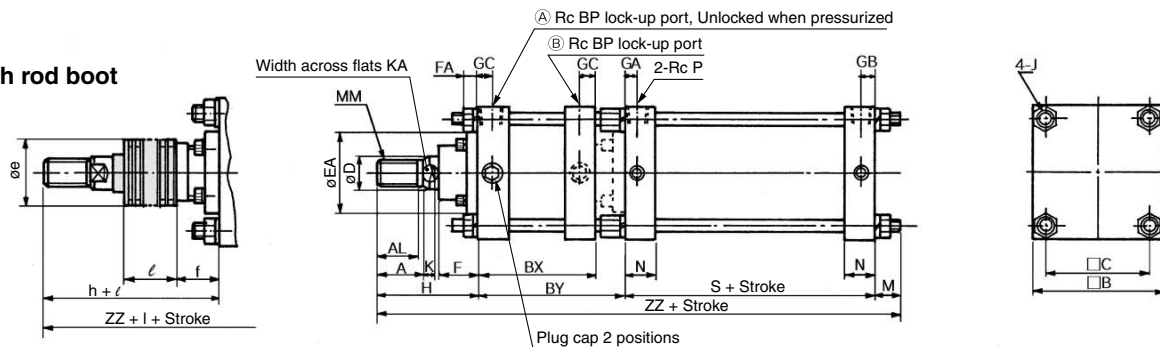
Ⓐ Lock-up at piston forward Ⓑ Lock-up at piston backward

With rod boot



ø125 to ø160

With rod boot



Bore size (mm)	Stroke range (mm)		A	AL	B	B <sub>1</sub>	BX	BY	BP	C	D	EA	EB	F	FA	GA	GB	GC	H <sub>1</sub>	J	K	KA
	Without rod boot	With rod boot																				
40	Up to 500	20 to 500	30	27	60	22	59	69	1/4	44	16	40	32	6.5	—	15	15	11	8	M8 x 1.25	6	14
50	Up to 600	20 to 600	35	32	70	27	67	78	1/4	52	20	50	40	6.0	—	17	17	11	11	M8 x 1.25	7	18
63	Up to 600	20 to 600	35	32	86	27	73	84	1/4	64	20	55	40	6.0	—	17	17	11	11	M10 x 1.25	7	18
80	Up to 750	20 to 750	40	37	102	32	77	92	1/4	78	25	65	52	8.0	—	21	21	11	13	M12 x 1.75	11	22
100	Up to 750	20 to 750	40	37	116	41	85	100	1/4	92	30	80	52	8.0	—	21	21	11	16	M12 x 1.75	11	26
125	Up to 1000	30 to 1000	50	47	145	—	112.5	141.5	1/2	115	36	90	—	43	14	16	16	16	—	M14 x 1.5	15	31
140	Up to 1000	30 to 1000	50	47	161	—	121	150	1/2	128	36	90	—	43	14	16	16	16	—	M14 x 1.5	15	31
160	Up to 1200	30 to 1200	56	53	182	—	133	167	3/4	144	40	90	—	43	14	18.5	18.5	18.5	—	M16 x 1.5	17	36

Bore size (mm)	M	MM	N	P	S	W	Without rod boot		With rod boot					
							H	ZZ	e	f	h	l	ZZ	
40	11	M14 x 1.5	27	1/4	84	8	51	215	36	16.5	59	1/4 stroke	223	
50	11	M18 x 1.5	30	3/8	90	0	58	237	45	16.0	66	1/4 stroke	245	
63	14	M18 x 1.5	31	3/8	98	0	58	254	45	16.0	66	1/4 stroke	262	
80	17	M22 x 1.5	37	1/2	116	0	71	296	60	18.0	80	1/4 stroke	305	
100	17	M26 x 1.5	40	1/2	126	0	72	315	60	18.0	81	1/4 stroke	324	
125	27	M30 x 1.5	35	1/2	98	—	110	376.5	75	40	133	1/5 stroke	399.5	
140	27	M30 x 1.5	35	1/2	98	—	110	385	75	40	133	1/5 stroke	408	
160	30.5	M36 x 1.5	39	3/4	106	—	120	423.5	75	40	141	1/5 stroke	444.5	

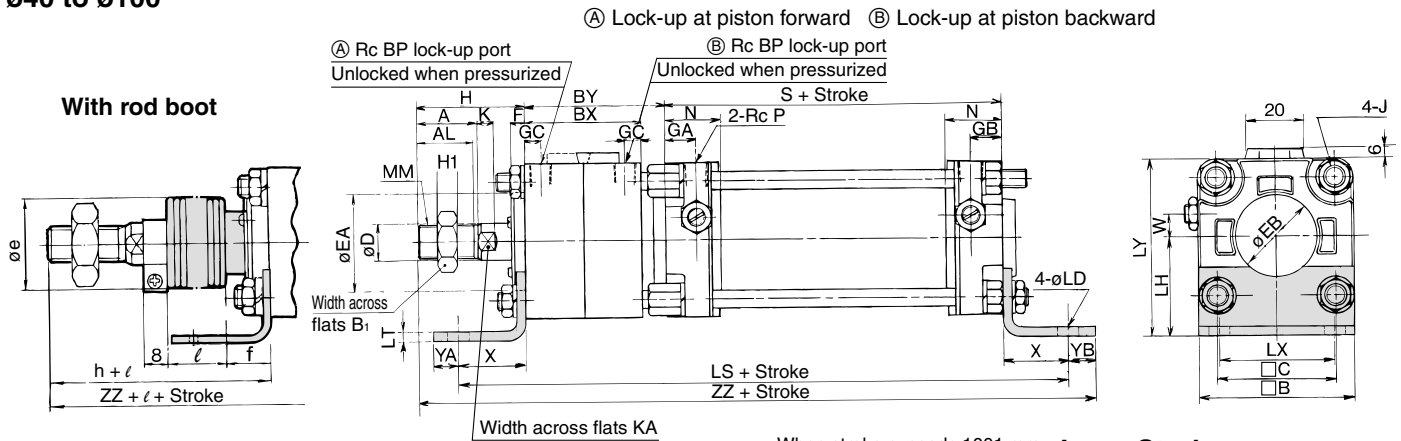
Note) In installing an air cylinder, if a hole must be made to accommodate the rod portion, make sure to machine a hole that is larger than the boot outer diameter "øe".

- CL
- CL1
- MLGC
- CNG
- MNB
- CNA
- CNS
- CLS
- CLQ
- MLGP
- RLQ
- MLU
- ML1C
- D-
- X
- 20-
- Data

# Series CL1

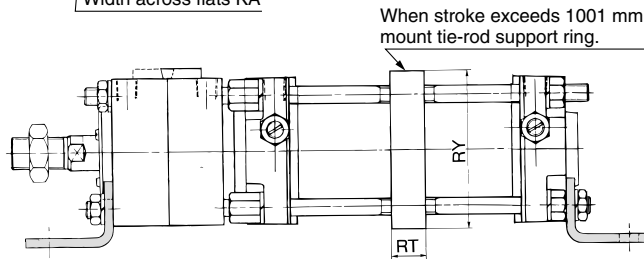
## Axial Foot Style (L)

ø40 to ø100



### Long stroke

ø50 to ø100



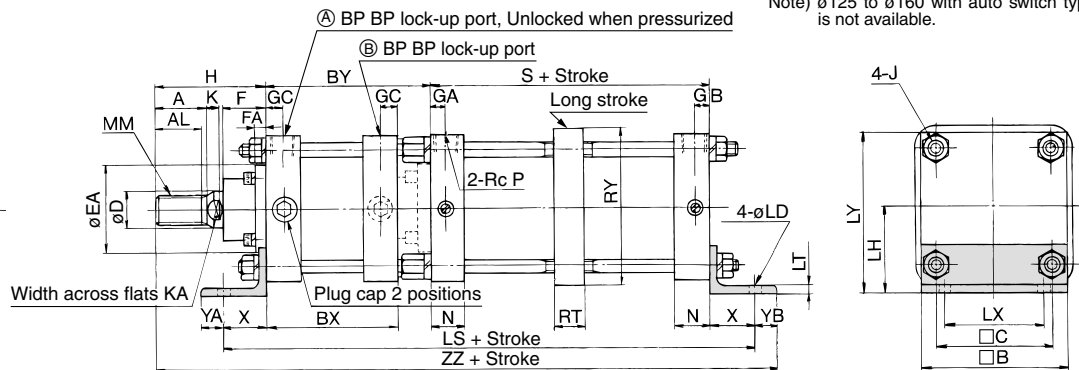
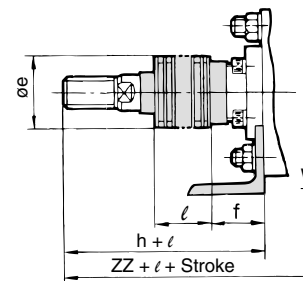
### Long Stroke

Bore size (mm)	Stroke range (mm)	RT	RY
40	501 to 800	—	—
	601 to 1000	—	—
50	601 to 1000	—	—
	1001 to 1200	30	76
63	601 to 1000	—	—
	1001 to 1200	40	92
80	751 to 1000	—	—
	1001 to 1400	45	112
100	751 to 1000	—	—
	1001 to 1500	50	136
125	1401 to 1600	36	164
140	1401 to 1600	36	184
160	1401 to 1600	40	204

Note) ø125 to ø160 with auto switch type is not available.

ø125 to ø160

### With rod boot



Bore size (mm)	Stroke range (mm)		A	AL	B	B <sub>1</sub>	BX	BY	BP	C	D	EA	EB	F	FA	GA	GB	GC	H <sub>1</sub>	J	K	KA	LD	LH
	Without rod boot	With rod boot																						
40	Up to 500	20 to 500	30	27	60	22	59	69	1/4	44	16	40	32	6.5	—	15	15	11	8	M8 x 1.25	6	14	9	40
50	Up to 600	20 to 600	35	32	70	27	67	78	1/4	52	20	50	40	6.0	—	17	17	11	11	M8 x 1.25	7	18	9	45
63	Up to 600	20 to 600	35	32	86	27	73	84	1/4	64	20	55	40	6.0	—	17	17	11	11	M10 x 1.25	7	18	11.5	50
80	Up to 750	20 to 750	40	37	102	32	77	92	1/4	78	25	65	52	8.0	—	21	21	11	13	M12 x 1.75	11	22	13.5	65
100	Up to 750	20 to 750	40	37	116	41	85	100	1/4	92	30	80	52	8.0	—	21	21	11	16	M12 x 1.75	11	26	13.5	75
125	Up to 1400	30 to 1400	50	47	145	—	112.5	141.5	1/2	115	36	90	—	43	14	16	16	16	—	M14 x 1.5	15	31	19	85
140	Up to 1400	30 to 1400	50	47	161	—	121	150	1/2	128	36	90	—	43	14	16	16	16	—	M14 x 1.5	15	31	19	100
160	Up to 1400	30 to 1400	56	53	182	—	133	167	3/4	144	40	90	—	43	14	18.5	18.5	18.5	—	M16 x 1.5	17	36	19	106

Bore size (mm)	LS	LT	LX	LY	MM	N	P	S	W	X	YA	YB	Without rod boot		With rod boot				
													H	ZZ	e	f	h	l	ZZ
40	207	3.2	42	70	M14 x 1.5	27	1/4	84	8	27	13	13	51	244	36	16.5	59	1/4 stroke	252
50	222	3.2	50	80	M18 x 1.5	30	3/8	90	0	27	13	13	58	266	45	16.0	66	1/4 stroke	274
63	250	3.2	59	93	M18 x 1.5	31	3/8	98	0	34	16	16	58	290	45	16.0	66	1/4 stroke	298
80	296	4.5	76	116	M22 x 1.5	37	1/2	116	0	44	21	16	71	339	60	18.0	80	1/4 stroke	348
100	312	6.0	92	133	M26 x 1.5	40	1/2	126	0	43	22	17	72	358	60	18.0	81	1/4 stroke	367
125	329.5	8	100	157.5	M30 x 1.5	35	1/2	98	—	45	20	20	110	414.5	75	40	133	1/5 stroke	437.5
140	338	9	112	180.5	M30 x 1.5	35	1/2	98	—	45	30	30	110	433	75	40	133	1/5 stroke	456
160	373	9	118	197	M36 x 1.5	39	3/4	106	—	50	25	25	120	468	75	40	141	1/5 stroke	489

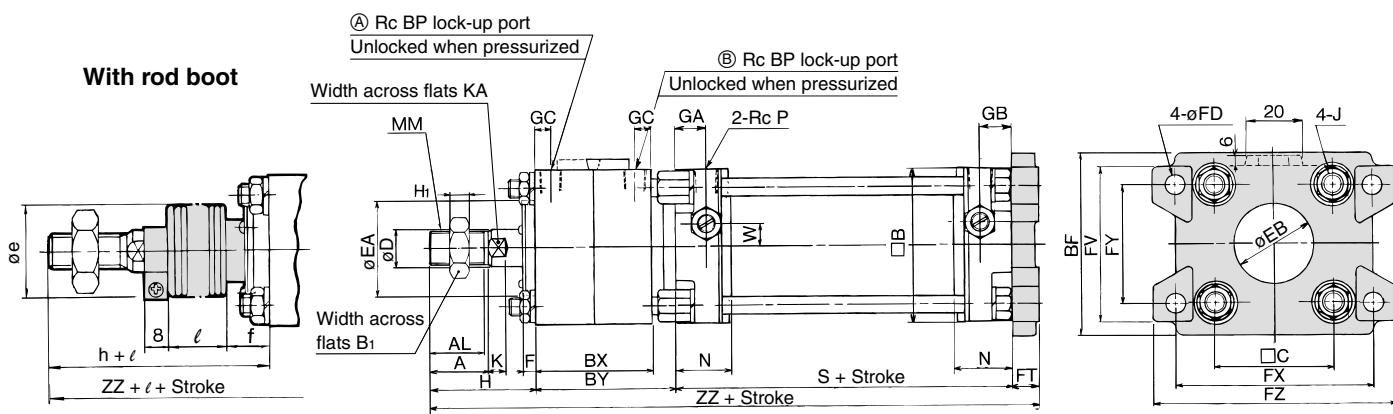


# Lock-up Cylinder Double Acting, Single Rod **Series CL1**

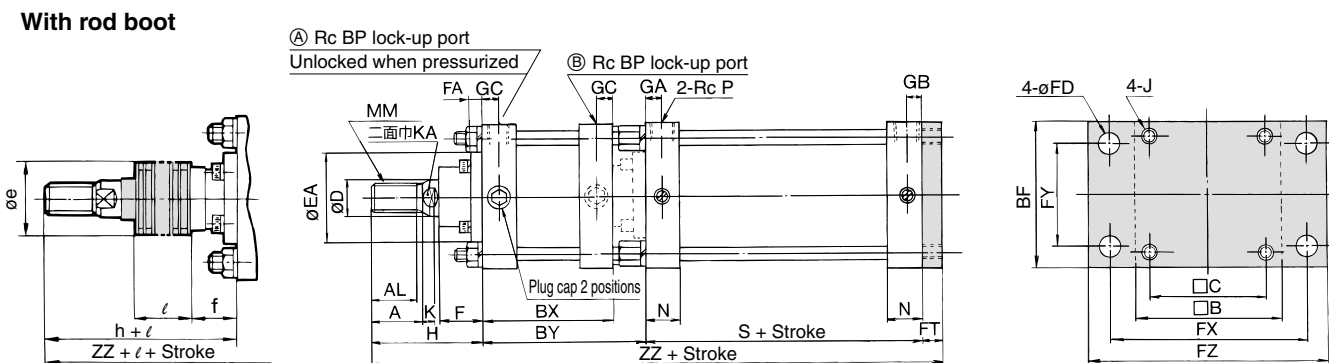
## Head Side Flange Style (G)

ø40 to ø100

Ⓐ Lock-up at piston forward Ⓑ Lock-up at piston backward



ø125 to ø160



- CL
- CL1**
- MLGC
- CNG
- MNB
- CNA
- CNS
- CLS
- CLQ
- MLGP
- RLQ
- MLU
- ML1C
- D-
- X
- 20-
- Data

Bore size (mm)	Stroke range (mm)		A	AL	B	B <sub>1</sub>	BF	BP	BX	BY	C	D	EA	EB	F	FA	FD	FT	FX	FY	FZ	FV	GA	GB	GC	H <sub>1</sub>
	Without rod boot	With rod boot																								
40	Up to 500	20 to 500	30	27	60	22	71	1/4	59	69	44	16	40	32	6.5	—	9.0	12	80	42	100	60	15	15	11	8
50	Up to 600	20 to 600	35	32	70	27	81	1/4	67	78	52	20	50	40	6.0	—	9.0	12	90	50	110	70	17	17	11	11
63	Up to 600	20 to 600	35	32	86	27	101	1/4	73	84	64	20	55	40	6.0	—	11.5	15	105	59	130	86	17	17	11	11
80	Up to 750	20 to 750	40	37	102	32	119	1/4	77	92	78	25	65	52	8.0	—	13.5	18	130	76	160	102	21	21	11	13
100	Up to 750	20 to 750	40	37	116	41	133	1/4	85	100	92	30	80	52	8.0	—	13.5	18	150	92	180	116	21	21	11	16
125	Up to 1000	30 to 1000	50	47	145	—	145	1/2	112.5	141.5	115	36	90	—	43	14	19	14	190	100	230	—	16	16	16	—
140	Up to 1000	30 to 1000	50	47	161	—	160	1/2	121	150	128	36	90	—	43	14	19	20	212	112	255	—	16	16	16	—
160	Up to 1200	30 to 1200	56	53	182	—	180	3/4	133	167	144	40	90	—	43	14	19	20	236	118	275	—	18.5	18.5	18.5	—

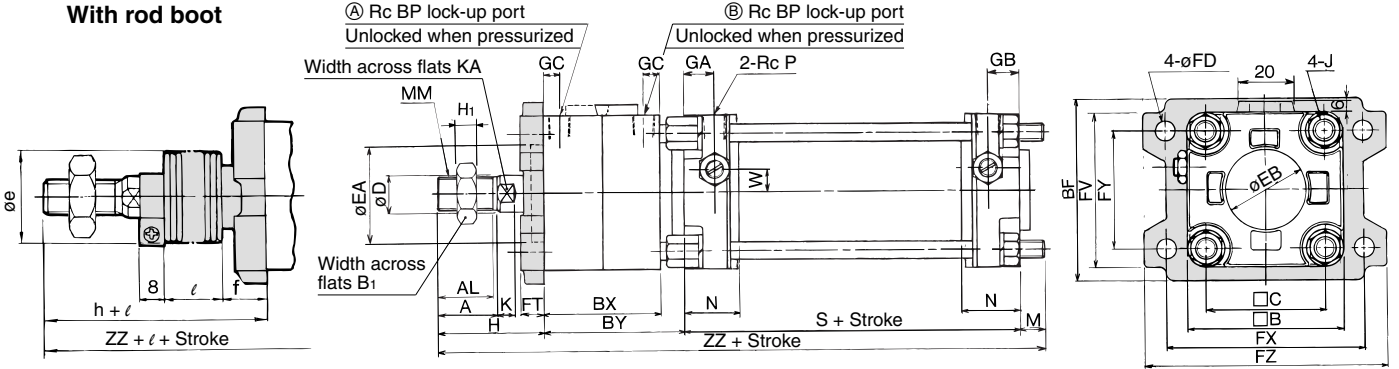
Bore size (mm)	J	K	KA	MM	N	P	S	W	Without rod boot		With rod boot				
									H	ZZ	e	f	h	ℓ	ZZ
40	M8 x 1.25	6	14	M14 x 1.5	27	1/4	84	8	51	216	36	16.5	59	1/4 stroke	224
50	M8 x 1.25	7	18	M18 x 1.5	30	3/8	90	0	58	238	45	16.0	66	1/4 stroke	246
63	M10 x 1.25	7	18	M18 x 1.5	31	3/8	98	0	58	255	45	16.0	66	1/4 stroke	263
80	M12 x 1.75	11	22	M22 x 1.5	37	1/2	116	0	71	297	60	18.0	80	1/4 stroke	306
100	M12 x 1.75	11	26	M26 x 1.5	40	1/2	126	0	72	316	60	18.0	81	1/4 stroke	325
125	M14 x 1.5	15	31	M30 x 1.5	35	1/2	98	—	110	363.5	75	40	133	1/5 stroke	386.5
140	M14 x 1.5	15	31	M30 x 1.5	35	1/2	98	—	110	378	75	40	133	1/5 stroke	401
160	M16 x 1.5	17	36	M36 x 1.5	39	3/4	106	—	120	413	75	40	141	1/5 stroke	434

# Series CL1

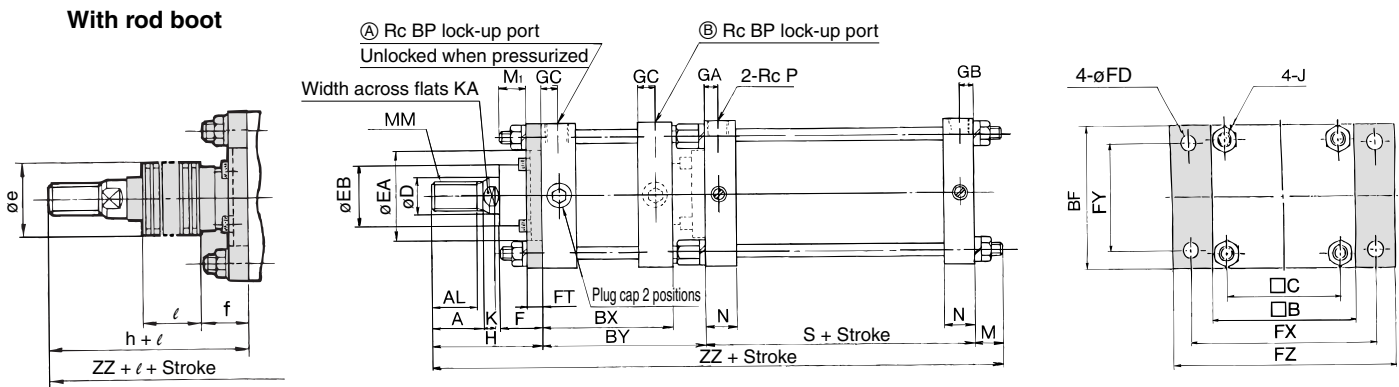
## Rod Side Flange Style (F)

ø40 to ø100

Ⓐ Lock-up at piston forward Ⓑ Lock-up at piston backward



ø125 to ø160



Bore size (mm)	Stroke range (mm)		Long stroke range (mm)	A	AL	B	B <sub>1</sub>	BF	BP	BX	BY	C	D	EA	EB	F	FD	FT	FX	FY	FZ
	Without rod boot	With rod boot																			
40	Up to 500	20 to 500	501 to 800	30	27	60	22	71	1/4	59	69	44	16	40	32	—	9.0	12	80	42	100
50	Up to 600	20 to 600	601 to 1000	35	32	70	27	81	1/4	67	78	52	20	50	40	—	9.0	12	90	50	110
63	Up to 600	20 to 600	601 to 1000	35	32	86	27	101	1/4	73	84	64	20	55	40	—	11.5	15	105	59	130
80	Up to 750	20 to 750	751 to 1000	40	37	102	32	119	1/4	77	92	78	25	65	52	—	13.5	18	130	76	160
100	Up to 750	20 to 750	751 to 1000	40	37	116	41	133	1/4	85	100	92	30	80	52	—	13.5	18	150	92	180
125	Up to 1400	30 to 1400	—	50	47	145	—	145	1/2	112.5	141.5	115	36	90	59	43	19	14	190	100	230
140	Up to 1400	30 to 1400	—	50	47	161	—	160	1/2	121	150	128	36	90	59	43	19	20	212	112	255
160	Up to 1400	30 to 1400	—	56	53	182	—	180	3/4	133	167	144	40	90	59	43	19	20	236	118	275

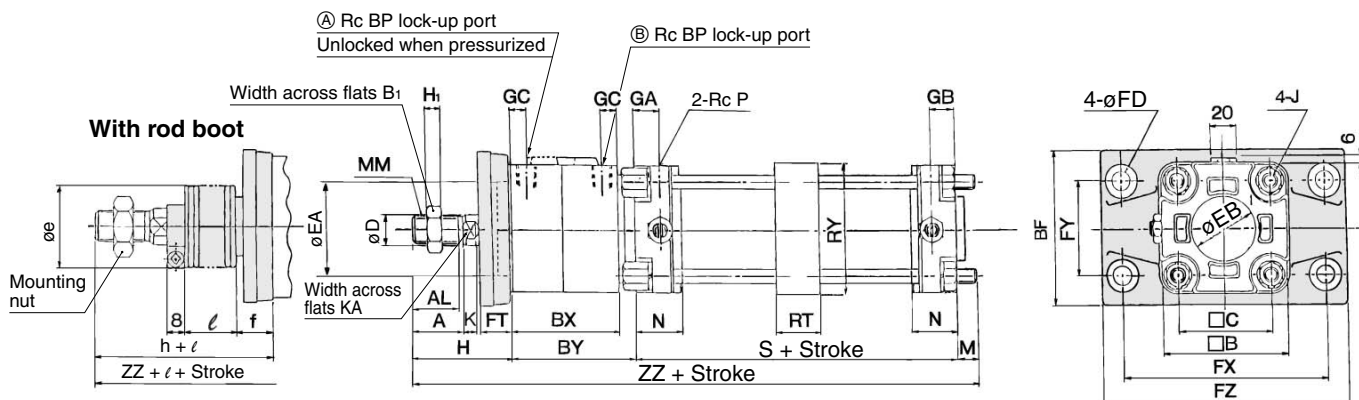
Bore size (mm)	FV	GA	GB	GC	H <sub>1</sub>	J	K	KA	M	M <sub>1</sub>	MM	N	P	S	W	Without rod boot		With rod boot				
	H	ZZ	e	f	h	ℓ	ZZ															
40	60	15	15	11	8	M8 x 1.25	6	14	11	—	M14 x 1.5	27	1/4	84	8	51	215	36	16.5	59	1/4 stroke	223
50	70	17	17	11	11	M8 x 1.25	7	18	11	—	M18 x 1.5	30	3/8	90	0	58	237	45	16.0	66	1/4 stroke	245
63	86	17	17	11	11	M10 x 1.25	7	18	14	—	M18 x 1.5	31	3/8	98	0	58	254	45	16.0	66	1/4 stroke	262
80	102	21	21	11	13	M12 x 1.75	11	22	17	—	M22 x 1.5	37	1/2	116	0	71	296	60	18.0	80	1/4 stroke	305
100	116	21	21	11	16	M12 x 1.75	11	26	17	—	M26 x 1.5	40	1/2	126	0	72	315	60	18.0	81	1/4 stroke	324
125	—	16	16	16	—	M14 x 1.5	15	31	30	22	M30 x 1.5	35	1/2	98	—	110	379.5	75	40	133	1/5 stroke	402.5
140	—	16	16	16	—	M14 x 1.5	15	31	24	19	M30 x 1.5	35	1/2	98	—	110	382	75	40	133	1/5 stroke	405
160	—	18.5	18.5	18.5	—	M16 x 1.5	17	36	26	22	M36 x 1.5	39	3/4	106	—	120	419	75	40	141	1/5 stroke	440

# Lock-up Cylinder Double Acting, Single Rod **Series CL1**

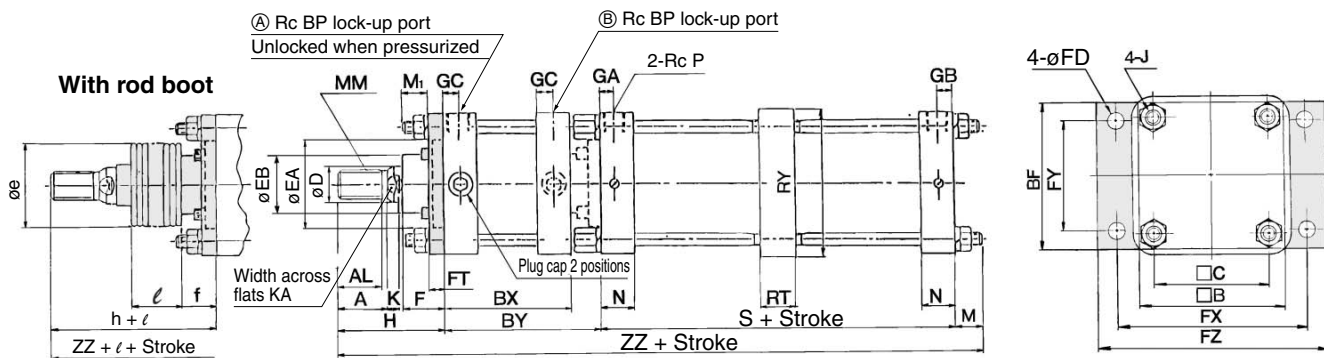
## Rod Side Flange Style (F)/Long Stroke

ø50 to ø100

Ⓐ Lock-up at piston forward Ⓑ Lock-up at piston backward



ø125 to ø160



- CL
- CL1
- MLGC
- CNG
- MNB
- CNA
- CNS
- CLS
- CLQ
- MLGP
- RLQ
- MLU
- ML1C
- D-
- X
- 20-
- Data

Bore size (mm)	Stroke range	A	AL	B	B <sub>1</sub>	BF	BP	BX	BY	C	D	EA	EB	F	FD	FT	FX	FY	FZ	GA	GB	GC	H <sub>1</sub>	J	K	KA
50	1001 to 1200	35	32	70	27	88	1/4	67	78	52	20	50	40	—	9.0	20	120	58	144	17	17	11	11	M8 x 1.25	7	18
63	1001 to 1200	35	32	86	27	105	1/4	73	84	64	20	55	40	—	11.5	23	140	64	170	17	17	11	11	M10 x 1.25	7	18
80	1001 to 1400	40	37	102	32	124	1/4	77	92	78	25	65	52	—	13.5	28	164	84	198	21	21	11	13	M12 x 1.75	11	22
100	1001 to 1500	40	37	116	41	140	1/4	85	100	92	30	80	52	—	13.5	29	180	100	220	21	21	11	16	M12 x 1.75	11	26
125	1401 to 1600	50	47	145	—	145	1/2	112.5	141.5	115	36	90	59	43	19	14	190	100	230	16	16	16	—	M14 x 1.5	15	31
140	1401 to 1600	50	47	161	—	160	1/2	121	150	128	36	90	59	43	19	20	212	112	255	16	16	16	—	M14 x 1.5	15	31
160	1401 to 1600	56	53	182	—	180	3/4	133	167	144	40	90	59	43	19	20	236	118	275	18.5	18.5	—	—	M16 x 1.5	17	36

Bore size (mm)	Stroke range	M	M <sub>1</sub>	MM	N	P	RT	RY	S	W	Without rod boot		With rod boot				
											H	ZZ	e	f	h	l	ZZ
50	1001 to 1200	6	—	M18 x 1.5	30	3/8	30	76	90	0	67	241	45	16.0	66	1/4 stroke	240
63	1001 to 1200	10	—	M18 x 1.5	31	3/8	40	92	98	0	71	263	45	16.0	66	1/4 stroke	258
80	1001 to 1400	12	—	M22 x 1.5	37	1/2	45	112	116	0	87	307	60	18.0	80	1/4 stroke	300
100	1001 to 1500	12	—	M26 x 1.5	40	1/2	50	136	126	0	89	327	60	18.0	81	1/4 stroke	319
125	1401 to 1600	30	22	M30 x 1.5	35	1/2	36	164	98	—	110	379.5	75	40	133	1/5 stroke	402.5
140	1401 to 1600	24	19	M30 x 1.5	35	1/2	36	184	98	—	110	382	75	40	133	1/5 stroke	405
160	1401 to 1600	26	22	M36 x 1.5	39	3/4	45	204	106	—	120	419	75	40	141	1/5 stroke	440

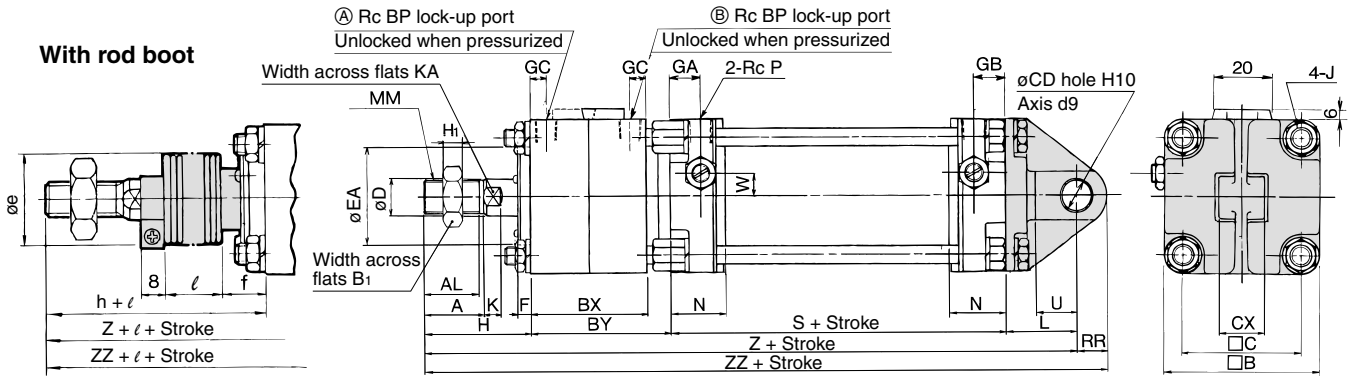
Note) Bore size ø40 and bore sizes ø125 through ø160 with auto switch are not available.

# Series CL1

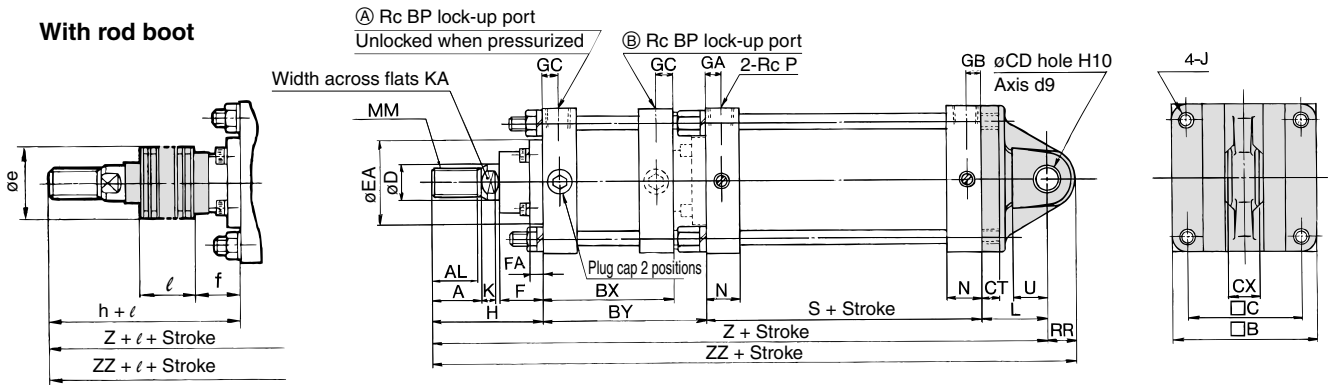
## Single Clevis Style (C)

ø40 to ø100

Ⓐ Lock-up at piston forward Ⓑ Lock-up at piston backward



ø125 to ø160



Bore size (mm)	Stroke range (mm)		A	AL	B	B <sub>1</sub>	BP	BX	BY	C	CD	CT	CX	D	EA	F	FA	GA	GB	GC	H <sub>1</sub>
	Without rod boot	With rod boot																			
40	Up to 500	20 to 500	30	27	60	22	1/4	59	69	44	10	—	15.0 <sup>-0.1</sup> <sub>-0.3</sub>	16	40	6.5	—	15	15	11	8
50	Up to 600	20 to 600	35	32	70	27	1/4	67	78	52	12	—	18.0 <sup>-0.1</sup> <sub>-0.3</sub>	20	50	6.0	—	17	17	11	11
63	Up to 600	20 to 600	35	32	86	27	1/4	73	84	64	16	—	25.0 <sup>-0.1</sup> <sub>-0.3</sub>	20	55	6.0	—	17	17	11	11
80	Up to 750	20 to 750	40	37	102	32	1/4	77	92	78	20	—	31.5 <sup>-0.1</sup> <sub>-0.3</sub>	25	65	8.0	—	21	21	11	13
100	Up to 750	20 to 750	40	37	116	41	1/4	85	100	92	25	—	35.5 <sup>-0.1</sup> <sub>-0.3</sub>	30	80	8.0	—	21	21	11	16
125	Up to 1000	30 to 1000	50	47	145	—	1/2	112.5	141.5	115	25	17	32.0 <sup>-0.1</sup> <sub>-0.3</sub>	36	90	43	14	16	16	16	—
140	Up to 1000	30 to 1000	50	47	161	—	1/2	121	150	128	28	17	36.0 <sup>-0.1</sup> <sub>-0.3</sub>	36	90	43	14	16	16	16	—
160	Up to 1200	30 to 1200	56	53	182	—	3/4	133	167	144	32	20	40.0 <sup>-0.1</sup> <sub>-0.3</sub>	40	90	43	14	18.5	18.5	18.5	—

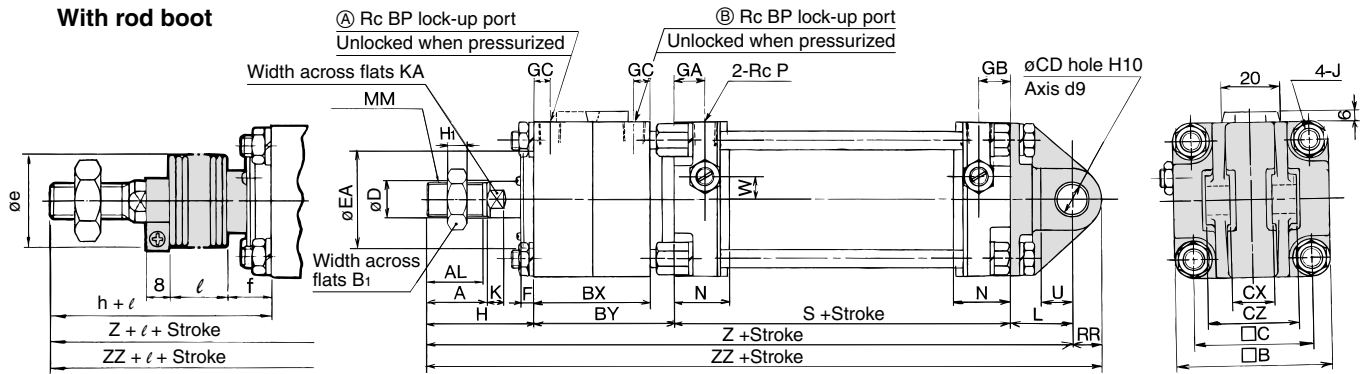
Bore size (mm)	J	K	KA	L	MM	N	P	RR	S	U	W	Without rod boot				With rod boot				
												H	Z	ZZ	e	f	h	ℓ	Z	ZZ
40	M8 x 1.25	6	14	30	M14 x 1.5	27	1/4	10	84	16	8	51	234	244	36	16.5	59	1/4 stroke	242	252
50	M8 x 1.25	7	18	35	M18 x 1.5	30	3/8	12	90	19	0	58	261	273	45	16.0	66	1/4 stroke	269	281
63	M10 x 1.25	7	18	40	M18 x 1.5	31	3/8	16	98	23	0	58	280	296	45	16.0	66	1/4 stroke	288	304
80	M12 x 1.75	11	22	48	M22 x 1.5	37	1/2	20	116	28	0	71	327	347	60	18.0	80	1/4 stroke	336	356
100	M12 x 1.75	11	26	58	M26 x 1.5	40	1/2	25	126	36	—	72	356	381	60	18.0	81	1/4 stroke	365	390
125	M14 x 1.5	15	31	65	M30 x 1.5	35	1/2	29	98	35	—	110	414.5	443.5	75	40	133	1/5 stroke	437.5	466.5
140	M14 x 1.5	15	31	75	M30 x 1.5	35	1/2	32	98	40	—	110	433	465	75	40	133	1/5 stroke	456	488
160	M16 x 1.5	17	36	80	M36 x 1.5	39	3/4	36	106	45	—	120	473	509	75	40	141	1/5 stroke	494	530

# Lock-up Cylinder Double Acting, Single Rod Series CL1

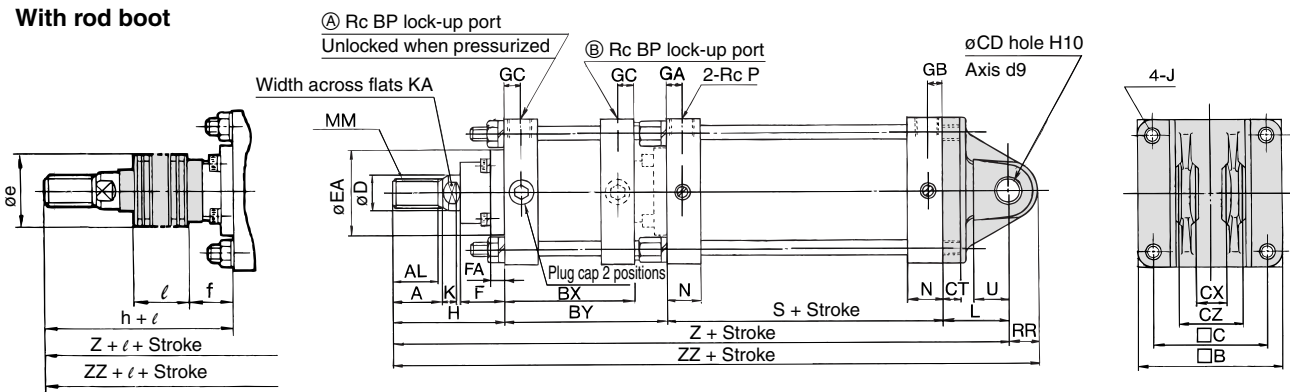
## Double Clevis Style (D)

ø40 to ø100

Ⓐ Lock-up at piston forward Ⓑ Lock-up at piston backward



ø125 to ø160



Bore size (mm)	Stroke range (mm)		A	AL	B	B <sub>1</sub>	BP	BX	BY	C	CD	CT	CX	CZ	D	EA	F	FA	GA	GB
	Without rod boot	With rod boot																		
40	Up to 500	20 to 500	30	27	60	22	1/4	59	69	44	10	—	15.0 <sup>+0.3</sup> / <sub>+0.1</sub>	29.5	16	40	6.5	—	15	15
50	Up to 600	20 to 600	35	32	70	27	1/4	67	78	52	12	—	18.0 <sup>+0.3</sup> / <sub>+0.1</sub>	38	20	50	6.0	—	17	17
63	Up to 600	20 to 600	35	32	86	27	1/4	73	84	64	16	—	25.0 <sup>+0.3</sup> / <sub>+0.1</sub>	49	20	55	6.0	—	17	17
80	Up to 750	20 to 750	40	37	102	32	1/4	77	92	78	20	—	31.5 <sup>+0.3</sup> / <sub>+0.1</sub>	61	25	65	8.0	—	21	21
100	Up to 750	20 to 750	40	37	116	41	1/4	85	100	92	25	—	35.5 <sup>+0.3</sup> / <sub>+0.1</sub>	64	30	80	8.0	—	21	21
125	Up to 1000	30 to 1000	50	47	145	—	1/2	112.5	141.5	115	25	17	32.0 <sup>+0.3</sup> / <sub>+0.1</sub>	64 <sup>0</sup> / <sub>-0.2</sub>	36	90	43	14	16	16
140	Up to 1000	30 to 1000	50	47	161	—	1/2	121	150	128	28	17	36.0 <sup>+0.3</sup> / <sub>+0.1</sub>	72 <sup>0</sup> / <sub>-0.2</sub>	36	90	43	14	16	16
160	Up to 1200	30 to 1200	56	53	182	—	3/4	133	167	144	32	20	40.0 <sup>+0.3</sup> / <sub>+0.1</sub>	80 <sup>0</sup> / <sub>-0.2</sub>	40	90	43	14	18.5	18.5

Bore size (mm)	GC	H <sub>1</sub>	J	K	KA	L	MM	N	P	RR	S	U	W	Without rod boot			With rod boot					
														H	Z	ZZ	e	f	h	ℓ	Z	ZZ
40	11	8	M8 x 1.25	6	14	30	M14 x 1.5	27	1/4	10	84	16	8	51	234	244	36	16.5	59	1/4 stroke	242	252
50	11	11	M8 x 1.25	7	18	35	M18 x 1.5	30	3/8	12	90	19	0	58	261	273	45	16.0	66	1/4 stroke	269	281
63	11	11	M10 x 1.25	7	18	40	M18 x 1.5	31	3/8	16	98	23	0	58	280	296	45	16.0	66	1/4 stroke	288	304
80	11	13	M12 x 1.75	11	22	48	M22 x 1.5	37	1/2	20	116	28	0	71	327	347	60	18.0	80	1/4 stroke	336	356
100	11	16	M12 x 1.75	11	26	58	M26 x 1.5	40	1/2	25	126	36	0	72	356	381	60	18.0	81	1/4 stroke	365	390
125	16	—	M14 x 1.5	15	31	65	M30 x 1.5	35	1/2	29	98	35	—	110	414.5	443.5	75	40	133	1/5 stroke	437.5	466.5
140	16	—	M14 x 1.5	15	31	75	M30 x 1.5	35	1/2	32	98	40	—	110	433	465	75	40	133	1/5 stroke	456	488
160	18.5	—	M16 x 1.5	17	36	80	M36 x 1.5	39	3/4	36	106	45	—	120	473	509	75	40	141	1/5 stroke	494	530

\* Clevis pin, flat washer and cotter pin are attached.

CL

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

MLGP

RLQ

MLU

ML1C

D-

-X

20-

Data



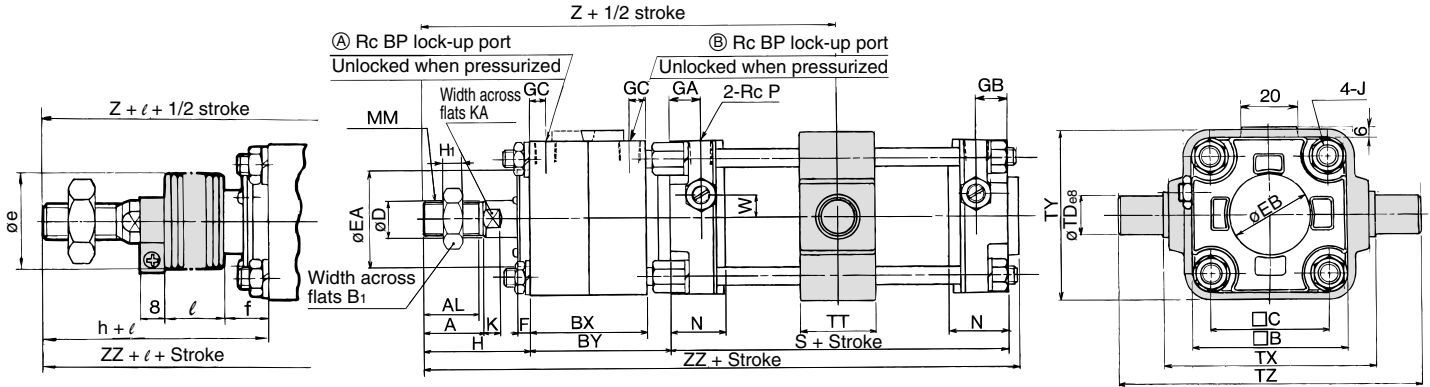
# Series CL1

## Center Trunnion Style (T)

ø40 to ø100

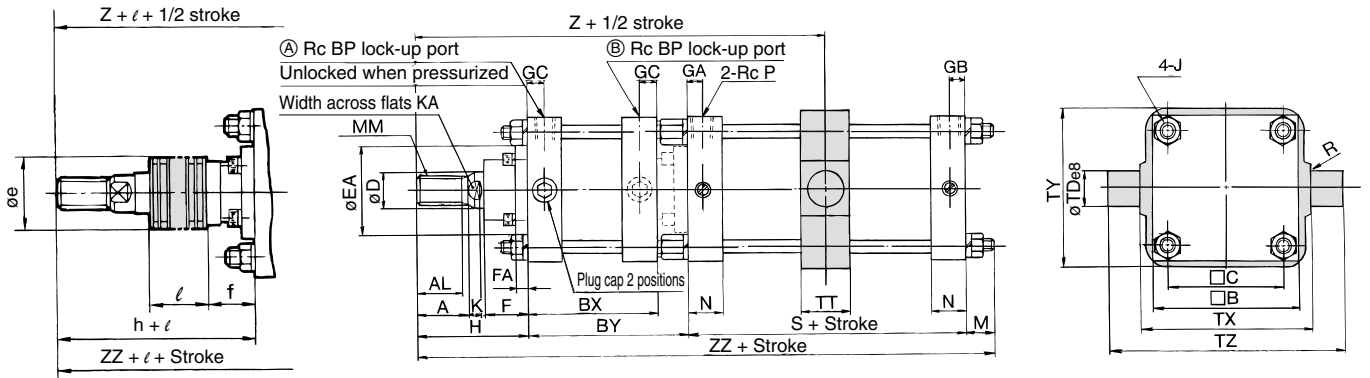
Ⓐ Lock-up at piston forward Ⓑ Lock-up at piston backward

With rod boot



ø125 to ø160

With rod boot



Bore size (mm)	Stroke range (mm)		A	AL	B	B <sub>1</sub>	BP	BX	BY	C	D	EA	EB	F	FA	GA	GB	GC	H <sub>1</sub>	J	K	KA
	Without rod boot	With rod boot																				
40	Up to 500	20 to 500	30	27	60	22	1/4	59	69	44	16	40	32	6.5	—	15	15	11	8	M8 x 1.25	6	14
50	Up to 600	20 to 600	35	32	70	27	1/4	67	78	52	20	50	40	6.0	—	17	17	11	11	M8 x 1.25	7	18
63	Up to 600	20 to 600	35	32	86	27	1/4	73	84	64	20	55	40	6.0	—	17	17	11	11	M10 x 1.25	7	18
80	Up to 750	20 to 750	40	37	102	32	1/4	77	92	78	25	65	52	8.0	—	21	21	11	13	M12 x 1.75	11	22
100	Up to 750	20 to 750	40	37	116	41	1/4	85	100	92	30	80	52	8.0	—	21	21	11	16	M12 x 1.75	11	26
125	25 to 1000	30 to 1000	50	47	145	—	1/2	112.5	141.5	115	36	90	—	43	14	16	16	16	—	M14 x 1.5	15	31
140	30 to 1000	30 to 1000	50	47	161	—	1/2	121	150	128	36	90	—	43	14	16	16	16	—	M14 x 1.5	15	31
160	35 to 1200	35 to 1200	56	53	182	—	3/4	133	167	144	40	90	—	43	14	18.5	18.5	18.5	—	M16 x 1.5	17	36

Bore size (mm)	M	MM	N	P	R	S	TD <sub>es</sub>	TT	TX	TY	TZ	W	Without rod boot			With rod boot					
													H	Z	ZZ	e	f	h	l	Z	ZZ
40	—	M14 x 1.5	27	1/4	—	84	15 <sup>-0.032</sup> <sub>-0.052</sub>	22	85	62	117	8	51	162	209	36	16.5	59	1/4 stroke	170	217
50	—	M18 x 1.5	30	3/8	—	90	15 <sup>-0.032</sup> <sub>-0.059</sub>	22	95	74	127	0	58	181	232	45	16.0	66	1/4 stroke	189	240
63	—	M18 x 1.5	31	3/8	—	98	18 <sup>-0.032</sup> <sub>-0.059</sub>	28	110	90	148	0	58	191	246	45	16.0	66	1/4 stroke	199	254
80	—	M22 x 1.5	37	1/2	—	116	25 <sup>-0.040</sup> <sub>-0.073</sub>	34	140	110	192	0	71	221	286	60	18.0	80	1/4 stroke	230	295
100	—	M26 x 1.5	40	1/2	—	126	25 <sup>-0.040</sup> <sub>-0.073</sub>	40	162	130	214	0	72	235	306	60	18.0	81	1/4 stroke	244	315
125	19	M30 x 1.5	35	1/2	1.0	98	32 <sup>-0.050</sup> <sub>-0.089</sub>	50	170	164	234	—	110	300.5	368.5	75	40	133	1/5 stroke	323.5	391.5
140	19	M30 x 1.5	35	1/2	1.5	98	36 <sup>-0.050</sup> <sub>-0.089</sub>	55	190	184	262	—	110	309	377	75	40	133	1/5 stroke	332	400
160	22	M36 x 1.5	39	3/4	1.5	106	40 <sup>-0.050</sup> <sub>-0.089</sub>	60	212	204	292	—	120	340	415	75	40	141	1/5 stroke	361	436