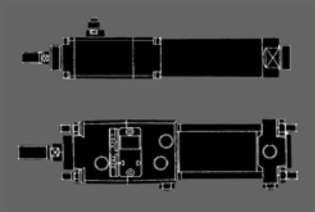


# Fine Lock Cylinder
# Lock-up Cylinder
## *Series* CL / ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100, ø125, ø140, ø160

| Locking style | Spring lock | Pneumatic lock | Spring/ Pneumatic lock |
|---|---|---|---|
| Features | ●Unlocking<br>Discharging the air causes the lock to operate. | ●Pressure locking<br>The holding power can be varied according to the air pressure that is applied to the port. | ●Pressure locking<br>The holding power can be varied according to the air pressure that is applied to the port.<br>●Unlocking<br>Discharging the air causes the lock to operate. |

### Locks in both directions
**The cylinder can be locked in either stroke direction.**
**(The lock-up cylinder can be locked only in one direction.)**

### Maximum piston speed: 500mm/s
**Able to operate at 50 to 500mm/s, if within the allowable kinetic energy range. (The lock-up cylinder can operate at 50 to 200mm/s.)**

### Variations

| Series | Action | Style | Standard: Built-in magnet | Standard: With rod boot | Locking direction | Locking style: Spring lock | Locking style: Pneumatic lock | Locking style: Spring/ pneumatic lock | Bore (mm) | Standard stroke (mm) | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fine lock cylinder** | | | | | | | | | | | |
| **Series CLJ2**  | Double acting | Single rod | ● | | Both directions | ● | ● | ● | 16 | 15 to 200 | 3.1-8 |
| **Series CLM2**  | Double acting | Single rod | ● | ● | Both directions | ● | ● | ● | 20<br>25<br>32<br>40 | 25 to 300 | 3.1-15 |
| **Series CLG1**  | Double acting | Single rod | ● | ● | Both directions | ● | ● | ● | 20 | 25 to 200 | 3.1-25 |
| | | | | | | | | | 25<br>32<br>40 | 25 to 300 | |
| **Series CLA**  | Double acting | Single rod | ● | ● | Both directions | ● | ● | ● | 40 | 25 to 500 | 3.1-33<br>3.1-43 |
| | | | | | | | | | 50<br>63 | 25 to 600 | |
| | | Double rod | ● | ● | | ● | ● | ● | 80<br>100 | 25 to 700 | |
| **Lock-up cylinder** | | | | | | | | | | | |
| **Series CL1**  | Double acting | Single rod | ● | ● | One direction | ● | | | 40 | 25 to 500 | 3.1-49 |
| | | | | | | | | | 50, 63 | 25 to 600 | |
| | | | | | | | | | 80, 100 | 25 to 700 | |
| | | | | | | | | | 125, 140 160 | Up to 1600 | |

| Made to Order | Refer to p.5.4-90 for Series CL Made to Order specifications. |
|---|---|

CL
MLGC
CNA
CB
CV/MVG
CXW
CXS
CXT
MX
MXU
MXS
MXQ
MXF
MXW
MXP
MG
MGP
MGQ
MGG
MGC
MGF
CY1
MY1

# Series CL
# Prior to Use

## ⚠Precautions

**Be sure to read before handling.**
**The precautions on these pages are for the fine lock cylinder and lock-up cylinder.**
**Refer to actuator common precautions on p.0-39 to 0-46 for general actuator precautions.**

### ⚠ Warning

#### Design on Equipment Machine

①Prevent personnel from coming into direct contact with the driven object as well as the moving portion of a cylinder. If there is a risk of contact, provide safety measures such as a cover or a system that uses sensors that will activate an emergency stop before contact is made.

②Use a balance circuit in which lurching of the piston is taken into consideration. If the lock is applied at a desired position of a stroke and compressed air is applied to only one side of the cylinder, the piston will lurch at a high speed the moment the lock is disengaged. In such a situation, there is a risk of injury to humans, or equipment damage. To prevent the piston from lurching, use a balance circuit such as the recommended pneumatic circuit (p.3.1-4). If an air-hydro fine lock cylinder is used, make sure to operate the lock portion through air pressure. Never use oil on the lock-up cylinder because the lock-up cylinder is a non-lube style. Failure to observe this could cause the lock to malfunction.

### ⚠ Warning

#### Selection

**Notes for setting the maximum load in the locked state.**

When a cylinder is in a no-load and locked state, the holding force (maximum static load) is the lock's ability to hold a static load that does not involve vibrations or shocks. To ensure braking force, the maximum load must be set as described below.

①For constant static loads, such as for drop prevention:
• Fine lock series (CLJ2, CLM2, CLG1, CLA series)
**35% or less of the holding force (maximum static load)**
Note: For applications such as drop prevention, consider situations in which the air source is shut off, and make selections based on the holding force of the spring locked state. Do not use the pneumatic lock for drop prevention purposes.
• Lock-up series (Series CL1)
**50% or less of the holding force (maximum static load)**

②When kinetic energy acts upon the cylinder, such as when effecting an intermediate stop:
There are constraints in terms of the allowable kinetic energy that can be applied to the cylinder in a locked state. Therefore, refer to the allowable kinetic energy of the respective series. Furthermore, during locking, the mechanism must sustain the thrust of the cylinder itself, in addition to absorbing the kinetic energy. Therefore, even within a given allowable kinetic energy level, there is an upper limit to the amount of the load that can be sustained.
• Fine lock series (Series CLJ1, CLM2, CLG1, CLA)
**Max. load at horizontal mounting: 70% or less of the holding force (max. static load) for spring lock**
**Max. load at vertical mounting: 35% or less of the holding force (max. static load) for spring lock**
• Lock-up series (Series CL1)
**Max. load at horizontal mounting: 50% or less of the holding force (max. static load)**
**Max. load at vertical mounting: 25% or less of the holding force (max. static load)**

③In a locked state, do not apply impacts, strong vibrations or rotational forces. Do not apply a impacts, strong vibrations or rotational forces from external sources, because this could damage or shorten the life of the lock unit.

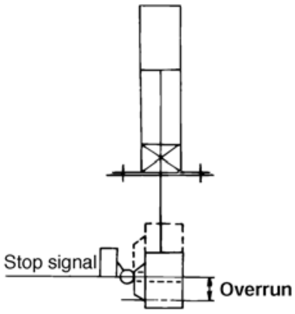
④The locking of the fine lock cylinder is directional. Although the fine lock cylinder can be locked in both directions, be aware that its holding force is smaller in one of the directions.
CLJ2/CLM2/CLG1··· Holding force at piston rod extended side decreases approx. 15%.
CLA··· Holding force at piston rod retracted side decreases approx. 15%.

⑤The locking of the lock-up cylinder is unidirectional.
Because the locking direction of the lock-up cylinder is unidirectional, select the locking direction in accordance with the particular operating conditions. It is also possible to manufacture a bidirectional lock-up cylinder. For details, refer to "Made to Order" on p.5.4-90. Due to the nature of its construction, a lock-up cylinder has a play of approximately 0.5mm to 1mm in the axial direction. Therefore, if an external stopper is used to stop the piston rod and the lock is engaged, the piston rod will shift in the amount of its axial play.

⑥To effect an intermediate stop, take the cylinder's stopping precision and overrun amount into consideration.
Because the lock is applied by mechanical means, the piston will not stop immediately in response to a stopping signal, but only after a time lag. This lag determines the amount of the overrun of the piston stroke. Thus, the range of the maximum and minimum amounts of the overrun is the stopping precision.
• **Place the limit switch before the desired stopping position, only in the amount of the overrun.**
• **A limit switch requires a detection length (dog length) that is equivalent to the amount of overrun + a**
• **SMC's auto switches have an operation range of 8 to 14mm, depending on the switch. If the overrun exceeds this range, self holding of the contact point must be effected on the switch load side.**
∗The series and their stopping accuracy are as follows: CLJ series (p.3.1-10), CLM2 series (p.3.1-18), CLG1 (p.3.1-27), CLA series (p.3.1-35), and CL1 series (p.3.1-50).

⑦To improve stopping accuracy, use DC-based control circuitry and a solenoid valve with an excellent response, and locate the solenoid valve as close as possible to the cylinder.

⑧Be aware that the stopping accuracy is influenced by changes in the piston speed.
The variance in the stopping position increases if the piston speed changes, such as due to load fluctuations during the reciprocal movement of the piston. Therefore, take measures to ensure a constant piston speed immediately preceding the stopping position. Furthermore, the variances in the stopping position increases when the piston is effecting a cushioning stroke or during acceleration after starting its movement.



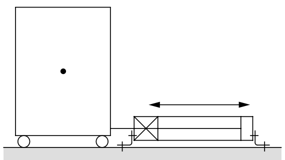
## ⚠ Warning

### Mounting

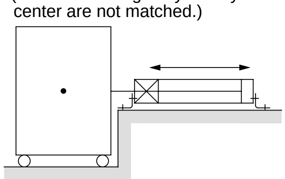
①To attach a load to the end of the rod, make sure that the lock is in the disengaged state.
- If this is performed with the lock engaged, a load that exceeds the allowable rotational force or holding force would be applied to the piston rod, which could damage the locking mechanism. The fine lock and CL1 series ø40 to ø100 cylinders have a built-in manual unlocking mechanism. Therefore, they can be maintained in the unlocked state without supplying air. For CL1 series with ø125 to ø160 cylinders, simply connect piping to the lock-up port, and supply air pressure of 0.2MPa or more to disengage the lock in order to attach a load.

## ⚠ Caution

①Do not apply an unbalanced load to the piston rod.
- Pay particular attention to aligning the center of gravity of the load with the axial center of the cylinder. If there is a large amount of deviation, the piston rod could become unevenly worn or damaged due to the inertial moment that is created when the piston rod is stopped by the lock.



X (Load center of gravity and cylinder axis center are not matched.)



◯ (Load center of gravity and cylinder axis center are matched.)

Note) Can be used if all of the generated moment is absorbed by an effective guide.

## ⚠ Caution

### Adjustment

①Place it in the locked position. (Excluding the CL1 series ø125 to ø160.)
- The locks are manually disengaged at the time the cylinders are shipped from the factory. Therefore, make sure to change them to the locked state before using the cylinders. For procedures to effect the change, refer to p.3.1-5 for the fine lock series, and p.3.1-52 for the lock-up cylinders. Be aware that the lock will not operate properly if the change is not performed correctly.
- Adjust the cylinder's air balance. In the state in which a load is attached to the cylinder, disengage the lock and adjust the air pressure at the rod side and the head side of the cylinder to obtain a load balance. By maintaining a proper air balance, the piston rod can be prevented from lurching when the lock is disengaged.

②Adjust the mounting position of detections such as those of the auto switches. To effect an intermediate stop, adjust the mounting position of the auto switch detection by taking the amount of overrun into consideration in relation to the desired stopping position.

# Series CL
# Prior to Use

## Pneumatic Circuit

### ⚠Warning

① **To stop the piston by engaging the lock, make sure to use a pneumatic circuit that applies a balanced pressure to both ends of the piston.**
To prevent the piston from lurching after it has been stopped with the lock, during restarting or when disengaging manually, provide a circuit that applies a balanced pressure to both ends of the piston to cancel out the force that is generated by the load in the direction of the operation of the piston.

② **Using 50% or more of the effective area of the cylinder actuating solenoid valve as a guide, use a solenoid valve with a large effective area for the unlocking solenoid.**
The greater the effective area, the shorter will be the length of time the lock takes to engage (shortening the overrun amount), thus improving the stopping precision.

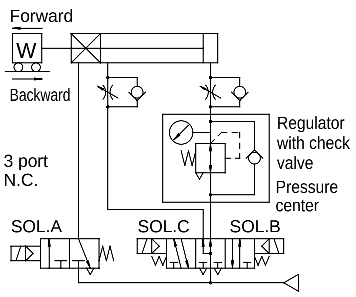
③ **Place the unlocking solenoid close to the cylinder so that it will not be located farther than the cylinder actuating solenoid valve.**
The closer the valve is located to the cylinder (the shorter the pipe length), the shorter will be the overrun amount, thus improving the stopping precision.

④ **Provide 0.5 seconds or more between the time the lock is engaged (to effect an intermediate stop of the cylinder) until the lock is disengaged.**
If the length of time the piston is stopped by engaging the lock is short, the piston rod (and the load) could lurch at a speed that is higher than the speed controlled by the speed controller.

⑤ **During restarting, control the signal for switching the unlocking solenoid to be output before or at the same time as the signal for the cylinder actuating solenoid valve is output.**
If the signal is delayed, the piston rod (and the load) could lurch at a speed that is higher than the speed controlled by the speed controller.

⑥ **Basic circuit**

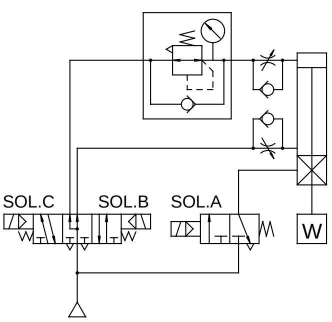
1. [Horizontal]



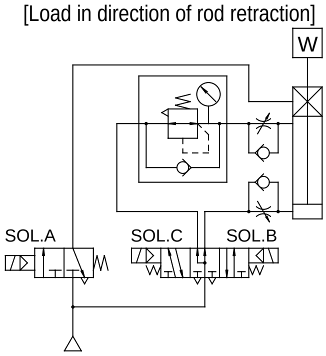

| SOL.A | SOL.B | SOL.C | Action | |
|---|---|---|---|---|
| ON | ON | OFF | Forward | |
| OFF | OFF | OFF | Locked stop | 0.5s or more |
| ON | OFF | OFF | Unlocked | 0 to 0.5s |
| ON | ON | OFF | Forward | |
| ON | OFF | ON | Backward | |
| OFF | OFF | OFF | Locked stop | 0.5s or more |
| ON | OFF | OFF | Unlocked | 0 to 0.5s |
| ON | OFF | ON | Backward | |

2. [Vertical]

[Load in direction of rod extension]

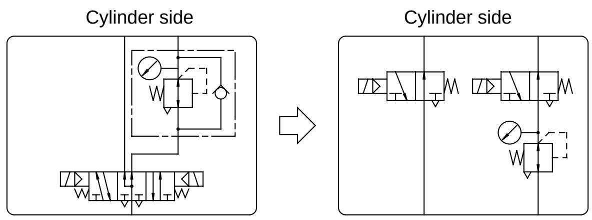



[Load in direction of rod retraction]



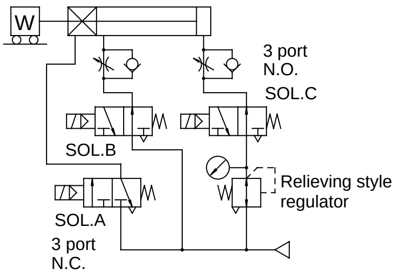

### ⚠Caution

① The 3 position pressure center solenoid valve and regulator with check valve can be interchanged with two 3-port, N.O. valves and a relieving style regulator.



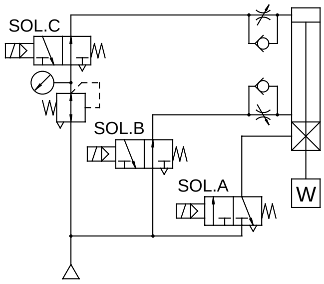

[Example]

1. [Horizontal]

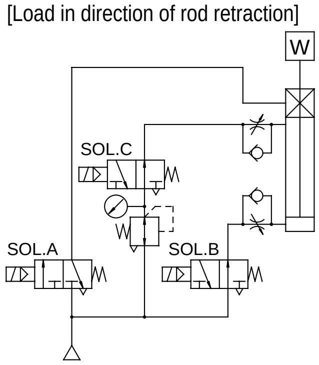



2. [Vertical]

[Load in direction of rod extension]




[Load in direction of rod retraction]



# How to Manually Disengage the Lock and Change from the Unlocked to the Locked State

**The lock is manually disengaged at the time the cylinder is shipped from the factory. Because the lock will not operate in this state, make sure to change it to the locked state before operation, after having adjusted the axial center for installation.**

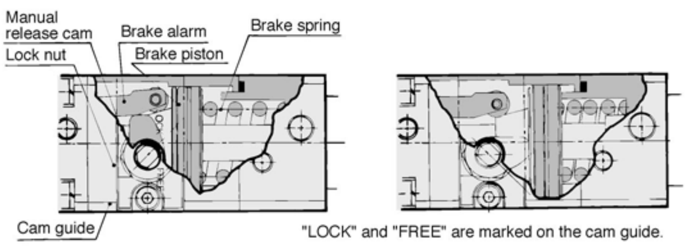
## How to Change from the Unlocked State to the Locked State

**(a) CLJ2, CLM2, CLG1**

① Loose locking nut.
② Turn the wrench flats section of the manual unlocking cam to the LOCK position that is marked on the cam guide.
③ While keeping the wrench flats section in place, tighten the lock nut.

Note) The manual unlocking cam will rotate approximately 180°. Do not rotate the wrench flats section excessively.

**Locked condition** **Manually lock released**



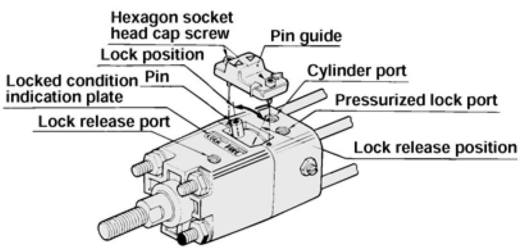

"LOCK" and "FREE" are marked on the cam guide.

**(b) CLA**

① Loosen the two hexagon socket bolts and remove the pin guide.
② As viewed from the end of the rod, the pin is tilted 15° to the right of the center.
③ Supply air pressure of 0.3MPa or more to the lock release port.
④ Using a wooden or plastic rod, such as the handle of a wooden mallet, push the pin and rotate it 30°.

Note) Never rotate the pin by striking it because this could bend or damage the pin. Be very careful when pushing the pin, as the surface is slippery.

⑤ Inside the pin guide, there is a slotted hole that is slightly larger than the pin. Align the pin with the slotted hole and secure them to the cover, using the hexagon socket bolts that were removed in step ①. The protruding portion of the pin guide will then align with the LOCK mark on the nameplate that is attached to the cover surface.




## Manually Disengaging the Lock

The lock of a fine lock series cylinder can be disengaged manually through the procedure described below. However, make sure to disengage the lock pneumatically before operating the cylinder.

Note) Manual disengagement of the lock could create a greater cylinder sliding resistance than pneumatic disengagement of the lock.

**(a) CLJ2, CLM2, CLG1**

① Loose locking nut.
② Supply air pressure of 0.3MPa or more to the lock release port.
③ Turn the wrench flats section of the manual unlocking cam until it stops at the FREE position that is marked on the cam guide.
④ While keeping the wrench flats section in place, tighten the lock nut.

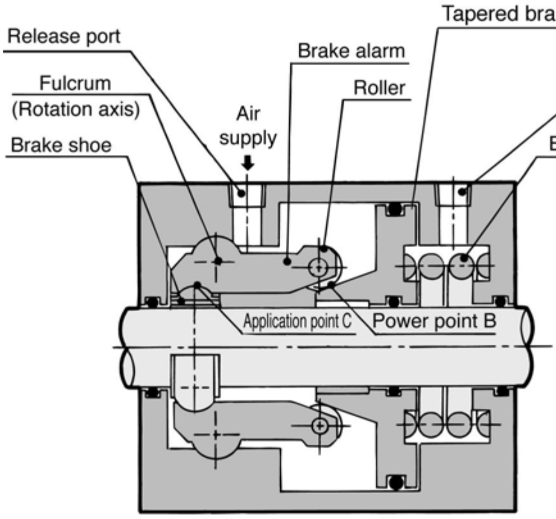
**(b) CLA**

① Loosen the two hexagon socket bolts and remove the pin guide.
② As viewed from the end of the rod, the pin is tilted 15° to the left of the center.
③ Supply air pressure of 0.3MPa or more to the lock release port.
④ Using a wooden or plastic rod, such as the handle of a wooden mallet, rotate the pin 30° without scratching it.

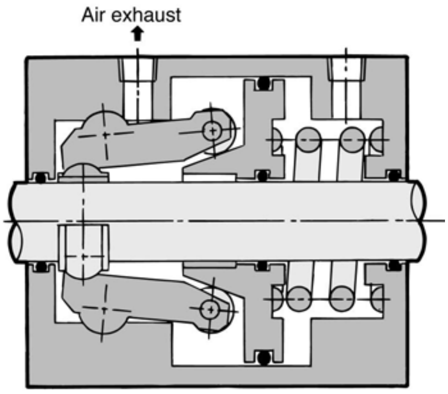
# Series CL
# Prior to Use

## Construction/Applicable Series: CLJ2, CLM2, CLG1

### Spring lock style



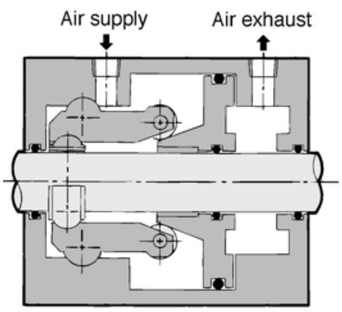

Lock released condition



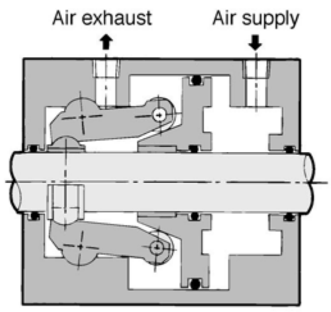

Locked condition

**Spring lock (exhaust lock)**
The spring force that is applied to the tapered brake piston becomes amplified through the wedge effect. This force becomes further amplified to the power of AB/AC through the mechanical advantage of a lever and acts on the brake shoe, which in turn, applies a large force to tighten and lock the piston rod. To disengage the lock, air pressure is supplied through the lock release port, thus disengaging the brake spring force.

### Pneumatic lock style



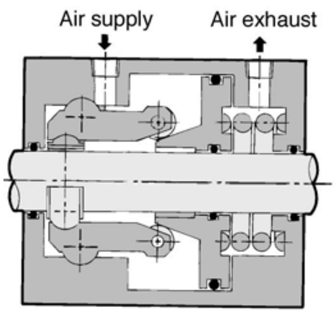

Lock released condition



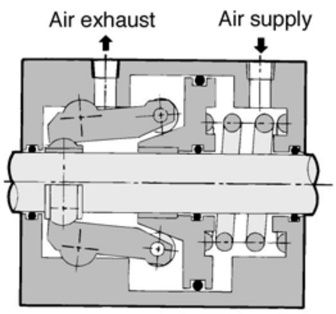

Locked condition

Brake piston is operated by air pressure.

### Lock system concurrently using spring and air pressure




Lock released condition

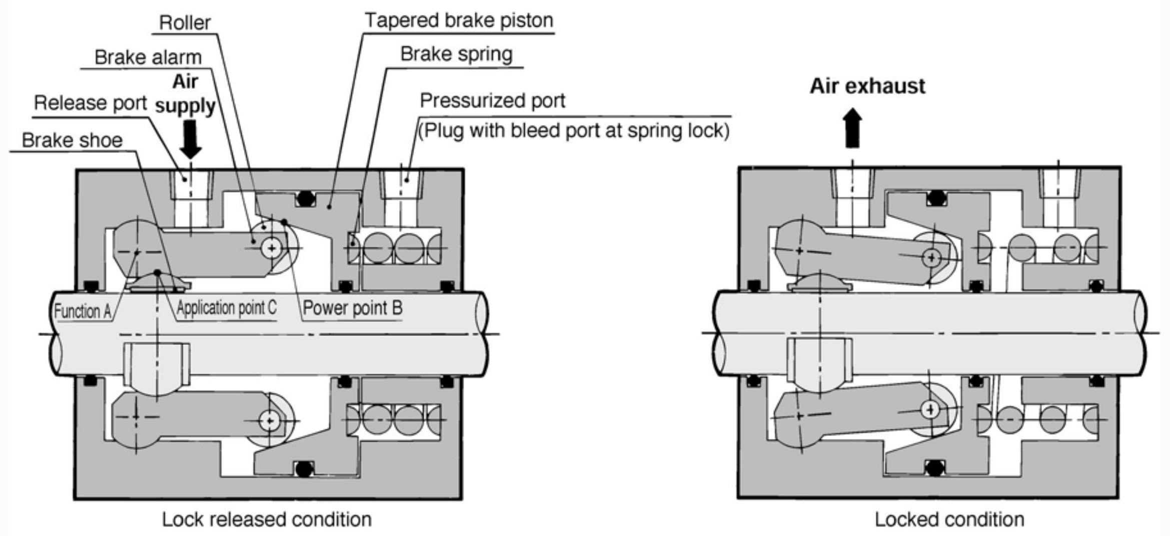



Lock released condition

Brake piston is operated by air pressure and spring force

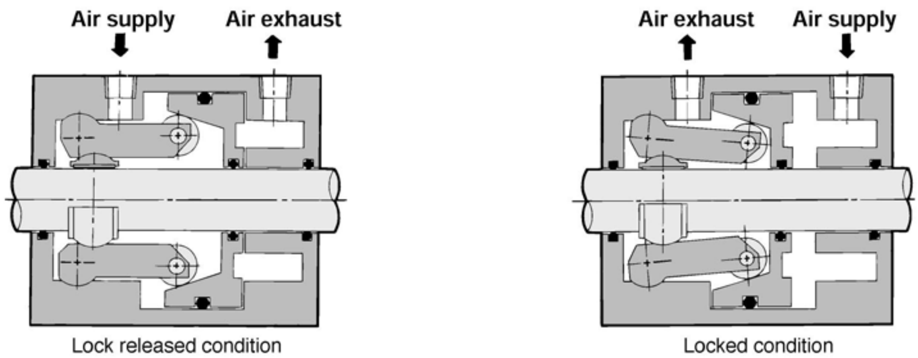
## Construction/Applicable Series: CLA

### Spring lock style



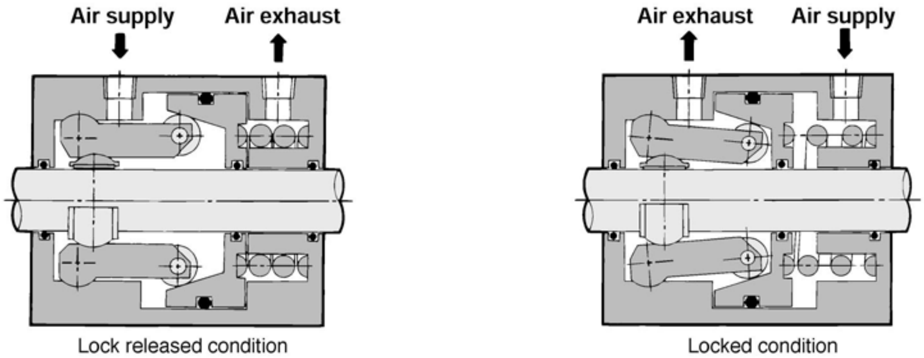

**Spring lock (exhaust lock)**
The spring force that is applied to the tapered brake piston becomes amplified through the wedge effect. This force becomes further amplified to the power of AB/AC through the mechanical advantage of a lever and acts on the brake shoe, which in turn, applies a large force to tighten and lock the piston rod. To disengage the lock, air pressure is supplied through the lock release port, thus disengaging the brake spring force.

### Pneumatic lock style




Brake piston is operated by air pressure.

### Lock system concurrently using spring and air pressure




Brake piston is operated by air pressure and spring force.

# Fine Lock Cylinder/Double Acting Single Rod

# *Series CLJ2* CAD

**ø16**

## How to Order

**Standard** CLJ2 L 16 — 60 R — E

**With auto switch** CDLJ2 L 16 — 60 R — E — C73 [ ]

**Air cylinder with auto switch**

**Mounting**

| | |
|---|---|
| **B** | Basic style |
| **L** | Axial foot style |
| **F** | Front flange style |
| **D** | Double clevis style |

**Bore size**

| | |
|---|---|
| **16** | 16mm |

**Cylinder standard stroke (mm)**

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

**Number of auto switches**

| | |
|---|---|
| **—** | 2 |
| **S** | 1 |
| **n** | n |

**Auto switch**

| | |
|---|---|
| **—** | Without auto switch (Built-in magnet) |

Refer to table below for auto switch selection.

**Lock operation**

| | |
|---|---|
| **E** | Spring lock (Exhaust lock) |
| **P** | Pneumatic lock (Pressurized lock) |
| **D** | Spring and pneumatic lock |

**Head cover port position**

| | |
|---|---|
| **—** | 90° to axis |
| **R** | Axial direction |

### Applicable Auto Switches/Refer to p.5.3-2 for further information on auto switch.

| Style | Special function | Electrical entry | Indicator | Wiring (Output) | Load voltage DC | | Load voltage AC | Auto switch model | Lead wire length (m)* 0.5 (—) | 3 (L) | 5 (Z) | None (N) | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3 wire (NPN equiv.) | — | 5V | — | **C76** | ● | ● | — | — | IC | — |
| Reed switch | — | Grommet | Yes | 2 wire | 24V | 12V | 100V | **C73** | ● | ● | ● | — | — | Relay, PLC |
| Reed switch | — | Grommet | No | 2 wire | 24V | 5V, 12V | 100V or less | **C80** | ● | ● | — | — | IC | Relay, PLC |
| Reed switch | — | Connector | Yes | 2 wire | 24V | 12V | — | **C73C** | ● | ● | ● | ● | — | Relay, PLC |
| Reed switch | — | Connector | No | 2 wire | 24V | 5V, 12V | 24V or less | **C80C** | ● | ● | ● | ● | IC | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3 wire (NPN) | 24V | 5V, 12V | — | **H7A1** | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3 wire (PNP) | 24V | 5V, 12V | — | **H7A2** | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 2 wire | 24V | 12V | — | **H7B** | ● | ● | ○ | — | — | Relay, PLC |
| Solid state switch | — | Connector | Yes | 2 wire | 24V | 12V | — | **H7C** | ● | ● | ● | ● | — | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color, With timer) | Grommet | Yes | 3 wire (NPN) | 24V | 5V, 12V | — | **H7NW** | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color, With timer) | Grommet | Yes | 3 wire (PNP) | 24V | 5V, 12V | — | **H7PW** | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color, With timer) | Grommet | Yes | 2 wire | 24V | 12V | — | **H7BW** | ● | ● | ○ | — | — | Relay, PLC |
| Solid state switch | Water resistant (2 color) | Grommet | Yes | 2 wire | 24V | 12V | — | **H7BA** | — | ● | ○ | — | — | Relay, PLC |
| Solid state switch | With diagnostic output (2 color) | Grommet | Yes | 3 wire (NPN) | 24V | 5V, 12V | — | **H7NF** | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Latching with diagnostic output (2 color) | Grommet | Yes | 4 wire (NPN) | 24V | — | — | **H7LF** | ● | ● | ○ | — | — | Relay, PLC |

∗Lead wire length symbol 0.5m········ – (Example) C73C 5m·········· Z (Example) C73CZ
3m·········· L C73CL None······ N C73CN

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

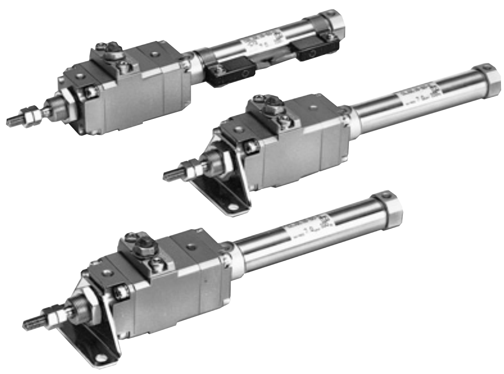
**Provided with a compact locking mechanism, it is suitable for intermediate stops, for emergency stops, and for drop prevention.**

## Locks in both directions

The piston rod can be locked in either direction of its cylinder stroke.

## Maximum piston speed: 500mm/s

It can be used at 50 to 500mm/s provided that it is within the allowable kinetic energy range.



## Specifications

| | |
|---|---|
| Bore size (mm) | 16 |
| Action | Double acting single rod |
| Style | Both of non-lube style and lube style |
| Lock operation | Spring lock (Exhaust lock)<br>Pneumatic (Pressurized lock)<br>Spring and pneumatic lock |
| Fluid | Air |
| Proof pressure | 1.05MPa |
| Max. operating pressure | 0.7MPa |
| Min. operating pressure | 0.08MPa |
| Ambient and fluid temperature | Without auto switch: –10°C to + 70°C<br>With auto switch: –10°C to + 60°C (No freezing) |
| Piston speed | 50 to 500mm/s* |
| Cushion | Rubber bumper |
| Thread tolerance | JIS class 2 |
| Stroke tolerance | $^{+1.0}_{0}$ |
| Mounting | Basic, Axial foot,<br>Front flange, Double clevis |

*Constraints associated with the allowable kinetic energy are imposed on the speeds at which the piston can be locked. To lock the piston in the stationary state for the purpose of drop prevention, the piston can be locked up to a maximum speed of 750mm/s.

## Fine Lock Specifications

| Lock operation | Spring lock (Exhaust lock) | Spring/ pneumatic lock | Pneumatic lock (Pressurized lock) |
|---|---|---|---|
| Fluid | Air | | |
| Max. operating pressure | 0.5MPa | | |
| Lock release pressure | 0.3MPa or more | | 0.1MPa or more |
| Lock start pressure | 0.25MPa or less | | 0.05MPa or more |
| Lock direction | Both directions | | |

## Standard Stroke

(mm)

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

## Mounting Bracket and Accessories/Refer to p.3.1-14 for details.

| | Mounting bracket | Basic | Axial foot | Front flange | Double clevis |
|---|---|---|---|---|---|
| Standard | Mounting nut | ● | ● | ● | — |
| | Rod end nut | ● | ● | ● | ● |
| | Clevis pin | — | — | — | ● |
| Option | Single knuckle joint | ● | ● | ● | ● |
| | Double knuckle joint (With pin) | ● | ● | ● | ● |
| | T bracket | — | — | — | ● |

## Bracket Part No.

| Mounting bracket | Part No. |
|---|---|
| Foot | CLJ-L016B |
| Flange | CLJ-F016B |
| T bracket* | CJ-T016B |

*T bracket is applicable to double clevis style (D).

## Auto Switch Mounting Bracket Part No. (Band mounting)

| Auto switch mounting bracket | Note |
|---|---|
| BJ2-016 | For D-C7, C8, H7 |

*Stainless steel mounting bolt set
The set of stainless steel mounting screws described below is available and can be used depending on the operating environment. (The band for auto switches must be ordered separately, as they are not included.)
BBA4: For D-C7/C8/H7
The stainless steel bolts described above are used when the D-H7BAL type switch is shipped mounted on a cylinder. When the switches are shipped as individual parts, the BBA4 set is included.

## Minimum Strokes for Auto Switch Mounting

| Auto switch mounting | Auto switch model | Number of auto switches | Minimum cylinder stroke (mm) |
|---|---|---|---|
| Band mounting | **D-C7**<br>**D-C8** | 2 (Same side) | 50 |
| | | 2 (Different side) | 15 |
| | | 1 | 10 |
| | **D-H7**<br>**D-H7□W**<br>**D-H7NF**<br>**D-H7BAL** | 2 (Same side) | 60 |
| | | 2 (Different side) | 15 |
| | | 1 | 10 |
| | **D-C73C**<br>**D-C80C**<br>**D-H7C** | 2 (Same side) | 65 |
| | | 2 (Different side) | 15 |
| | | 1 | 10 |
| | **D-H7LF** | 2 (Same side) | 65 |
| | | 2 (Different side) | 25 |
| | | 1 | 15 |

## Weight

(g)

| Bore size (mm) | | **16** |
|---|---|---|
| Basic weight* | | 320 |
| Additional weight per 15mm stroke | | 6.5 |
| Mounting bracket | Axial direction foot | 27 |
| | Front flange | 21 |
| | Double clevis (with pin)* | 10 |

*Basic weight includes mounting nut and rod end nut.
*Double clevis does not include mounting nut.
Calculation
Example: CLJ2L16-60
•Basic weight··················320(ø16)
•Additional weight···········6.5/15 stroke
•Cylinder stroke··············60 stroke
320+6.5/15 X 60+27=373g

## Stopping Accuracy (Not including tolerance of control system)

Unit: mm

| Lock style | Piston speed (mm/s) | | | |
|---|---|---|---|---|
| | 50 | 100 | 300 | 500 |
| Spring lock (Exhaust lock) | ±0.4 | ±0.5 | ±1.0 | ±2.0 |
| Pneumatic lock (Pressurized lock)<br>Spring and pneumatic lock | ±0.2 | ±0.3 | ±0.5 | ±1.5 |

Condition/Load: 2kg
Solenoid valve: Lock port mounting

## Head Cover Port Position

In the case of the basic style, there are two port positions on the head cover: one that is at 90° to the axis, and the other that is in the axial direction.

Axial direction

90° direction

### ⚠Caution

**Recommended Pneumatic Circuit/Precautions**

●Refer to p.3.1-2 to 3.1-5 for further specifications of fine lock cylinder CLJ2 series mentioned above.

## ⚠Caution/Allowable Kinetic Energy when Locking

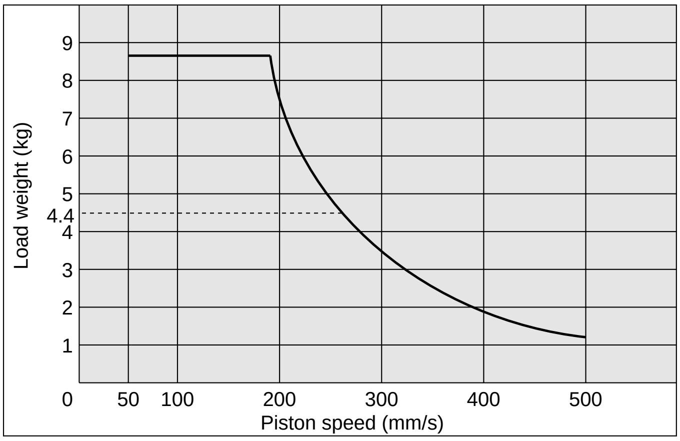
| Bore size (mm) | **16** |
|---|---|
| Allowable kinetic energy J | 0.17 |

① In terms of specific load conditions, this allowable kinetic energy is equivalent to a load of 3.7kg in weight, and a piston speed of 300mm/sec. Therefore, if the operating conditions are below these values, there is no need to calculate.
② Apply the following formula to obtain the kinetic energy of the load.

$$Ek=\frac{1}{2}m\upsilon^2$$

Ek: Load kinetic energy (J)
m: Load weight (kg)
$\upsilon$: Piston speed (m/s)

③ The piston speed will exceed the average speed immediately before locking. To determine the piston speed for the purpose of obtaining the kinetic energy of the load, use 1.2 times the average speed as a guide.
④ The relationship between the speed and the load is indicated in the diagram below. The area below the line is the allowable kinetic energy range.
⑤ During locking, the lock mechanism must sustain the thrust of the cylinder itself, in addition to absorbing the energy of the load. Therefore, even within an allowable kinetic energy level, there is an upper limit to the size of the load that can be sustained. Thus, a horizontally mounted cylinder must be operated below the solid line, and a vertically mounted cylinder must be operated below the dotted line.

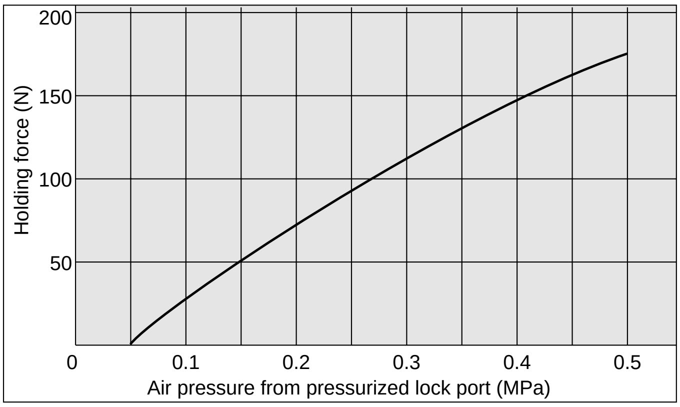



## Holding Force of Spring Lock (Maximum static load)

| Bore size (mm) | **16** |
|---|---|
| Holding force N | 122 |

Note) Holding force at piston rod extended decreases approximately 15%.

## Holding Force of Pneumatic Lock (Max. static load)




### ⚠Caution

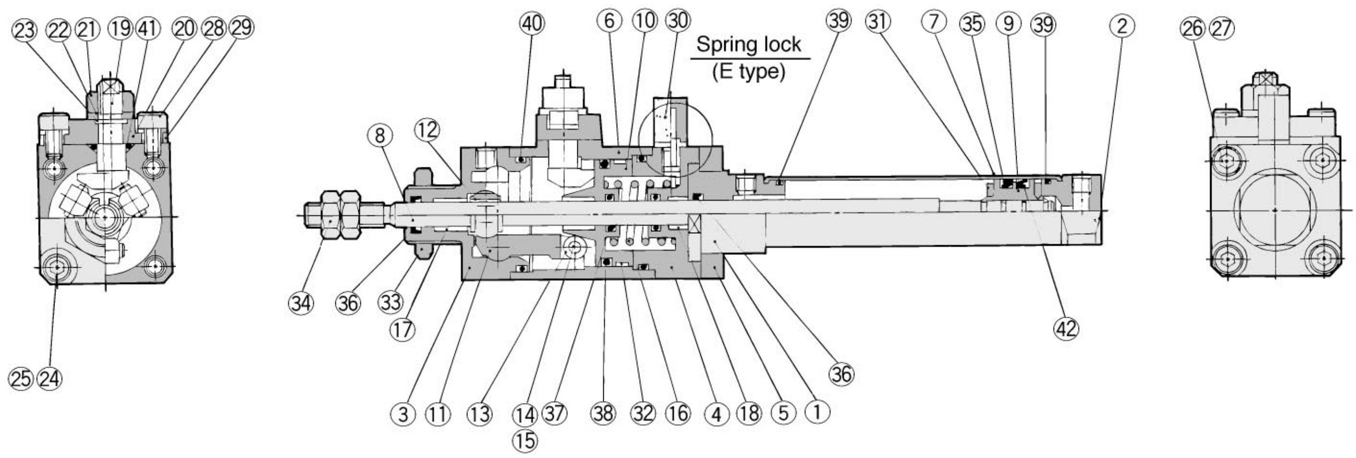
**Cautions when Locking**

The holding force is the lock's ability to hold a static load that does not involve vibrations or impacts, when it is locked without a load. Therefore, when normally using the cylinder near the upper limit of the holding force, be aware of the points described below.

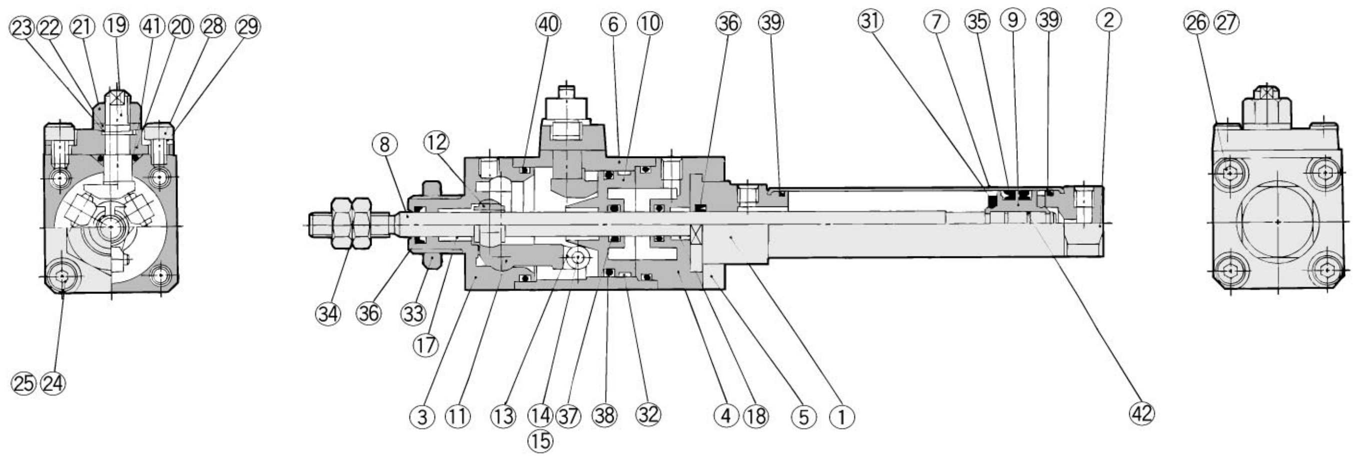
- If the piston rod slips because the lock's holding force has been exceeded, the brake shoe could be damaged, resulting in a reduced holding force or shortened life.
- To use the lock for drop prevention purposes, the load to be attached to the cylinder must be within 35% of the cylinder's holding force.
- Do not use the cylinder in the locked state to sustain a load that involves impact.

## Construction/(The cylinder cannot be disassembled.)

### Spring lock (Exhaust lock)
### Spring and pneumatic lock




### Pneumatic lock (Pressurized lock)



## Component Parts

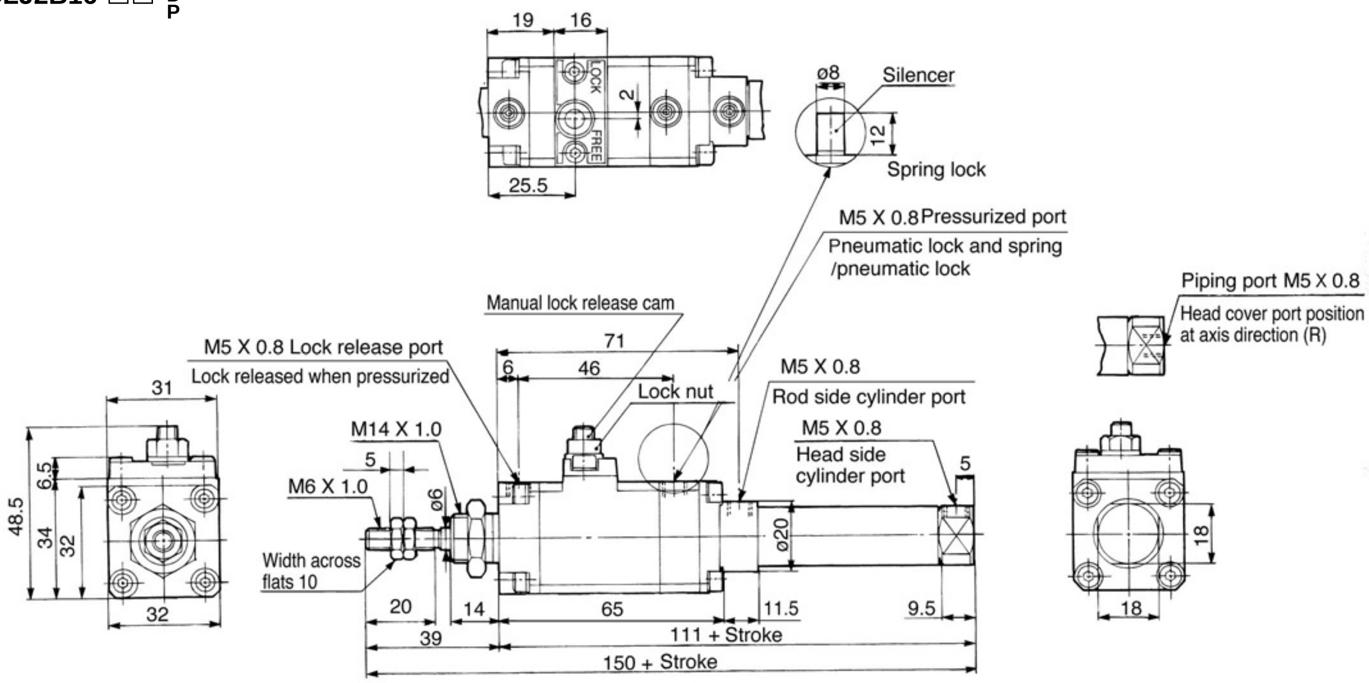
| No. | Description | Material | Note |
|---|---|---|---|
| 1 | Rod cover | Aluminum alloy | White anodized |
| 2 | Head cover | Aluminum alloy | White anodized |
| 3 | Cover A | Carbon steel | Nitrided, nickel chrome plated |
| 4 | Cover B | Aluminum alloy | Hard anodized |
| 5 | Cover C | Aluminum alloy | Hard anodized |
| 6 | Middle cover | Aluminum alloy | Hard anodized |
| 7 | Cylinder tube | Stainless steel | |
| 8 | Piston rod | Stainless steel | Hard chrome plated |
| 9 | Piston | Brass | |
| 10 | Brake piston | Carbon steel | Nitrided |
| 11 | Brake arm | Carbon steel | Nitrided |
| 12 | Brake shoe | Special friction material | |
| 13 | Roller | Carbon steel | Nitrided |
| 14 | Pin | Carbon steel | Heat treated |
| 15 | Snap ring | Carbon tool steel | Nickel plated |
| 16 | Brake spring | Steel wire | Zinc chromated |
| 17 | Bushing A | Oil impregnated sintered alloy | |
| 18 | Bushing B | Oil impregnated sintered alloy | |
| 19 | Manual lock relase cam | Chrome molybdenum steel | Nitrided |
| 20 | Cam guide | Carbon steel | Nitrided, platinum silver coated |
| 21 | Lock nut | Rolled steel | Nickel plated |

| No. | Description | Material | Note |
|---|---|---|---|
| 22 | Plain washer | Rolled steel | Nickel plated |
| 23 | Snap ring | Carbon tool steel | Nickel plated |
| 24 | Hex. socket head cap screw | Chrome molybdenum steel | Nickel plated |
| 25 | Retaining plate | Steel wire | Nickel plated |
| 26 | Hex. socket head cap screw | Chrome molybdenum steel | Nickel plated |
| 27 | Retaining plate | Steel wire | Nickel plated |
| 28 | Hex. socket head cap screw | Chrome molybdenum steel | Nickel plated |
| 29 | Retaining plate | Steel wire | Nickel plated |
| 30 | Silencer | Bronze | E type only |
| 31 | Damper | Urethane | |
| 32 | Wearing | Resin | |
| 33 | Mounting nut | Brass | Nickel plated |
| 34 | Rod end nut | Rolled steel | Nickel plated |
| 35 | Piston seal | NBR | |
| 36 | Rod seal A | NBR | |
| 37 | Rod seal B | NBR | |
| 38 | Brake piston seal | NBR | |
| 39 | Cylinder tube gasket | NBR | |
| 40 | Middle cover gasket | NBR | |
| 41 | Cam gasket | NBR | |
| 42 | Piston gasket | NBR | |

CL
MLGC
CNA
CB
CV/MVG
CXW
CXS
CXT
MX
MXU
MXS
MXQ
MXF
MXW
MXP
MG
MGP
MGQ
MGG
MGC
MGF
CY1
MY1

## Basic (B) CAD

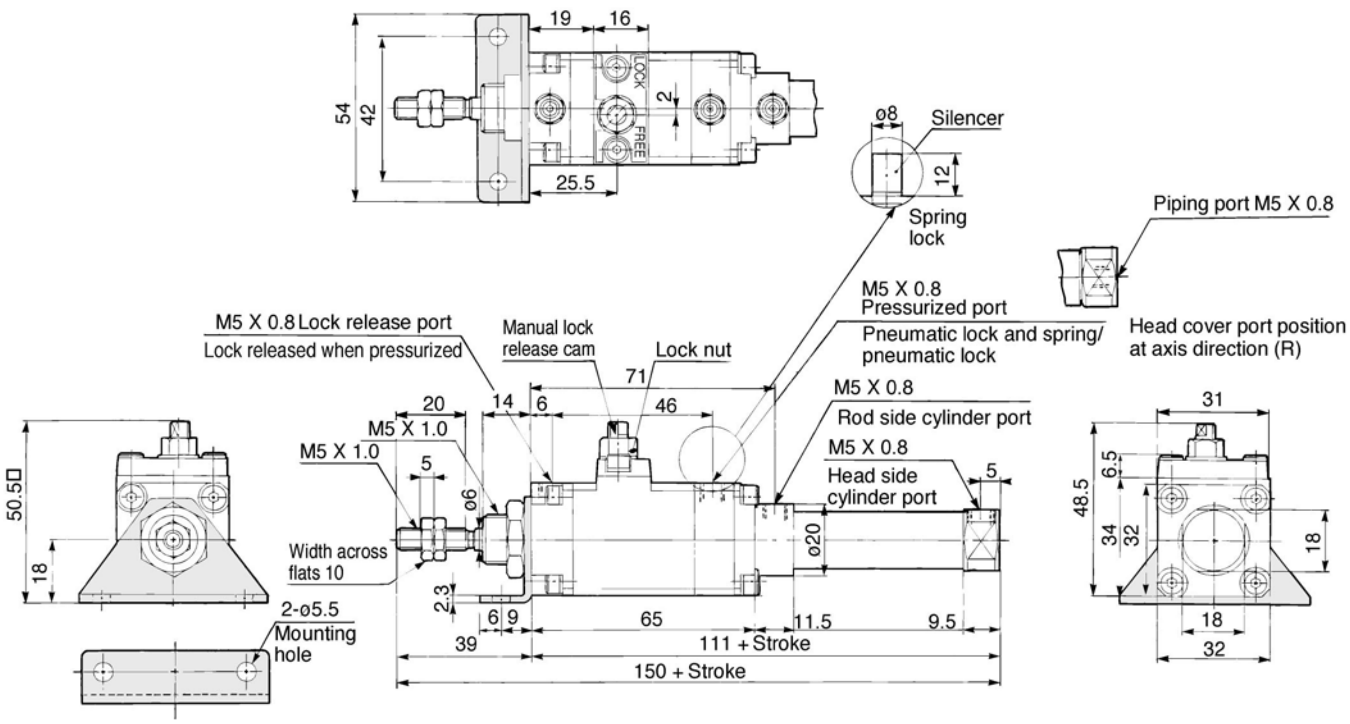
**CLJ2B16-□□-E/D/P**




CAD CLJ2B16···············SCLJ216, #1 (#1+#6)

## Axial Foot (L)

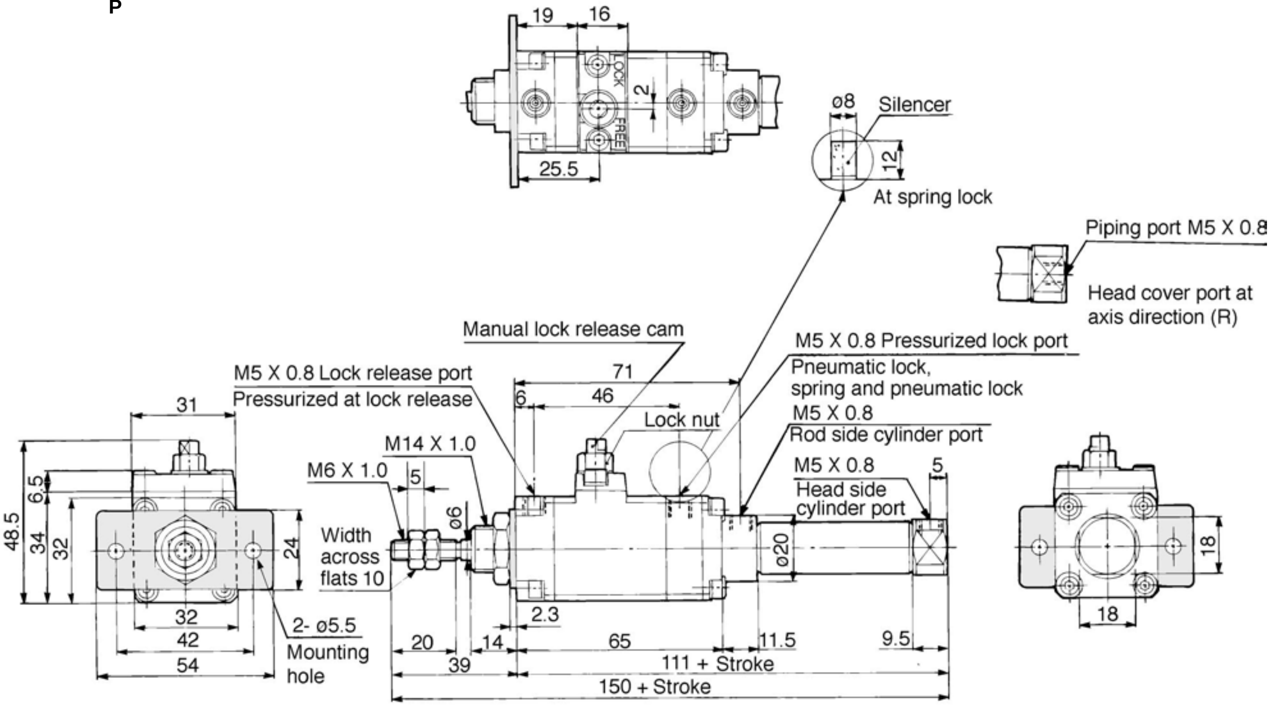
**CLJ2L16-□□-E/D/P**




CAD CLJ2L16···············SCLJ216, #2 (#1+#2+#6)

## Front Flange (F) CAD

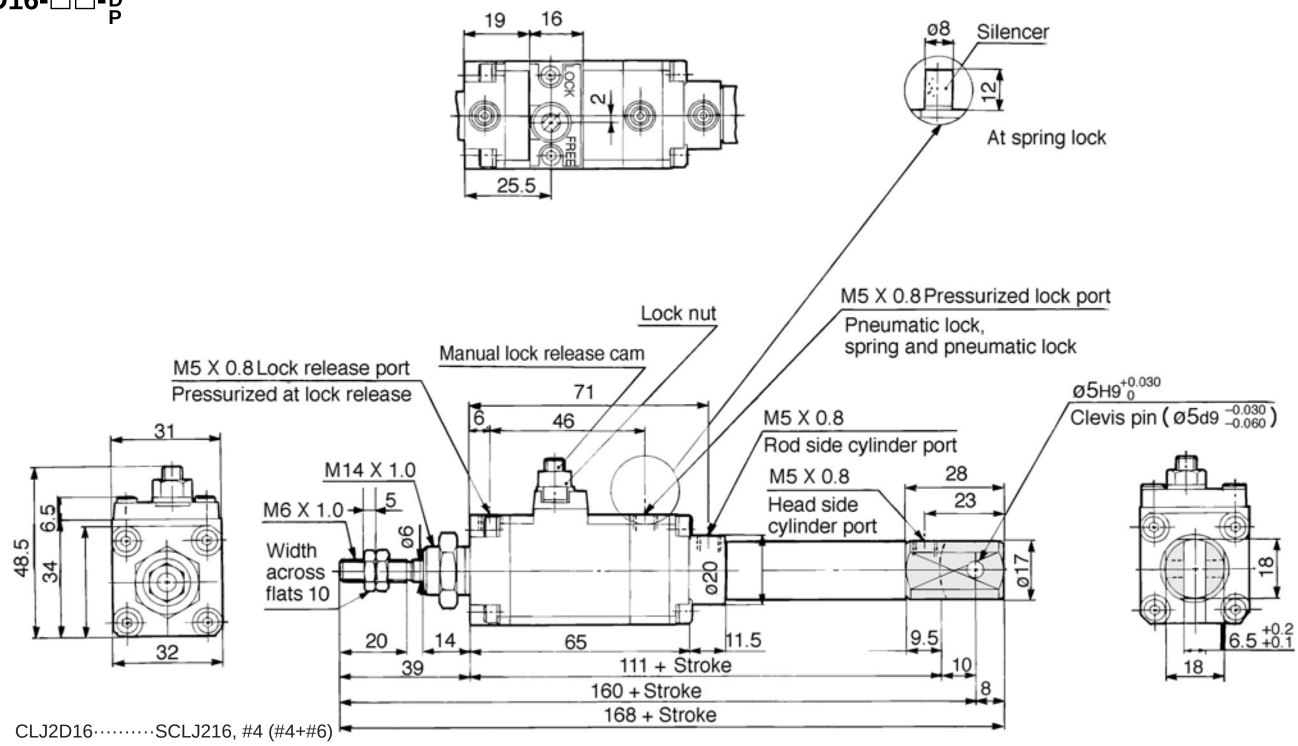
**CLJ2F16-□□-E/D/P**




CAD CLJ2F16··········SCLJ216, #3 (#1+#3+#6)

## Double Clevis (D) ＊Clevis pin and snap ring are packed with the double clevis style.

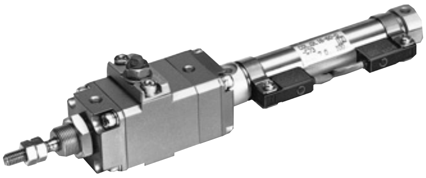
**CLJ2D16-□□-E/D/P**




CAD CLJ2D16··········SCLJ216, #4 (#4+#6)

# Series CDLJ2
# Auto Switch Specifications

Refer to p.5.3-2 for details of auto switch.



### Auto switch setting position and mounting height dimensions (Band mounting style)

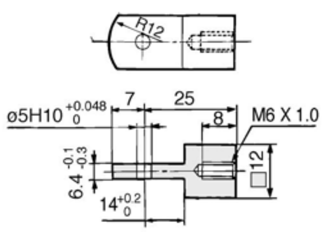
Refer to p.1.3-11 for dimensions because these are same as air cylinder CDJ2 series (Double acting single rod) style.

### Applicable Auto Switch

| Style | Model | Electrical entry/Function | Page |
|---|---|---|---|
| Reed switch | D-C7/C8 | Grommet | 5.3-9 |
| | D-C73C/C80C | Connector | 5.3-11 |
| Solid state switch | D-H7 | Grommet | 5.3-29 |
| | D-H7□W | Grommet(2 color indication) | 5.3-42 |
| | D-H7LF | Grommet(2 color, with diagnostic output) | 5.3-49 |
| | D-H7NF | Grommet(2 color, with diagnostic output) | 5.3-50 |
| | D-H7BAL | Grommet(2 color, with diagnostic output) | 5.3-55 |
| | D-H7C | Connector | 5.3-31 |

## Accessories

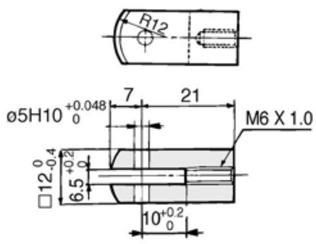
### Single knuckle joint/I-LJ016B




Material: Rolled steel

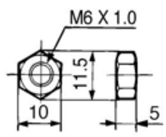
### Double knuckle joint/Y-LJ016B

∗ Knuckle pin and snap ring are packed.



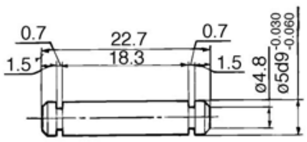

Material: Rolled steel

### Rod end nut/NT-015A



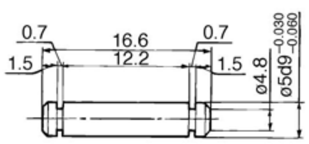

Material: Rolled steel

### Clevis pin/CD-Z015



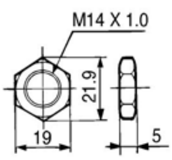

Material: Stainless steel

### Knuckle pin/IY-J015A



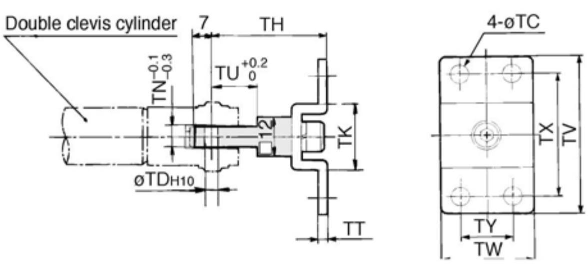

Material: Stainless steel

### Mounting nut/SNLJ-016B




Material: Brass

### T bracket/CJ-T016B




Material: Rolled steel

| Part no. | Bore size | TC | $TD_{H10}$ | TH | TK | TN | TT | TU | TV | TW | TX | TY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CJ-T016B** | **16** | 5.5 | $5^{+0.048}_{0}$ | 35 | 20 | 6.4 | 2.3 | 14 | 48 | 28 | 38 | 16 |

# Fine Lock Cylinder/Double Acting Single Rod

# Series CLM2

CAD

**ø20, ø25, ø32, ø40**

## How to Order

**Standard** CLM2 H L 25 — 100 J — E

**With auto switch** CDLM2 H L 25 — 100 J — E — C73 □

**Air cylinder with auto switch**

**Style**

| | |
|---|---|
| — | Pneumatic |
| H | Air-hydro |

**Mounting**

| | | | |
|---|---|---|---|
| B | Basic | T | Rear trunnion |
| L | Axial foot | E | Integrated clevis |
| F | Front flange | BZ | Boss cut basic |
| G | Rear flange | FZ | Boss cut flange |
| C | Single clevis | | |
| D | Double clevis | | |

**Bore size**

| | |
|---|---|
| 20 | 20mm |
| 25 | 25mm |
| 32 | 32mm |
| 40 | 40mm |

**Cylinder stroke (mm)**
Refer to standard stroke table on p.3.1-16.

**Rod boot**

| | |
|---|---|
| — | None |
| J | Nylon tarpaulin |
| K | Heat resistant tarpaulin |

**Lock operation**

| | |
|---|---|
| E | Spring lock (Exhaust lock) |
| P | Pneumatic lock (Pressurized lock) |
| D | Spring and pneumatic lock |

**Auto switch**

| | |
|---|---|
| — | Without auto switch (Built-in magnet) |

Refer to table below for auto switch selection.

**Number of auto switches**

| | |
|---|---|
| — | 2 |
| S | 1 |
| n | n |

### Applicable Auto switches/Refer to p.5.3-2 for further information on auto switch.

| Style | Special function | Electrical entry | Indicator | Wiring (output) | Load voltage DC | | Load voltage AC | Auto switch model | Lead wire length (m)* 0.5 (—) | 3 (L) | 5 (Z) | None (N) | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3 wire (NPN equiv.) | — | 5V | — | C76 | ● | ● | — | — | IC | — |
| Reed switch | — | Grommet | Yes | 2 wire | 24V | 12V | 100V | C73 | ● | ● | ● | — | — | Relay, PLC |
| Reed switch | — | Grommet | No | 2 wire | 24V | 5V, 12V | 100V or less | C80 | ● | ● | — | — | IC | Relay, PLC |
| Reed switch | — | Grommet | Yes | 2 wire | 24V | 12V | — | B53 | ● | ● | ● | — | — | PLC |
| Reed switch | — | Grommet | Yes | 2 wire | 24V | 12V | 100V, 200V | B54 | ● | ● | ● | — | — | Relay, PLC |
| Reed switch | — | Grommet | No | 2 wire | 24V | 12V | 200V | B64 | ● | ● | — | — | — | Relay, PLC |
| Reed switch | — | Connector | Yes | 2 wire | 24V | 12V | — | C73C | ● | ● | ● | ● | — | Relay, PLC |
| Reed switch | — | Connector | No | 2 wire | 24V | 5V, 12V | 24V or less | C80C | ● | ● | ● | ● | IC | Relay, PLC |
| Reed switch | — | Terminal conduit | Yes | 2 wire | 24V | 12V | — | A33A | — | — | — | ● | — | PLC |
| Reed switch | — | Terminal conduit | Yes | 2 wire | 24V | 12V | 100V, 200V | A34A | — | — | — | ● | — | Relay, PLC |
| Reed switch | — | DIN terminal | Yes | 2 wire | 24V | 12V | 100V, 200V | A44A | — | — | — | ● | — | Relay, PLC |
| Reed switch | Diagnostic indication (2 color) | Grommet | Yes | 2 wire | 24V | — | — | B59W | ● | ● | — | — | — | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3 wire (NPN) | 24V | 5V, 12V | — | H7A1 | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3 wire (PNP) | 24V | 5V, 12V | — | H7A2 | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 2 wire | 24V | 12V | — | H7B | ● | ● | ○ | — | — | Relay, PLC |
| Solid state switch | — | Connector | Yes | 2 wire | 24V | 12V | — | H7C | ● | ● | ● | ● | — | Relay, PLC |
| Solid state switch | — | Termina conduit | Yes | 3 wire (NPN) | 24V | 5V, 12V | — | G39A | — | — | — | ● | — | Relay, PLC |
| Solid state switch | — | Termina conduit | Yes | 2 wire | 24V | 12V | — | K39A | — | — | — | ● | — | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color) | Grommet | Yes | 3 wire (NPN) | 24V | 5V, 12V | — | H7NW | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color) | Grommet | Yes | 3 wire (PNP) | 24V | 5V, 12V | — | H7PW | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color) | Grommet | Yes | 2 wire | 24V | 12V | — | H7BW | ● | ● | ○ | — | — | Relay, PLC |
| Solid state switch | Water resistant (2 color) | Grommet | Yes | 2 wire | 24V | 12V | — | H7BA | — | ● | ○ | — | — | Relay, PLC |
| Solid state switch | With timer | Grommet | Yes | 3 wire (NPN) | 24V | 5V, 12V | — | G5NT | — | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | With diagnostic output (2 color) | Grommet | Yes | 4 wire (NPN) | 24V | 5V, 12V | — | H7NF | — | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Latching with diagnostic output (2 color) | Grommet | Yes | 4 wire (NPN) | 24V | 5V, 12V | — | H7LF | ● | ● | ○ | — | — | Relay, PLC |

*Lead wire length symbol 0.5m···· — (Example) C80C 5m·······Z (Example) C80CZ
3m········L C80CL None···N C80CN

** Solid state switch marked with a "○" are manufactured upon receipt of order.
*** Do not specify "N" (No lead wire) in case of D-A3□A, A44A, G39A and K39A.

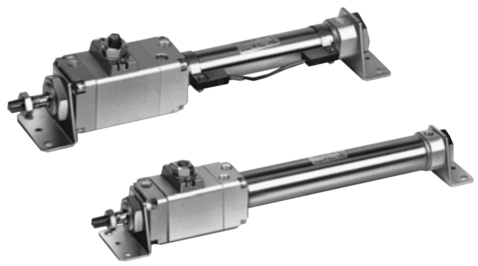
**Provided with a compact locking mechanism, it is suitable for intermediate stops, for emergency stops, and for drop prevention.**

## Locks in both directions

The piston rod can be locked in either direction of its cylinder stroke.

## Maximum piston speed: 500mm/s

It can be used at 50 to 500mm/s provided that it is within the allowable kinetic energy range.



## Specifications

| Bore size (mm) | 20 | 25 | 32 | 40 |
|---|---|---|---|---|
| Action | Double acting single rod | | | |
| Style | Pneumatic | | | |
| Lock operation | Spring lock (Exhaust lock),<br>Pneumatic lock (Pressurized lock), Spring and pneumatic lock | | | |
| Fluid | Air | | | |
| Proof pressure | 1.5MPa | | | |
| Max. operating pressure | 1.0MPa | | | |
| Min. operating pressure | 0.08MPa | | | |
| Ambient and fluid temperature | Without auto switch: –10°C to +70°C<br>With auto switch: –10°C to +60°C (No freezing) | | | |
| Lubrication | Not required (Non-lube) | | | |
| Piston speed | 50 to 500mm/s | | | |
| Thread tolerance | JIS class 2 | | | |
| Stroke length tolerance | $^{+1.4}_{0}$ | | | |
| Piping/Screw-in style | Rc(PT)1/8 | | | Rc(PT)1/4 |
| Mounting | Basic, Axial foot, Front flange, Rear flange,<br>Single clevis, Double clevis, Rear trunnion,<br>Integrated clevis, Boss cut, Boss cut flange | | | |

* Constraints associated with the allowable kinetic energy are imposed on the speeds at which the piston can be locked. To lock the piston in the stationary state for the purpose of drop prevention, the piston can be locked up to a maximum speed of 750mm/s.

## Fine Lock Specifications

| Lock operation | Spring lock (Exhaust lock) | Spring/ pneumatic lock | Pneumatic lock (Pressurized lock) |
|---|---|---|---|
| Fluid | Air | | |
| Max. operating lock | 0.5MPa | | |
| Lock release pressure | 0.3MPa or more | | 0.1MPa or more |
| Lock starting pressure | 0.25MPa or less | | 0.05MPa or less |
| Lock direction | Both directions | | |

## Standard Stroke

| Bore size (mm) | Standard stroke (mm)(1) | Long stroke(2) (mm) | Allowable max. stroke (mm) |
|---|---|---|---|
| **20** | 25, 50, 75, 100, 125, 150, 200, 250, 300 | 400 | 1000 |
| **25** | | 450 | |
| **32** | | 450 | |
| **40** | | 500 | |

Note 1) Intermediate stroke is also available.
Note 2) The long stroke style is applicable to the axial foot style and the front flange style.
For other applications that exceed the mounting support bracket and long stroke limitations, the maximum stroke that can be used is determined by the stroke selection table (reference edition).

## Rod Boot Material

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

* Max. ambient temperature for rod boot

## Minimum Strokes for Auto Switch Mounting

(mm)

| Auto switch model | Number of auto switches: 2 pcs. Different side | 2 pcs. Same side | 1 pc. Different side | 1 pc. Same side | 1 pc. |
|---|---|---|---|---|---|
| **D-C7**<br>**D-C8** | 15 | 50 | $15+45(\frac{n-2}{2})$<br>(n=2, 4, 6···) | 50+45(n–2) | 10 |
| **D-H7□**<br>**D-H7□W**<br>**D-H7BAL**<br>**D-H7NF** | 15 | 60 | | 60+45(n–2) | 10 |
| **D-C73C**<br>**D-C80C**<br>**D-H7C** | 15 | 65 | $15+50(\frac{n-2}{2})$<br>(n=2, 4, 6···) | 65+50(n–2) | 10 |
| **D-H7LF** | 20 | 65 | $20+50(\frac{n-2}{2})$<br>(n=2, 4, 6···) | | 10 |
| **D-B5**<br>**D-B6** | 15 | 75 | $15+50(\frac{n-2}{2})$<br>(n=2, 4, 6···) | 75+55(n–2) | 10 |
| **D-B59W** | 20 | 75 | $20+50(\frac{n-2}{2})$<br>(n=2, 4, 6···) | | 15 |
| **D-A3□A**<br>**D-G39A**<br>**D-K39A**<br>**D-A44A** | 35 | 100 | 35+30(n–2) | 100+100(n–2) | 10 |

## Mounting and Accessories

| Mounting \ Accessory | Standard equipment: Mounting nut | Standard equipment: Rod end nut | Standard equipment: Clevis pin | Accessories: Single knuckle joint | Accessories: Double knuckle joint | Accessories: Clevis bracket | Accessories: Rod boot |
|---|---|---|---|---|---|---|---|
| Basic | ● (1pc.) | ● | — | ● | ● | — | ● |
| Axial foot | ●(2) | ● | — | ● | ● | — | ● |
| Front flange | ●(1) | ● | — | ● | ● | — | ● |
| Rear flange | ●(1) | ● | — | ● | ● | — | ● |
| Integrated clevis | — (1) | ● | — | ● | ● | ● | ● |
| Single clevis | — (1) | ● | — | ● | ● | — | ● |
| Double clevis | — (1) | ● | ● | ● | ● | — | ● |
| Rear trunnion | ● (1) (2) | ● | — | ● | ● | — | ● |
| Boss cut basic | ●(1) | ● | — | ● | ● | — | ● |
| Boss cut flange | ●(1) | ● | — | ● | ● | — | ● |
| Note | | | | | With pin | With pin | |

Note 1) The mouting nuts are not provided with the integrated clevis style, single clevis style, or the double clevis style.
Note 2) The rear trunnion style is provided with a trunnion nut.

## Weight

(kg)

| Bore size (mm) | | 20 | 25 | 32 | 40 |
|---|---|---|---|---|---|
| Basic weight | Basic | 0.55 | 0.87 | 0.94 | 1.30 |
| | Axial foot | 0.70 | 1.03 | 1.10 | 1.57 |
| | Flange | 0.61 | 0.96 | 1.03 | 1.42 |
| | Integrated clevis | 0.53 | 0.85 | 0.93 | 1.26 |
| | Single clevis | 0.59 | 0.91 | 0.98 | 1.39 |
| | Double clevis | 0.60 | 0.93 | 0.99 | 1.43 |
| | Trunnion | 0.59 | 0.94 | 1.00 | 1.40 |
| | Boss cut basic | 0.54 | 0.85 | 0.92 | 1.27 |
| | Boss cut flange | 0.60 | 0.94 | 1.01 | 1.39 |
| Additional weight per 50mm 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 |

Calculation Example: CLM2L32-100
・Basic weight···········1.10(Foot, ø32)
・Additional weight····0.08/50 stroke
・Cylinder stroke·······100 stroke 1.10+0.08 X 100/50=1.26kg

## Auto Switch Mounting Bracket Part No.

| Auto switch model | Bore size (mm) 20 | 25 | 32 | 40 |
|---|---|---|---|---|
| **D-C7/C8 D-H7** | BM2-020 | BM2-025 | BM2-032 | BM2-040 |
| **D-B5/B6 D-G** | BA2-020 | BA2-025 | BA2-032 | BA2-040 |
| **D-A3□A/A44A D-G39A/K39A** | BM3-020 | BM3-025 | BM3-032 | BM3-040 |

* Stainless steel mounting bolt set
The set of stainless steel mounting screws described below is available and can be used depending on the operating environment. (The band for auto switches must be ordered separately, as they are not included.)
BBA3: For D-B5/B6/G5
BBA4: For D-C7/C8/H7
The stainless steel bolts described above are used when the D-H7BA type switch is shipped mounted on a cylinder. when the switches are shipped as individual parts, the BBA4 set is included.

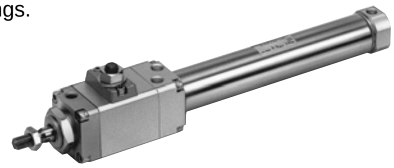
## Mounting Bracket Part No.

| 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** | CM-D020B | CM-D032B | | CM-D040B |
| Trunnion (With nut) | CM-T020B | CM-T032B | | CM-T040B |

* When ordering foot brackets, 2pcs. should be ordered for each cylinder.
** Clevis pin and snap ring (ø40: cotter pin) are packed with the double clevis style

## Boss cut

A cylinder that has been shortened overall by removing the boss for mounting the support bracket for the head cover, it can be used to achieve further space savings.



### Total length comparison (vs. standard) (mm)

| ø20 | ø25 | ø32 | ø40 |
|---|---|---|---|
| ▲13 | ▲13 | ▲13 | ▲16 |

### Mounting style

■Boss cut basic style (BZ) ■Boss cut flange style (FZ)

## Air-hydro

**CLM2H** [Mounting style] [Bore size] – [Stroke] [Rod boot]
Air-hydro

Low hydraulic cylinder 1MPa or less
Through the concurrent use of a CC Series air-hydro unit, it is possible to operate at a constant or low speeds or for intermediate stops, just like a hydraulic unit, while using pneumatic equipment such as a valve.

## Specifications

| | |
|---|---|
| Fluid | Turbine oil (Locked area: air) |
| Action | Double acting single rod |
| Bore size | ø20, ø25, ø32, ø40 |
| Max. operating pressure | 1.0MPa |
| Min. operating pressure | 0.2MPa |
| Piston speed | 15 to 300mm/s |
| Cushion | Rubber bumper (Standard equipment) |
| Piping | Screw-in piping |
| Mounting | Basic, Axial foot, Front flange, Rear flange, Single clevis, Double clevis, Rear trunnion, Integrated clevis, Boss cut |

* Auto switch can be mounted.
● For an exterior dimension diagram to identify the mounting support types, refer to p.3.1-21 to 3.1-24 as the dimensions are identical to those of standard.

## ⚠ Caution/Allowable Kinetic Energy when Locking

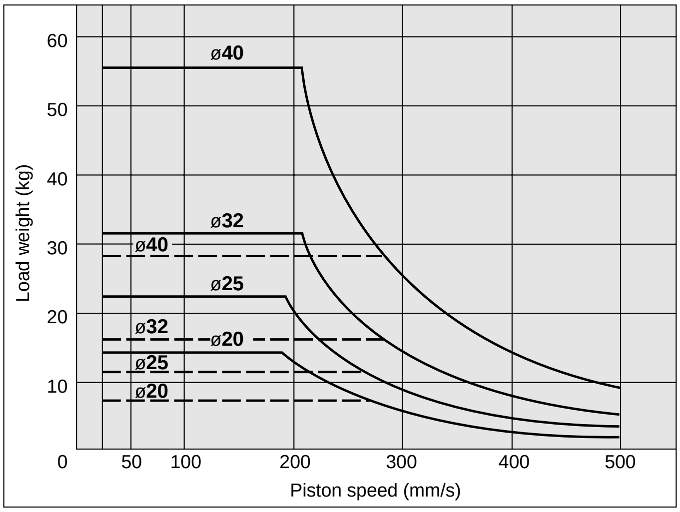
| Bore size (mm) | 20 | 25 | 32 | 40 |
|---|---|---|---|---|
| Allowable kinetic energy J | 0.26 | 0.42 | 0.67 | 1.19 |

① In terms of specific load conditions, the allowable kinetic energy indicated in the table above is equivalent to a 50% load ratio at 0.5MPa, and a piston speed of 300mm/sec. Therefore, if the operating conditions are below these values, calculations are unnecessary.
② Apply the following formula to obtain the kinetic energy of the load.

$$Ek=\frac{1}{2}m\upsilon^2$$

Ek: Load kinetic energy (J)
m: Load weight (kg)
$\upsilon$: Piston speed (m/s)

③ The piston speed will exceed the average speed immediately before locking. To determine the piston speed for the purpose of obtaining the kinetic energy of the load, use 1.2 times the average speed as a guide.
④ The relationship between the speed and the load is indicated in the diagram below. Use the cylinder in the range below the line.
⑤ During locking, the lock mechanism must sustain the thrust of the cylinder itself, in addition to absorbing the energy of the load. Therefore, even within a given allowable kinetic energy level, there is an upper limit to the size of the load that can be sustained. Thus, a horizontally mounted cylinder must be operated below the solid line, and a vertically mounted cylinder must be operated below the dotted line.




## Stopping Accuracy (Not including tolerance of control system) (mm)

| Lock | Piston speed (mm/s) | | | | |
|---|---|---|---|---|---|
| | 20* | 50 | 100 | 300 | 500 |
| Spring lock (Exhaust lock) | ±0.3 | ±0.4 | ±0.5 | ±1.0 | ±2.0 |
| Pneumatic lock (Pressurized lock), Spring and pneumatic lock | ±0.15 | ±0.2 | ±0.3 | ±0.5 | ±1.5 |

Conditions/load: 25% of thrust force at 0.5MPa
Solenoid valve: mounted to the lock port
The "20mm/s" marked with "*" is applicable to an air-hydro style that is actuated hydraulically.

## ⚠ Caution

### Recommended Pneumatic Circuit/Cautions on Handling

Refer to p.3.1-2 to 3.1-5 for further specifications of fine lock cylinder CLM2 series.

## Fine Lock Cylinder with Auto Switch

Regarding the installation position and the mounting height of the auto switch, refer to p.1.4-21, as the dimensions are identical to those of the CDM2 series air cylinder (double acting, single rod style).

## Accessories

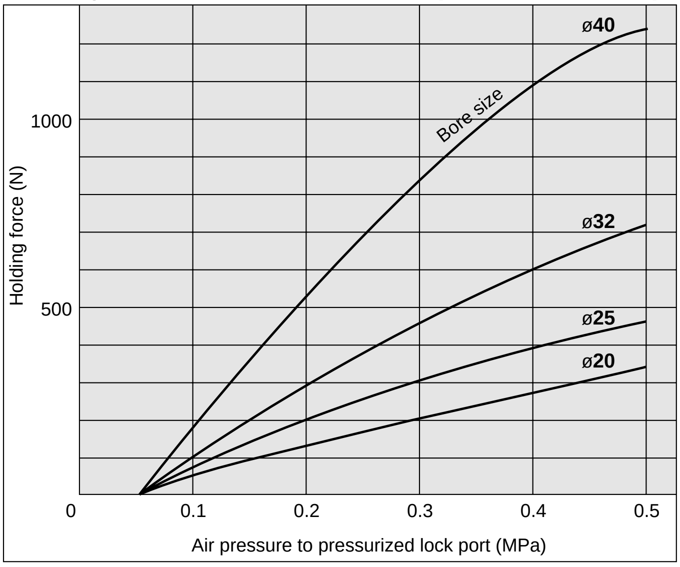
Refer to p.1.4-19 and 1.4-20 for accessory dimensions because it is same as CM2 series.

## Holding Force of Spring Lock (Max. static load)

| Bore size (mm) | 20 | 25 | 32 | 40 |
|---|---|---|---|---|
| Holding force N | 196 | 313 | 443 | 784 |

Note) Holding force at piston rod extended side decreases approx. 15%.

## Holding Force of Pneumatic Lock (Max. Static Load)




## ⚠ Caution

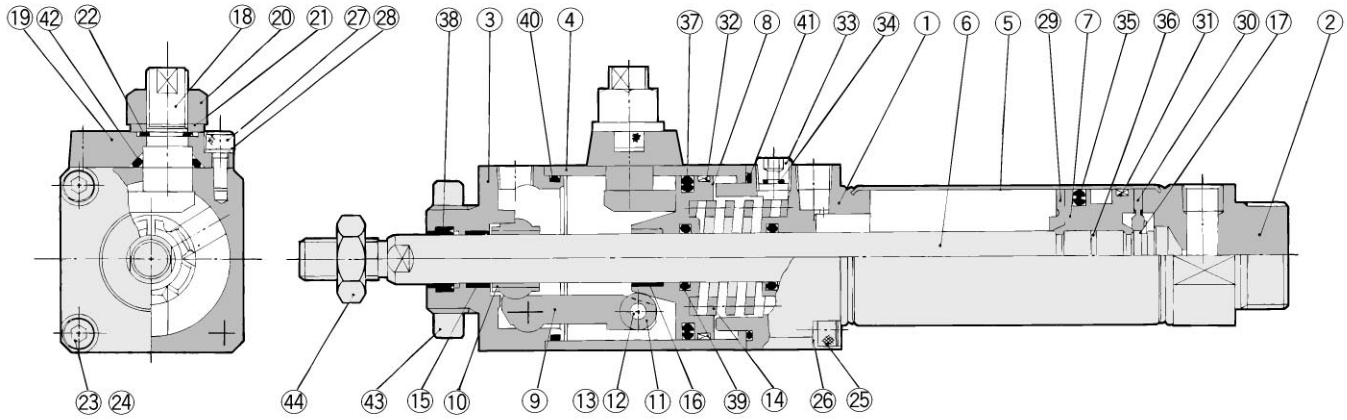
### Cautions when Locking

The holding force is the lock's ability to hold a static load that does not involve vibrations or impacts, when it is locked without a load. Therefore, when normally using the cylinder near the upper limit of the holding force, be aware of the points described below.

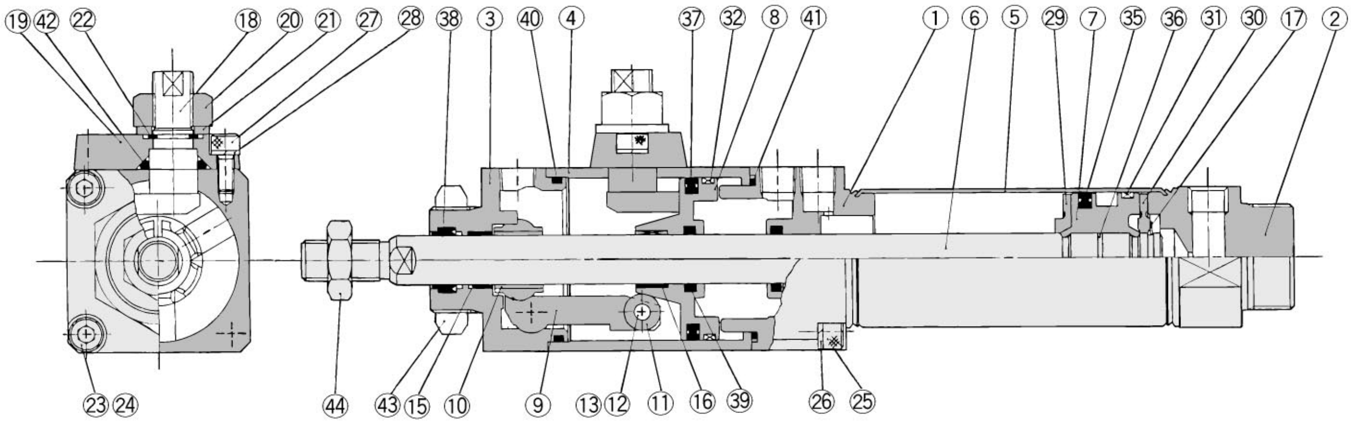
- If the piston rod slips because the lock's holding force has been exceeded, the brake shoe could be damaged, resulting in a reduced holding force or shortened life.
- Do not use the cylinder in the locked state to sustain a load that involves impact.
- To use the lock for drop prevention purposes, the load to be attached to the cylinder must be within 35% of the cylinder's holding force.

## Construction/(The cylinder cannot be disassembled.)

### Spring lock (Exhaust lock)
### Spring and pneumatic lock




### Pneumatic lock (Pressurized lock)




### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Rod cover | Aluminum alloy | White anodized |
| ② | Head cover | Aluminum alloy | White anodized |
| ③ | Cover | Carbon steel | Nitrided, chrome plated |
| ④ | Middle cover | Aluminum alloy | Hard anodized |
| ⑤ | Cylinder tube | Stainless steel | |
| ⑥ | Piston rod | Carbon steel | Hard chrome plated |
| ⑦ | Piston | Aluminum alloy | Chromated |
| ⑧ | Brake piston | Carbon steel | Nitrided |
| ⑨ | Brake arm | Carbon steel | Nitrided |
| ⑩ | Brake shoe | Special friction material | |
| ⑪ | Roller | Carbon steel | |
| ⑫ | Pin | Carbon steel | |
| ⑬ | Snap ring | Carbon tool steel | Nickel plated |
| ⑭ | Brake spring | Spring steel wire | Dacrodized |
| ⑮ | Bushing | Oil impregnated sintered alloy | |
| ⑯ | Bushing | Oil impregnated sintered alloy | |
| ⑰ | Snap ring | Carbon tool steel | Nickel plated |
| ⑱ | Manual lock release cam | Chrome molybdenum steel | Nickel plated |
| ⑲ | Cam guide | Carbon steel | Nitrided, coated |
| ⑳ | Lock nut | Rolled steel | Nickel plated |
| ㉑ | Flat washer | Rolled steel | Nickel plated |
| ㉒ | Snap ring | Carbon tool steel | Nickel plated |
| ㉓ | Hex. socket head cap screw | Chrome molybdenum steel | Nickel plated |

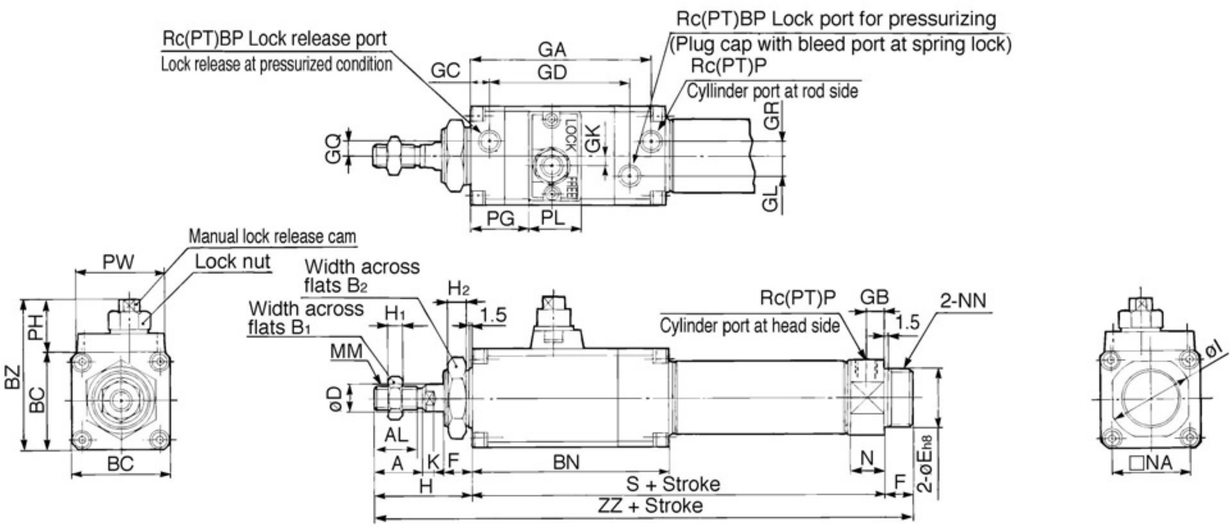
| No. | Description | Material | Note |
|---|---|---|---|
| ㉔ | Spring washer | Steel wire | Nickel plated |
| ㉕ | Hex. socket head cap screw | Chrome molybdenum steel | Nickel plated |
| ㉖ | Spring washer | Steel wire | Nickel plated |
| ㉗ | Hex. socket head cap screw | Chrome molybdenum steel | Nickel plated |
| ㉘ | Spring washer | Steel wire | Nickel plated |
| ㉙ | Damper A | Urethane | |
| ㉚ | Damper B | Urethane | |
| ㉛ | Wearing | Resin | |
| ㉜ | Wearing | Resin | |
| ㉝ | Hex. socket head plug | Carbon steel | E type only |
| ㉞ | Element | Bronze | E type only |
| ㉟ | Piston seal | NBR | |
| ㊱ | Piston gasket | NBR | |
| ㊲ | Brake piston seal | NBR | |
| ㊳ | Rod seal A | NBR | |
| ㊴ | Rod seal B | NBR | |
| ㊵ | Middle cover gasket A | NBR | |
| ㊶ | Middle cover gasket B | NBR | |
| ㊷ | Cam gasket | NBR | |
| ㊸ | Mounting nut | Carbon steel | Nickel plated |
| ㊹ | Rod end nut | Carbon steel | Nickel plated |

CL
MLGC
CNA
CB
CV/MVG
CXW
CXS
CXT
MX
MXU
MXS
MXQ
MXF
MXW
MXP
MG
MGP
MGQ
MGG
MGC
MGF
CY1
MY1

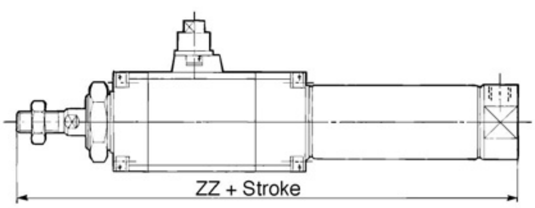
## Basic (B)

**CLM2B** Bore size – Stroke

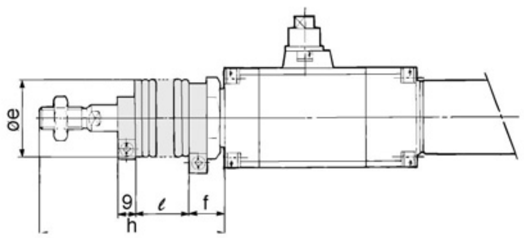
### Standard




### Boss cut




### With rod boot




(mm)

| Bore | Stroke range | A | AL | $B_1$ | $B_2$ | BC | BN | BP | BQ | BZ | D | E | F | GA | GB | GC | GD | GK | GL | GQ | GR | H | $H_1$ | $H_2$ | I |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | to 300 | 18 | 15.5 | 13 | 26 | 38 | 80 | 1/8 | 1/8 | 57.5 | 8 | $20^{\ 0}_{-0.033}$ | 13 | 73.5 | 8 | 8 | 55 | 3.5 | 6 | 4 | 4 | 41 | 5 | 8 | 28 |
| **25** | to 300 | 22 | 19.5 | 17 | 32 | 45 | 90 | 1/8 | 1/8 | 69 | 10 | $26^{\ 0}_{-0.033}$ | 13 | 83.5 | 8 | 9 | 64.5 | 4 | 9 | 7 | 7 | 45 | 6 | 8 | 33.5 |
| **32** | to 300 | 22 | 19.5 | 17 | 32 | 45 | 90 | 1/8 | 1/8 | 69 | 12 | $26^{\ 0}_{-0.033}$ | 13 | 83.5 | 8 | 9 | 64.5 | 4 | 9 | 7 | 7 | 45 | 6 | 8 | 37.5 |
| **40** | to 300 | 24 | 21 | 22 | 41 | 52 | 100.5 | 1/8 | 1/8 | 76 | 14 | $32^{\ 0}_{-0.039}$ | 16 | 90.5 | 11 | 8 | 70 | 4 | 11 | 8 | 7 | 50 | 8 | 10 | 46.5 |

(mm)

| Bore | K | MM | N | NA | NN | P | PG | PH | PL | PW | S | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 5 | M8 X 1.25 | 15 | 24 | M20 X 1.5 | 1/8 | 22 | 19.5 | 20 | 38 | 127 | 181 |
| **25** | 5.5 | M10 X 1.25 | 15 | 30 | M26 X 1.5 | 1/8 | 27 | 24 | 24 | 41 | 137 | 195 |
| **32** | 5.5 | M10 X 1.25 | 15 | 34.5 | M26 X 1.5 | 1/8 | 27 | 24 | 24 | 41 | 139 | 197 |
| **40** | 7 | M14 X 1.5 | 21.5 | 42.5 | M32 X 2 | 1/4 | 29 | 24 | 24 | 41 | 167 | 233 |

**Boss cut**

| Bore | ZZ |
|---|---|
| **20** | 168 |
| **25** | 182 |
| **32** | 184 |
| **40** | 217 |

**With rod boot** (mm)

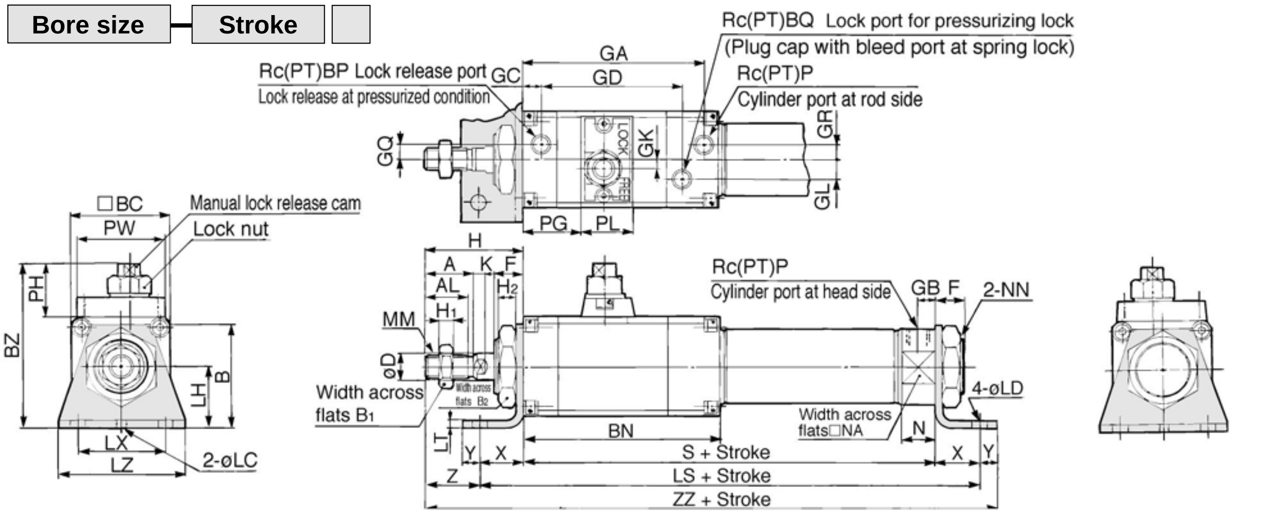
| Bore | e | f | h | | | | | | | ℓ | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |
| **20** | 35 | 17 | 68 | 81 | 93 | 106 | 131 | 156 | – | 12.5 | 25 | 37.5 | 50 | 75 | 100 | – |
| **25** | 35 | 17 | 72 | 85 | 97 | 110 | 135 | 160 | 185 | 12.5 | 25 | 37.5 | 50 | 75 | 100 | 125 |
| **32** | 35 | 17 | 72 | 85 | 97 | 110 | 135 | 160 | 185 | 12.5 | 25 | 37.5 | 50 | 75 | 100 | 125 |
| **40** | 46 | 17 | 77 | 90 | 102 | 115 | 140 | 165 | 190 | 12.5 | 25 | 37.5 | 50 | 75 | 100 | 125 |

∗ Over 301mm stroke: Long stroke.

CAD
CLM2B20··········SCLM220, #1 (#1+#12)
CLM2B25··········SCLM225, #1 (#1+#12)
CLM2B32··········SCLM232, #1 (#1+#12)
CLM2B40··········SCLM240, #1 (#1+#12)

## Axial Foot (L) CAD

**CLM2L** Bore size – Stroke




(mm)

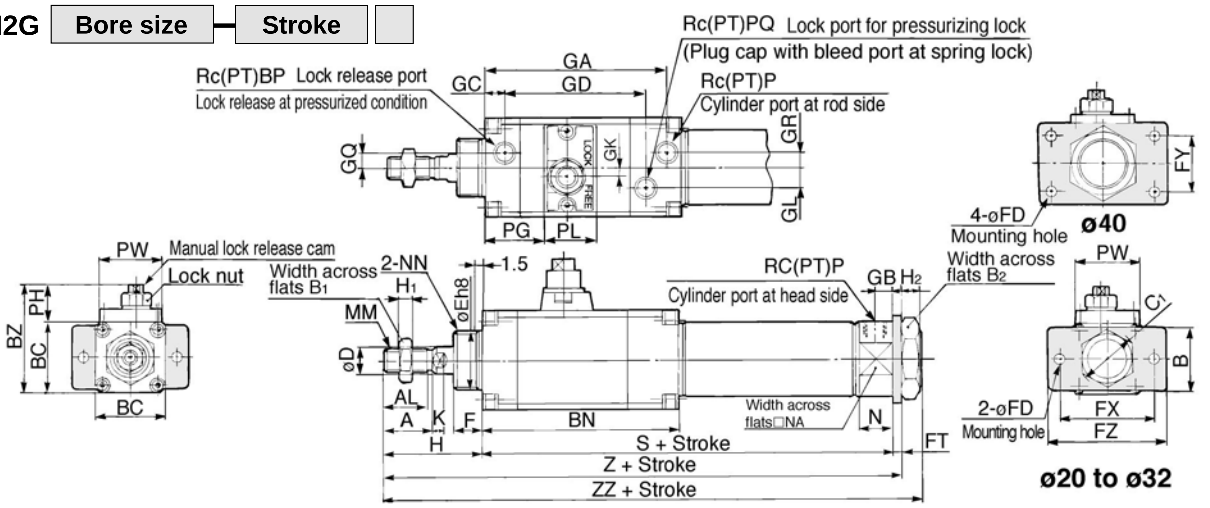
| Bore | Stroke range | A | AL | B | $B_1$ | $B_2$ | BC | BN | BP | BQ | BZ | D | F | GA | GB | GC | GD | GK | GL | GQ | GR | H | $H_1$ | $H_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | to 400 | 18 | 15.5 | 40 | 13 | 26 | 38 | 80 | 1/8 | 1/8 | 63.5 | 8 | 13 | 73.5 | 8 | 8 | 55 | 3.5 | 6 | 4 | 4 | 41 | 5 | 8 |
| **25** | to 450 | 22 | 19.5 | 47 | 17 | 32 | 45 | 90 | 1/8 | 1/8 | 74.5 | 10 | 13 | 83.5 | 8 | 9 | 64.5 | 4 | 9 | 7 | 7 | 45 | 6 | 8 |
| **32** | to 450 | 22 | 19.5 | 47 | 17 | 32 | 45 | 90 | 1/8 | 1/8 | 74.5 | 12 | 13 | 83.5 | 8 | 9 | 64.5 | 4 | 9 | 7 | 7 | 45 | 6 | 8 |
| **40** | to 500 | 24 | 21 | 54 | 22 | 41 | 52 | 100.5 | 1/8 | 1/8 | 80 | 14 | 16 | 90.5 | 11 | 8 | 70 | 4 | 11 | 8 | 7 | 50 | 8 | 10 |

(mm)

| Bore | K | LC | LD | LH | LS | LT | LX | LZ | MM | N | NA | NN | P | PG | PH | PL | PW | S | X | Y | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 5 | 4 | 6.8 | 25 | 167 | 3.2 | 40 | 55 | M8 X 1.25 | 15 | 24 | M20 X 1.5 | 1/8 | 22 | 19.5 | 20 | 38 | 127 | 20 | 8 | 21 | 196 |
| **25** | 5.5 | 4 | 6.8 | 28 | 177 | 3.2 | 40 | 55 | M10 X 1.25 | 15 | 30 | M26 X 1.5 | 1/8 | 27 | 24 | 24 | 41 | 137 | 20 | 8 | 25 | 210 |
| **32** | 5.5 | 4 | 6.8 | 28 | 179 | 3.2 | 40 | 55 | M10 X 1.25 | 15 | 34.5 | M26 X 1.5 | 1/8 | 27 | 24 | 24 | 41 | 139 | 20 | 8 | 25 | 212 |
| **40** | 7 | 4 | 7 | 30 | 213 | 3.2 | 55 | 75 | M14 X 1.5 | 21.5 | 42.5 | M32 X 2 | 1/4 | 29 | 24 | 24 | 41 | 167 | 23 | 10 | 27 | 250 |

## Rear Flange (G)

**CLM2G** Bore size – Stroke




(mm)

| Bore | Stroke range | A | AL | B | $B_1$ | $B_2$ | BC | BN | BP | BQ | BZ | $C_1$ | D | E | F | FD | FT | FX | FY | FZ | GA | GB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | to 300 | 18 | 15.5 | 34 | 13 | 26 | 38 | 80 | 1/8 | 1/8 | 57.5 | 30 | 8 | $20^{\ 0}_{-0.033}$ | 13 | 7 | 4 | 60 | – | 75 | 73.5 | 8 |
| **25** | to 300 | 22 | 19.5 | 40 | 17 | 32 | 45 | 90 | 1/8 | 1/8 | 69 | 37 | 10 | $26^{\ 0}_{-0.033}$ | 13 | 7 | 4 | 60 | – | 75 | 83.5 | 8 |
| **32** | to 300 | 22 | 19.5 | 40 | 17 | 32 | 45 | 90 | 1/8 | 1/8 | 69 | 37 | 12 | $26^{\ 0}_{-0.033}$ | 13 | 7 | 4 | 60 | – | 75 | 83.5 | 8 |
| **40** | to 300 | 24 | 21 | 52 | 22 | 41 | 52 | 100.5 | 1/8 | 1/8 | 76 | 47.3 | 14 | $32^{\ 0}_{-0.033}$ | 16 | 7 | 5 | 66 | 36 | 82 | 90.5 | 11 |

(mm)

| Bore | GC | GD | GK | GL | GQ | b | H | $H_1$ | $H_2$ | K | MM | N | NA | NN | P | PG | PH | PL | PW | S | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 8 | 55 | 3.5 | 6 | 4 | 4 | 41 | 5 | 8 | 5 | M8 X 1.25 | 15 | 24 | M20 X 1.5 | 1/8 | 22 | 19.5 | 20 | 38 | 127 | 172 | 181 |
| **25** | 9 | 64.5 | 4 | 9 | 7 | 7 | 45 | 6 | 8 | 5.5 | M10 X 1.25 | 15 | 30 | M26 X 1.5 | 1/8 | 27 | 24 | 24 | 41 | 137 | 186 | 195 |
| **32** | 9 | 64.5 | 4 | 9 | 7 | 7 | 45 | 6 | 8 | 5.5 | M10 X 1.25 | 15 | 34.5 | M26 X 1.5 | 1/8 | 27 | 24 | 24 | 41 | 139 | 188 | 197 |
| **40** | 8 | 70 | 4 | 11 | 8 | 7 | 50 | 8 | 10 | 7 | M14 X 1.5 | 21.5 | 42.5 | M32 X 2 | 1/4 | 29 | 24 | 24 | 41 | 167 | 222 | 233 |

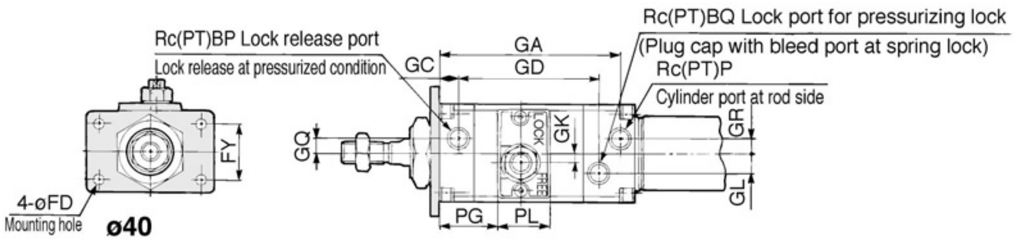
CAD

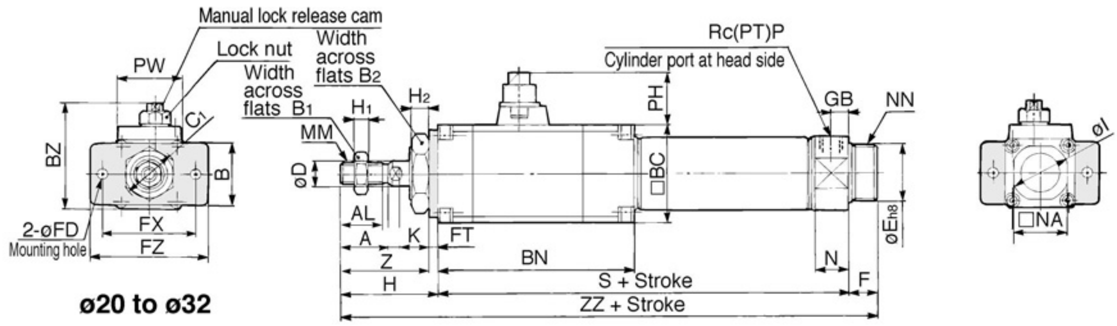
CLM2L20··········SCLM220, #3 (#1+#3+#12)
CLM2L25··········SCLM225, #3 (#1+#3+#12)
CLM2L32··········SCLM232, #3 (#1+#3+#12)
CLM2L40··········SCLM240, #3 (#1+#3+#12)

CLM2G20··········SCLM220, #5 (#1+#5+#12)
CLM2G25··········SCLM225, #5 (#1+#5+#12)
CLM2G32··········SCLM232, #5 (#1+#5+#12)
CLM2G40··········SCLM240, #5 (#1+#5+#12)

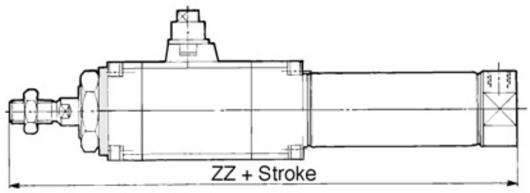
## Front Flange (F)

CLM2F Bore size – Stroke




**Boss cut**




(mm)

| Bore | Stroke range | A | AL | B | $B_1$ | $B_2$ | BC | BN | BP | BQ | BZ | $C_1$ | D | E | F | FD | FT | FX | FY | FZ | GA | GB | GC | GD | GK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | to 400 | 18 | 15.5 | 34 | 13 | 26 | 38 | 80 | $^1/_8$ | $^1/_8$ | 57.5 | 30 | 8 | $20^{0}_{-0.033}$ | 13 | 7 | 4 | 60 | – | 75 | 73.5 | 8 | 8 | 55 | 3.5 |
| **25** | to 450 | 22 | 19.5 | 40 | 17 | 32 | 45 | 90 | $^1/_8$ | $^1/_8$ | 69 | 37 | 10 | $26^{0}_{-0.033}$ | 13 | 7 | 4 | 60 | – | 75 | 83.5 | 8 | 9 | 64.5 | 4 |
| **32** | to 450 | 22 | 19.5 | 40 | 17 | 32 | 45 | 90 | $^1/_8$ | $^1/_8$ | 69 | 37 | 12 | $26^{0}_{-0.033}$ | 13 | 7 | 4 | 60 | – | 75 | 83.5 | 8 | 9 | 64.5 | 4 |
| **40** | to 500 | 24 | 21 | 52 | 22 | 41 | 52 | 100.5 | $^1/_8$ | $^1/_8$ | 76 | 47.3 | 14 | $32^{0}_{-0.033}$ | 16 | 7 | 5 | 66 | 36 | 82 | 90.5 | 11 | 8 | 70 | 4 |

(mm)

| Bore | GL | GQ | GR | H | $H_1$ | $H_2$ | I | K | MM | N | NA | NN | P | PG | PH | PL | PW | S | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 6 | 4 | 4 | 41 | 5 | 8 | 28 | 5 | M8 X 1.25 | 15 | 24 | M20 X 1.5 | $^1/_8$ | 22 | 19.5 | 20 | 38 | 127 | 37 | 181 |
| **25** | 9 | 7 | 7 | 45 | 6 | 8 | 33.5 | 5.5 | M10 X 1.25 | 15 | 30 | M26 X 1.5 | $^1/_8$ | 27 | 24 | 24 | 41 | 137 | 41 | 195 |
| **32** | 9 | 7 | 7 | 45 | 6 | 8 | 37.5 | 5.5 | M10 X 1.25 | 15 | 34.5 | M26 X 1.5 | $^1/_8$ | 27 | 24 | 24 | 41 | 139 | 41 | 197 |
| **40** | 11 | 8 | 7 | 50 | 8 | 10 | 46.5 | 7 | M14 X 1.5 | 21.5 | 42.5 | M32 X 2 | $^1/_8$ | 29 | 24 | 24 | 41 | 167 | 45 | 233 |

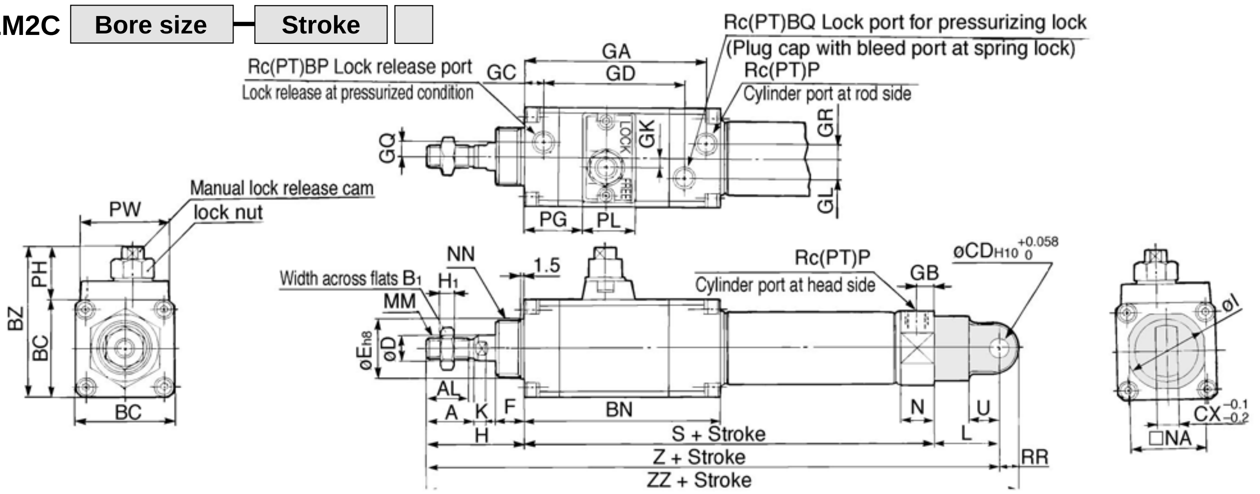
**Boss cut**

| Bore | ZZ |
|---|---|
| **20** | 168 |
| **25** | 182 |
| **32** | 184 |
| **40** | 217 |

CAD
CLM2F20··········SCLM220, #4 (#1+4+#12)
CLM2F25··········SCLM225, #4 (#1+4+#12)
CLM2F32··········SCLM232, #4 (#1+4+#12)
CLM2F40··········SCLM240, #4 (#1+4+#12)

## Single Clevis (C) CAD

**CLM2C** Bore size – Stroke




(mm)

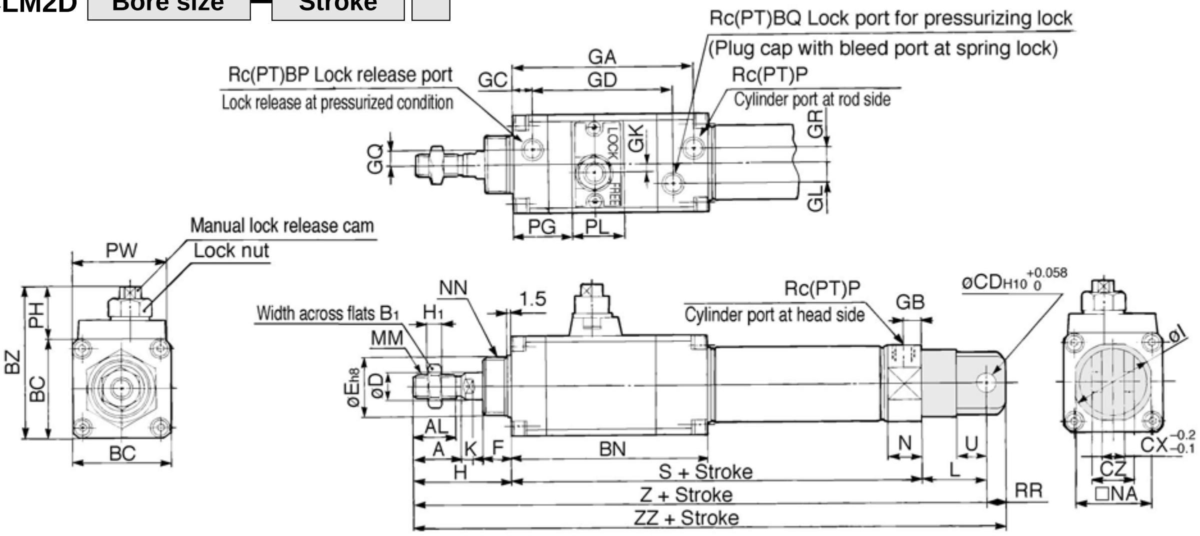
| Bore | Stroke range | A | AL | $B_1$ | BC | BN | BP | BQ | BZ | CD | CX | D | E | F | GA | GB | GC | GD | GK | GL | GQ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | to 300 | 18 | 15.5 | 13 | 38 | 80 | 1/8 | 1/8 | 57.5 | 9 | 10 | 8 | $20^{\ 0}_{-0.033}$ | 13 | 73.5 | 8 | 8 | 55 | 3.5 | 6 | 4 |
| **25** | to 300 | 22 | 19.5 | 17 | 45 | 90 | 1/8 | 1/8 | 69 | 9 | 10 | 10 | $26^{\ 0}_{-0.033}$ | 13 | 83.5 | 8 | 9 | 64.5 | 4 | 9 | 7 |
| **32** | to 300 | 22 | 19.5 | 17 | 45 | 90 | 1/8 | 1/8 | 69 | 9 | 10 | 12 | $26^{\ 0}_{-0.033}$ | 13 | 83.5 | 8 | 9 | 64.5 | 4 | 9 | 7 |
| **40** | to 300 | 24 | 21 | 22 | 52 | 100.5 | 1/8 | 1/8 | 76 | 10 | 15 | 14 | $32^{\ 0}_{-0.039}$ | 16 | 90.5 | 11 | 8 | 70 | 4 | 11 | 8 |

| Bore | GR | H | $H_1$ | I | K | L | MM | N | NA | NN | P | PG | PH | PL | PW | RR | S | U | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 4 | 41 | 5 | 28 | 5 | 30 | M8 X 1.25 | 15 | 24 | M20 X 1.5 | 1/8 | 22 | 19.5 | 20 | 38 | 9 | 127 | 14 | 198 | 207 |
| **25** | 7 | 45 | 6 | 33.5 | 5.5 | 30 | M10 X 1.25 | 15 | 30 | M26 X 1.5 | 1/8 | 27 | 24 | 24 | 41 | 9 | 137 | 14 | 212 | 221 |
| **32** | 7 | 45 | 6 | 37.5 | 5.5 | 30 | M10 X 1.25 | 15 | 34.5 | M26 X 1.5 | 1/8 | 27 | 24 | 24 | 41 | 9 | 139 | 14 | 214 | 223 |
| **40** | 7 | 50 | 8 | 46.5 | 7 | 39 | M14 X 1.5 | 21.5 | 42.5 | M32 X 2 | 1/4 | 29 | 24 | 24 | 41 | 11 | 167 | 18 | 256 | 267 |

CAD CLM2C20……SCLM220, #6 (#1 + #6 + #12) CLM2C32……SCLM220, #6 (#1+#6+#12)
CLM2C25……SCLM225, #6 (#1 + #6 + #12) CLM2C40……SCLM240, #6 (#1+#6+#12)

## Double Clevis (D)

**CLM2D** Bore size – Stroke




(mm)

| Bore | Stroke range | A | AL | $B_1$ | BC | BN | BP | BQ | BZ | CD | CX | CZ | D | E | F | GA | GB | GC | GD | GK | GL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | to 300 | 18 | 15.5 | 13 | 38 | 80 | 1/8 | 1/8 | 57.5 | 9 | 10 | 19 | 8 | $20^{\ 0}_{-0.033}$ | 13 | 73.5 | 8 | 8 | 55 | 3.5 | 6 |
| **25** | to 300 | 22 | 19.5 | 17 | 45 | 90 | 1/8 | 1/8 | 69 | 9 | 10 | 19 | 10 | $26^{\ 0}_{-0.033}$ | 13 | 83.5 | 8 | 9 | 64.5 | 4 | 9 |
| **32** | to 300 | 22 | 19.5 | 17 | 45 | 90 | 1/8 | 1/8 | 69 | 9 | 10 | 19 | 12 | $26^{\ 0}_{-0.033}$ | 13 | 83.5 | 8 | 9 | 64.5 | 4 | 9 |
| **40** | to 300 | 24 | 21 | 22 | 52 | 100.5 | 1/8 | 1/8 | 76 | 10 | 15 | 30 | 14 | $32^{\ 0}_{-0.039}$ | 16 | 90.5 | 11 | 8 | 70 | 4 | 11 |

| Bore | GQ | GR | H | $H_1$ | I | K | L | MM | N | NA | NN | P | PG | PH | PL | PW | RR | S | U | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 4 | 4 | 41 | 5 | 28 | 5 | 30 | M8 X 1.25 | 15 | 24 | M20 X 1.5 | 1/8 | 22 | 19.5 | 20 | 38 | 9 | 127 | 14 | 198 | 207 |
| **25** | 7 | 7 | 45 | 6 | 33.5 | 5.5 | 30 | M10 X 1.25 | 15 | 30 | M26 X 1.5 | 1/8 | 27 | 24 | 24 | 41 | 9 | 137 | 14 | 212 | 221 |
| **32** | 7 | 7 | 45 | 6 | 37.5 | 5.5 | 30 | M10 X 1.25 | 15 | 34.5 | M26 X 1.5 | 1/8 | 27 | 24 | 24 | 41 | 9 | 139 | 14 | 214 | 223 |
| **40** | 8 | 7 | 50 | 8 | 46.5 | 7 | 39 | M14 X 1.5 | 21.5 | 42.5 | M32 X 2 | 1/4 | 29 | 24 | 24 | 41 | 11 | 167 | 18 | 256 | 267 |

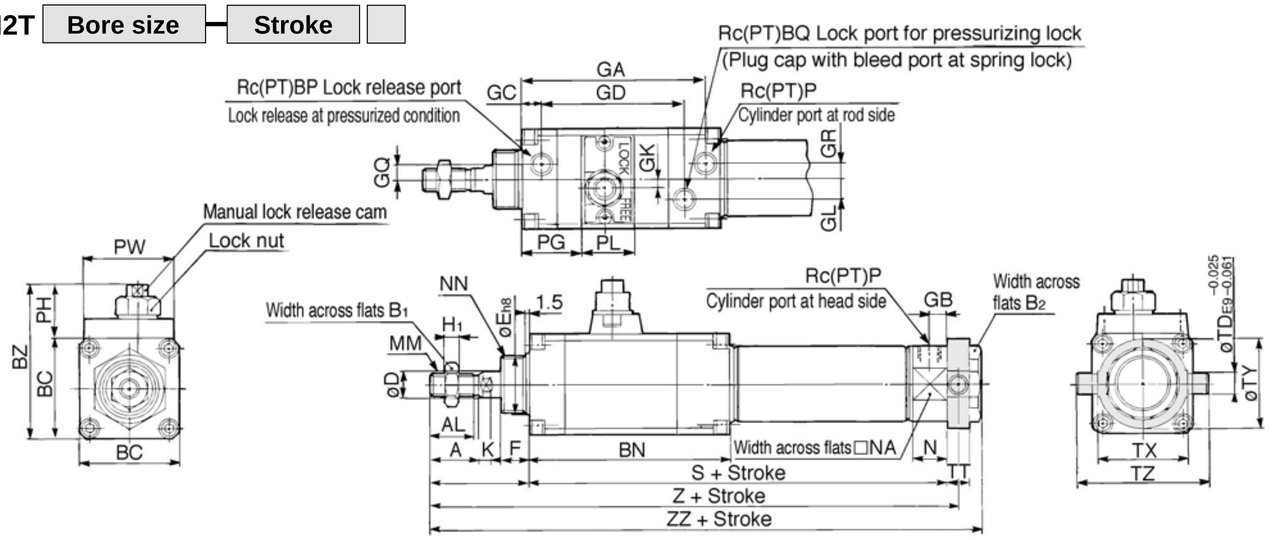
*Clevis pin and snap ring (ø40: cotter pin) are packed with the double clevis style.

CAD CLM2D20……SCLM220, #7 (#1+#7+#12) CLM2D32……SCLM232, #7 (#1+#7+#12)
CLM2D25……SCLM225, #7 (#1+#7+#12) CLM2D40……SCLM240, #7 (#1+#7+#12)

CL
MLGC
CNA
CB
CV/MVG
CXW
CXS
CXT
MX
MXU
MXS
MXQ
MXF
MXW
MXP
MG
MGP
MGQ
MGG
MGC
MGF
CY1
MY1

## Rear Trunnion (T) CAD

**CLM2T** Bore size – Stroke



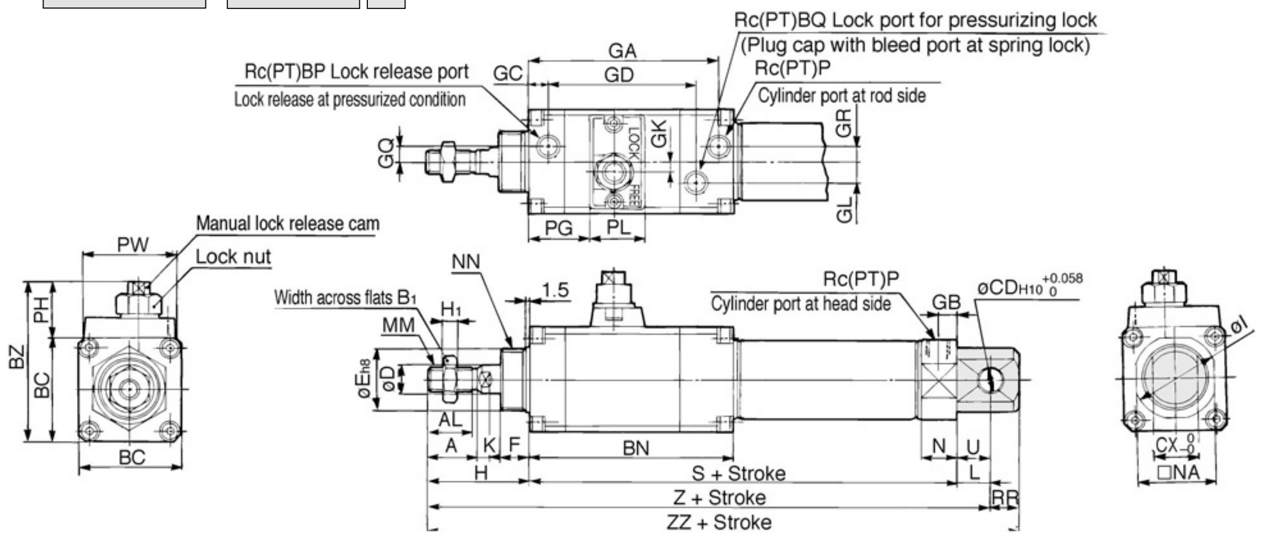

(mm)

| Bore | Stroke range | A | AL | $B_1$ | $B_2$ | BC | BN | BP | BQ | BZ | D | E | F | GA | GB | GC | GD | GK | GL | GQ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | to 300 | 18 | 15.5 | 13 | 26 | 38 | 80 | 1/8 | 1/8 | 57.5 | 8 | $20^{\ 0}_{-0.033}$ | 13 | 73.5 | 8 | 8 | 55 | 3.5 | 6 | 4 |
| **25** | to 300 | 22 | 19.5 | 17 | 32 | 45 | 90 | 1/8 | 1/8 | 69 | 10 | $26^{\ 0}_{-0.033}$ | 13 | 83.5 | 8 | 9 | 64.5 | 4 | 9 | 7 |
| **32** | to 300 | 22 | 19.5 | 17 | 32 | 45 | 90 | 1/8 | 1/8 | 69 | 12 | $26^{\ 0}_{-0.033}$ | 13 | 83.5 | 8 | 9 | 64.5 | 4 | 9 | 7 |
| **40** | to 300 | 24 | 21 | 22 | 41 | 52 | 100.5 | 1/8 | 1/8 | 76 | 14 | $32^{\ 0}_{-0.039}$ | 16 | 90.5 | 11 | 8 | 70 | 4 | 11 | 8 |

| Bore | GR | H | $H_1$ | K | MM | N | NA | NN | P | PG | PH | PL | PW | S | TD | TT | TX | TY | TZ | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 4 | 41 | 5 | 5 | M8 X 1.25 | 15 | 24 | M20 X 1.5 | 1/8 | 22 | 19.5 | 20 | 38 | 127 | 8 | 10 | 32 | 32 | 52 | 173 | 183 |
| **25** | 7 | 45 | 6 | 5.5 | M10 X 1.25 | 15 | 30 | M26 X 1.5 | 1/8 | 27 | 24 | 24 | 41 | 137 | 9 | 10 | 40 | 40 | 60 | 187 | 197 |
| **32** | 7 | 45 | 6 | 5.5 | M10 X 1.25 | 15 | 34.5 | M26 X 1.5 | 1/8 | 27 | 24 | 24 | 41 | 139 | 9 | 10 | 40 | 40 | 60 | 189 | 199 |
| **40** | 7 | 50 | 8 | 7 | M14 X 1.5 | 21.5 | 42.5 | M32 X 2 | 1/4 | 29 | 24 | 24 | 41 | 167 | 10 | 11 | 53 | 53 | 77 | 222.5 | 233 |

## Integrated Clevis (E)

**CLM2E** Bore size – Stroke




(mm)

| Bore | Stroke range | A | AL | $B_1$ | BC | BN | BP | BQ | BZ | CD | CX | D | E | F | GA | GB | GC | GD | GK | GL | GQ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | to 300 | 18 | 15.5 | 13 | 38 | 80 | 1/8 | 1/8 | 57.5 | 8 | 12 | 8 | $20^{\ 0}_{-0.033}$ | 13 | 73.5 | 8 | 8 | 55 | 3.5 | 6 | 4 |
| **25** | to 300 | 22 | 19.5 | 17 | 45 | 90 | 1/8 | 1/8 | 69 | 8 | 12 | 10 | $26^{\ 0}_{-0.033}$ | 13 | 83.5 | 8 | 9 | 64.5 | 4 | 9 | 7 |
| **32** | to 300 | 22 | 19.5 | 17 | 45 | 90 | 1/8 | 1/8 | 69 | 10 | 20 | 12 | $26^{\ 0}_{-0.033}$ | 13 | 83.5 | 8 | 9 | 64.5 | 4 | 9 | 7 |
| **40** | to 300 | 24 | 21 | 22 | 52 | 100.5 | 1/8 | 1/8 | 76 | 10 | 20 | 14 | $32^{\ 0}_{-0.039}$ | 16 | 90.5 | 11 | 8 | 70 | 4 | 11 | 8 |

| Bore | GR | H | $H_1$ | I | K | L | MM | N | NA | NN | P | PG | PH | PL | PW | RR | S | U | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 4 | 41 | 5 | 28 | 5 | 12 | M8 X 1.25 | 15 | 24 | M20 X 1.5 | 1/8 | 22 | 19.5 | 20 | 38 | 9 | 127 | 11.5 | 180 | 189 |
| **25** | 7 | 45 | 6 | 33.5 | 5.5 | 12 | M10 X 1.25 | 15 | 30 | M26 X 1.5 | 1/8 | 27 | 24 | 24 | 41 | 9 | 137 | 11.5 | 194 | 203 |
| **32** | 7 | 45 | 6 | 37.5 | 5.5 | 15 | M10 X 1.25 | 15 | 34.5 | M26 X 1.5 | 1/8 | 27 | 24 | 24 | 41 | 12 | 139 | 14.5 | 199 | 211 |
| **40** | 7 | 50 | 8 | 46.5 | 7 | 15 | M14 X 1.5 | 21.5 | 42.5 | M32 X 2 | 1/4 | 29 | 24 | 24 | 41 | 12 | 167 | 14.5 | 232 | 244 |

CAD
CLM2T20··········SCLM220, #8 (#1+#8+#12)
CLM2T25··········SCLM225, #8 (#1+#8+#12)
CLM2T32··········SCLM232, #8 (#1+#8+#12)
CLM2T40··········SCLM240, #8 (#1+#8+#12)
CLM2E20··········SCLM220, #9 (#9+#12)
CLM2E25··········SCLM225, #9 (#9+#12)
CLM2E32··········SCLM232, #9 (#9+#12)
CLM2E40··········SCLM240, #9 (#9+#12)

## Fine Lock Cylinder/Double Acting Single Rod

# Series CLG1

CAD

**ø20, ø25, ø32, ø40**

## How to Order

**Standard**

```
CLG1 L N 25 - 100 □ - E
```

**With auto switch**

```
CDLG1 L N 25 - 100 □ - E - C73 □
```

**Auto switch fine lock cylinder** (CDLG1)

**Mounting**

| | |
|---|---|
| **B** | Basic |
| **L** | Axial foot |
| **F** | Front flange |
| **G** | Rear flange |
| **U** | Front trunnion |
| **T** | Rear trunnion |
| **D** | Clevis |

**Style**

| | |
|---|---|
| **N** | Non-lube/Rubber bumper |
| **A** | Non-lube/Air cushion |

**Bore size**

| | |
|---|---|
| **20** | 20mm |
| **25** | 25mm |
| **32** | 32mm |
| **40** | 40mm |

**Cylinder stroke (mm)**

| Bore (mm) | Standard stroke (mm) | Long stroke (mm) |
|---|---|---|
| **20** | 25, 50, 75, 100, 125, 150, 200 | 201 to 350 |
| **25** | 25, 50, 75, 100, 125, 150, 200, 250, 300 | 301 to 400 |
| **32** | | 301 to 450 |
| **40** | | 301 to 800 |

∗ Intermediate strokes are also available.

**Cylinder rod boot**

| | |
|---|---|
| **—** | Without rod boot |
| **J** | Nylon tarpaulin |
| **K** | Heat resistant tarpaulin |

**Lock operation**

| | |
|---|---|
| **E** | Spring lock (Exhaust lock) |
| **P** | Pneumatic lock (Pressurized lock) |
| **D** | Spring and pneumatic lock |

**Auto switch**

| | |
|---|---|
| **—** | Without auto switch (Built-in magnet) |

∗Refer to table below for auto switch model no.

**Number of auto switches**

| | |
|---|---|
| **—** | 2 |
| **S** | 1 |
| **n** | n |

### Applicable Auto Switches/Refer to p.5.3-2 for further information on auto switch.

| Style | Special function | Electrical entry | Indicator | Wiring (Output) | Load voltage DC | | Load voltage AC | Auto switch model | Lead wire (m)* 0.5 (—) | 3 (L) | 5 (Z) | None (N) | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3 wire (NPN equiv.) | — | 5V | — | **C76** | ● | ● | — | — | IC | — |
| Reed switch | — | Grommet | Yes | 2 wire | 24V | 12V | — | **B53** | ● | ● | ● | — | — | PLC |
| Reed switch | — | Grommet | Yes | 2 wire | 24V | 12V | 200V or less | **B54** | ● | ● | ● | — | — | Relay, PLC |
| Reed switch | — | Grommet | Yes | 2 wire | 24V | 12V | 200V or less | **B64** | ● | ● | — | — | — | Relay, PLC |
| Reed switch | — | Grommet | Yes | 2 wire | 24V | 12V | 100V | **C73** | ● | ● | ● | — | — | Relay, PLC |
| Reed switch | — | Connector | Yes | 2 wire | 24V | 5V, 12V | ≤ 100V | **C80** | ● | ● | — | — | IC | Relay, PLC |
| Reed switch | — | Connector | Yes | 2 wire | 24V | 12V | — | **C73C** | ● | ● | ● | ● | — | Relay, PLC |
| Reed switch | — | Connector | Yes | 2 wire | 24V | 5V, 12V | ≤ 24V | **C80C** | ● | ● | ● | ● | IC | Relay, PLC |
| Reed switch | Diagnostic indication (2 color) | Grommet | No | 2 wire | 24V | — | — | **B59W** | ● | ● | — | — | — | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3 wire (NPN) | 24V | 5V, 12V | — | **H7A1** | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3 wire (PNP) | 24V | 5V, 12V | — | **H7A2** | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 2 wire | 24V | 12V | — | **H7B** | ● | ● | ○ | — | — | Relay, PLC |
| Solid state switch | — | Connector | Yes | 2 wire | 24V | 12V | — | **H7C** | ● | ● | ● | ● | — | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color) | Grommet | Yes | 3 wire (NPN) | 24V | 5V, 12V | — | **H7NW** | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color) | Grommet | Yes | 3 wire (PNP) | 24V | 5V, 12V | — | **H7PW** | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color) | Grommet | Yes | 2 wire | 24V | 12V | — | **H7BW** | ● | ● | ○ | — | — | Relay, PLC |
| Solid state switch | Water resistant (2 color) | Grommet | Yes | 2 wire | 24V | 12V | — | **H7BA** | — | ● | ○ | — | — | Relay, PLC |
| Solid state switch | With diagnostic output (2 color) | Grommet | Yes | 4 wire (NPN) | 24V | 5V, 12V | — | **H7NF** | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Latching with diagnostic output (2 color) | Grommet | Yes | 4 wire (NPN) | 24V | — | — | **H7LF** | ● | ● | ○ | — | — | Relay, PLC |
| Solid state switch | With timer | Grommet | Yes | 3 wire (NPN) | 24V | 5V, 12V | — | **G5NT** | — | ● | ○ | — | IC | Relay, PLC |

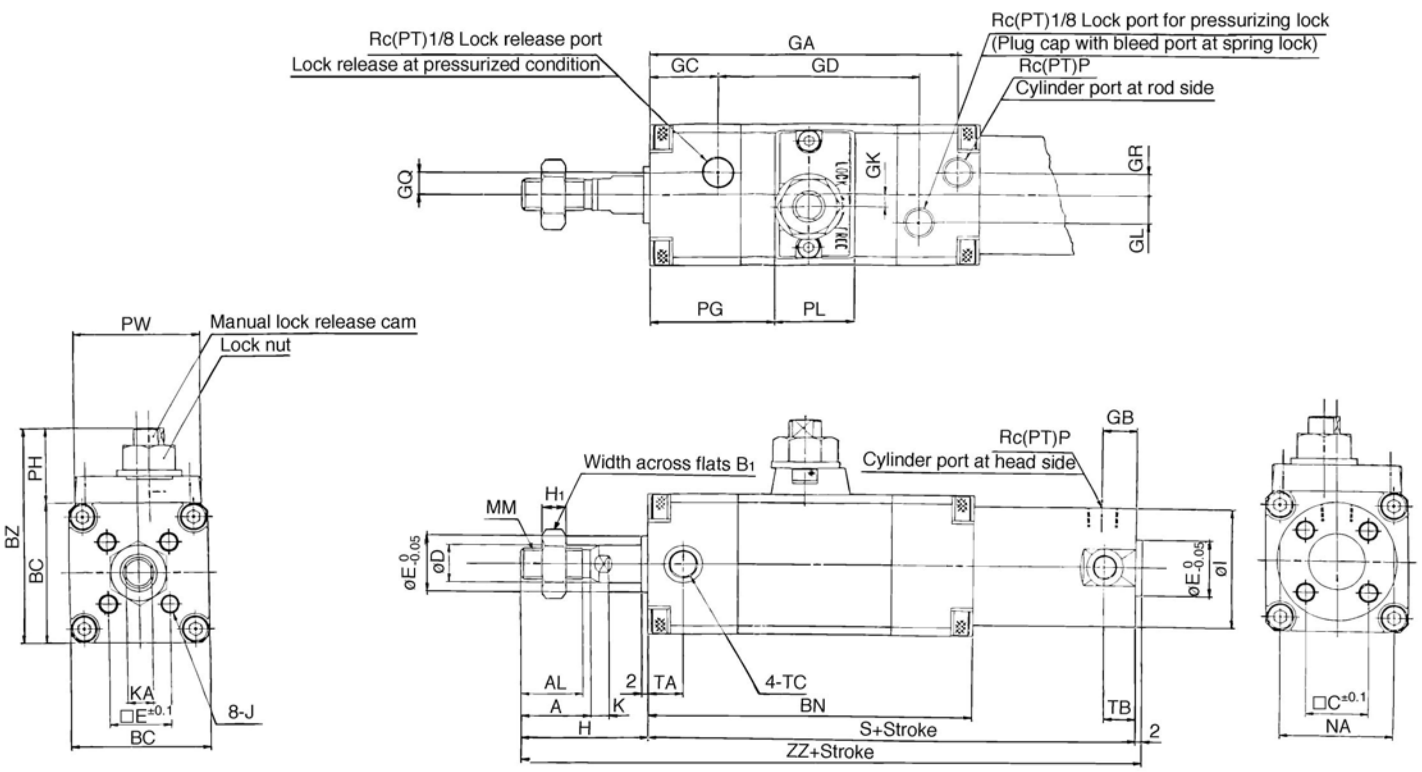
∗Lead wire length symbol

| | | |
|---|---|---|
| 0.5m ········ – | (Example) | H7C |
| 3m ··········· L | | H7CL |
| 5m ··········· Z | | H7CZ |
| None ········ N | | H7CN |

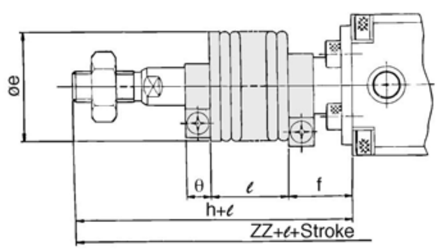
∗ Solid state switches marked with a "○" are manufactured upon receipt of order.

CL
MLGC
CNA
CB
CV/MVG
CXW
CXS
CXT
MX
MXU
MXS
MXQ
MXF
MXW
MXP
MG
MGP
MGQ
MGG
MGC
MGF
CY1
MY1

## Basic/CLG1BN CAD




### With rod boot




| Bore (mm) | Stroke range | AL | A | B1 | BC | BN | BZ | C | D | E | GA | GB | GC | GD | GK | GL | GQ | GR | I | J | K | KA | MM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | to 200 | 15.5 | 18 | 13 | 38 | 91 | 57.5 | 14 | 8 | 12 | 84 | 10 | 19 | 54 | 3.5 | 5.5 | 4 | 4 | 26 | M4 X 0.7 depth7 | 5 | 6 | M8 X 1.25 |
| **25** | to 300 | 19.5 | 22 | 17 | 45 | 101 | 69 | 16.5 | 10 | 14 | 94 | 10 | 20 | 62 | 4 | 9 | 7 | 7 | 31 | M5 X 0.8 depth7.5 | 5.5 | 8 | M10 X 1.25 |
| **32** | to 300 | 19.5 | 22 | 17 | 45 | 102 | 69 | 20 | 12 | 18 | 95 | 10 | 21 | 62 | 4 | 9 | 7 | 7 | 38 | M5 X 0.8 depth8 | 5.5 | 10 | M10 X 1.25 |
| **40** | to 300 | 27 | 30 | 19 | 52 | 111 | 76 | 26 | 16 | 25 | 103 | 10 | 23 | 67 | 4 | 11 | 8 | 8 | 47 | M6 X 1 depth12 | 6 | 14 | M14 X 1.5 |

| Bore (mm) | Stroke range | H1 | NA | P | PG | PH | PL | PW | S | TA | TB | TC | Without rod boot | | With rod boot | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | H | ZZ | e | f | h | ℓ | ZZ |
| **20** | to 200 | 5 | 24 | Rc(PT)1/8 | 33 | 19.5 | 20 | 38 | 141 | 11 | 11 | M5 X 0.8 | 35 | 178 | 30 | 16 | 55 | 0.25 Stroke | 198 |
| **25** | to 300 | 6 | 29 | Rc(PT)1/8 | 38 | 24 | 24 | 41 | 151 | 11 | 11 | M6 X 0.75 | 40 | 193 | 30 | 17 | 62 | | 215 |
| **32** | to 300 | 6 | 35.5 | Rc(PT)1/8 | 39 | 24 | 24 | 41 | 154 | 11 | 10 | M8 X 1 | 40 | 196 | 35 | 17 | 62 | | 218 |
| **40** | to 300 | 8 | 44 | Rc(PT)1/8 | 44 | 24 | 24 | 41 | 169 | 12 | 10 | M10 X 1.25 | 50 | 221 | 35 | 17 | 70 | | 241 |

∗ Refer to p.3.1-30 for long stroke dimensions.

CAD

Rubber bumper basic style **SCLG1** Bore size **, #1 (#1+#11)**
Air cushion basic style **SCLG1** Bore size **, #2 (#2+#11)**
Axial direction foot style **SCLG1** Bore size **, #3 (#1+#3+#11)**
Front flange style **SCLG1** Bore size **, #4 (#1+#4+#11)**
Rear flange stye **SCLG1** Bore size **, #5 (#1+#5+#11)**
Front trunnion style **SCLG1** Bore size **, #6 (#6+#11+#13)**
Rear trunnion style **SCLG1** Bore size **, #7 (#7+#11+#13)**
Clevis style **SCLG1** Bore size **, #8 (#1+#8+#11)**
Accessory **SCLG1** Bore size **, #9**
Rod boot **SCLG1** Bore size **, #10**

## ⚠ Caution/Allowable Kinetic Energy when Locking

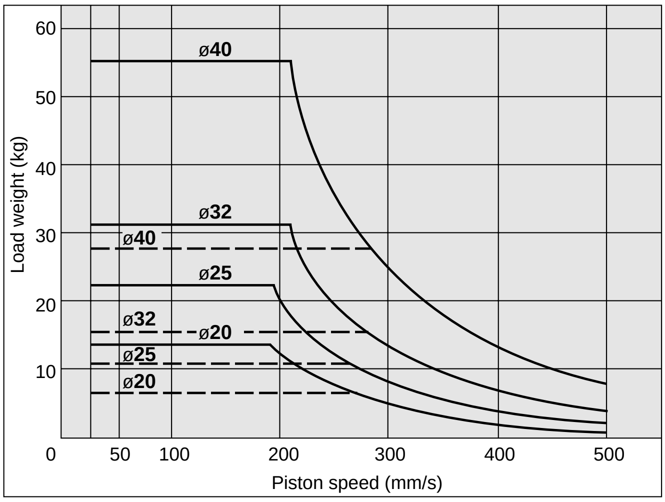
| Bore (mm) | 20 | 25 | 32 | 40 |
|---|---|---|---|---|
| Allowable kinetic energy J | 0.26 | 0.42 | 0.67 | 1.19 |

① In terms of specific load conditions, the allowable kinetic energy indicated in the table above is equivalent to a 50% load ratio at 0.5MPa, and a piston speed of 300mm/sec. Therefore, if the conditions are below these values, calculations are unnecessary.
② Apply the following formula to obtain the kinetic energy of the load.

$$Ek=\frac{1}{2}m\upsilon^2$$

Ek: Load kinetic energy (J)
m: Load weight (kg)
$\upsilon$: Piston speed (m/s) (Average speed X 1.2 times)

③ The piston speed will exceed the average speed immediately before locking. To determine the piston speed for the purpose of obtaining the kinetic energy of the load, use 1.2 times the average speed as a guide.
④ The relationship between the speed and the load of the respective tube bores is indicated in the diagram below. Use the cylinder in the range below the line.
⑤ During locking, the lock mechanism must sustain the thrust of the cylinder itself, in addition to absorbing the energy of the load. Therefore, even within a given allowable kinetic energy level, there is an upper limit to the size of the load that can be sustained. Thus, a horizontally mounted cylinder must be operated below the solid line, and a vertically mounted cylinder must be operated below the dotted line.

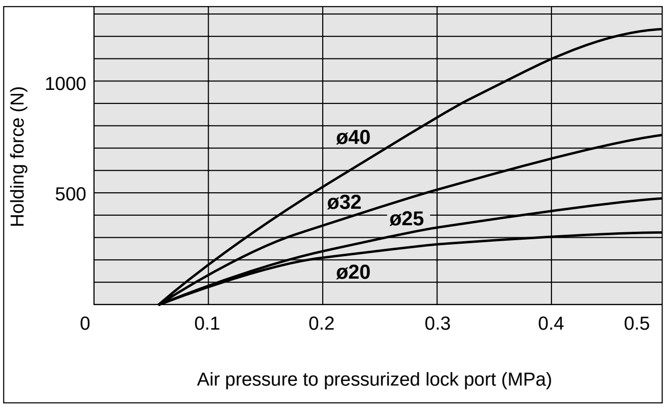



## Holding Force of Spring Lock (Max. static load)

| Bore size (mm) | 20 | 25 | 32 | 40 |
|---|---|---|---|---|
| Holding force N | 196 | 313 | 443 | 784 |

Note) Holding force at piston rod extended side decreases approx. 15%.

## Holding Force of Spring Lock (Max. static load)




## ⚠ Caution

### Cautions when Locking

The holding force is the lock's ability to hold a static load that does not involve vibrations or impacts, when it is locked without a load. Therefore, when normally using the cylinder near the upper limit of the holding force, be aware of the points described below.

- If the piston rod slips because the lock's holding force has been exceeded, the brake shoe could be damaged, resulting in a reduced holding force or shortened life.
- To use the lock for drop prevention purposes, the load to be attached to the cylinder must be within 35% of the cylinder's holding force.
- Do not use the cylinder in the locked state to sustain a load that involves impact.

## Stopping Accuracy (Not including tolerance of control system)

Unit:mm

| Lock | Piston speed (mm/s) | | | |
|---|---|---|---|---|
| | 50 | 100 | 300 | 500 |
| Spring lock (Exhaust lock) | ± 0.4 | ± 0.5 | ± 1.0 | ± 2.0 |
| Pneumatic lock (Pressurized lock)<br>Spring and pneumatic lock | ± 0.2 | ± 0.3 | ± 0.5 | ± 1.5 |

Condition/load: 25% of thrust force at 0.5MPa
Solenoid valve: mounted to the lock port

## Weight

(kg)

| | Bore size (mm) | 20 | 25 | 32 | 40 |
|---|---|---|---|---|---|
| Basic weight | Basic | 0.61 | 0.97 | 1.06 | 1.35 |
| | Axial foot | 0.72 | 1.10 | 1.22 | 1.57 |
| | Flange | 0.73 | 1.15 | 1.23 | 1.58 |
| | Trunnion | 0.62 | 0.99 | 1.09 | 1.40 |
| | Clevis | 0.66 | 1.05 | 1.21 | 1.58 |
| Front pivot bracket | | 0.11 | 0.13 | 0.20 | 0.27 |
| Rear pivot bracket | | 0.08 | 0.09 | 0.17 | 0.25 |
| Single knuckle joint | | 0.05 | 0.09 | 0.09 | 0.10 |
| Double knuckle joint (With pin) | | 0.05 | 0.09 | 0.09 | 0.13 |
| Additional weight per 50mm stroke | | 0.05 | 0.07 | 0.09 | 0.15 |
| Additional weight of air cushion | | 0.01 | 0.01 | 0.02 | 0.02 |
| Additional weight of long stroke | | 0.01 | 0.01 | 0.02 | 0.03 |

Calculation
Example: **CLG1LA20-100**(Foot, ø20, 100st)
•Basic weight································0.72
•Additional weight·························0.05/50 stroke
•Air cylinder stroke·························100 stroke
•Additional weight of air cushion····0.01kg
0.72+0.05 X 100/50+0.01=0.83kg

## ⚠ Caution

### Recommended Pneumatic Circuit/Cautions on Handling

**Refer to p.3.1-2 to 3.1-5 for further specifications of fine lock cylinder CLG1 series.**

## Fine Lock Cylinder with Auto Switch

Refer to p.1.6-13 for auto switch setting position and mounting height because it is same as those of air cylinder CDG1 series (double acting single rod style).

### Auto Switch Mounting Bracket (Band)/Part No.

| Auto switch model | Bore size (Part No.) | | | |
|---|---|---|---|---|
| | 20 | 25 | 32 | 40 |
| **D-B5, B6<br>D-G5, K5** | BA-01 | BA-02 | BA-32 | BA-04 |
| **D-C7, C8<br>D-H7** | BMA2-020 | BMA2-025 | BMA2-032 | BMA2-040 |

*Stainless steel mounting bolt set
The set of stainless steel mounting screws described below is available and can be used depending on the operating environment.
(The band for auto switches must be ordered separately, as they are not included.)
BBA3: For D-B5/B6/G5
BBA4: For D-C7/C8/H7
The stainless steel bolts described above are used when the D- H7BA type switch is shipped mounted on a cylinder. When the switches are shipped as individual parts, the BBA4 set are included.

### Mounting Bracket Part No.

| Mounting bracket | Bore size (Part No.) | | | |
|---|---|---|---|---|
| | 20 | 25 | 32 | 40 |
| Axial foot* | CLG-L020 | CLG-L025 | CLG-L032 | CLG-L040 |
| Flange | CLG-F020 | CLG-F025 | CLG-F032 | CLG-F040 |
| Trunnion | CG-T020 | CG-T025 | CG-T032 | CG-T040 |
| Clevis** | CG-D020 | CG-D025 | CG-D032 | CG-D040 |
| Front pivot bracket | CLG-020-24 | CLG-025-24 | CLG-032-24 | CLG-040-24 |
| Rear pivot bracket | CG-020-24A | CG-025-24A | CG-032-24A | CG-040-24A |

* When ordering foot brackets, 2 pcs. should be ordered for each cylinder.
** Clevis pin and snap ring are packed with the clevis style.

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

## Locks in both directions

The piston rod can be locked in either direction of its cylinder stroke.

## Model

| Series | Style | Action | Cushion | Piston seal | Bore (mm) | Lock operation |
|---|---|---|---|---|---|---|
| CLG1□N | Non-lube style | Double acting | Rubber bumper | Special seal | 20, 25 32, 40 | Spring lock (Exhaust lock), Pneumatic lock (Pressurized lock), Spring and pneumatic lock |
| CLG1□A | | | Air cushion | | | |

## Specifications

| | |
|---|---|
| Fluid | Air |
| Proof pressure | 1.5MPa |
| Max. operating pressure | 1MPa |
| Min. operating pressure | 0.08MPa |
| Ambient and fluid temperature | Without auto switch: –10°C to +70°C<br>With auto switch: –10°C to +60°C (No freezing) |
| Piston speed | 50 to 500mm/sec* |
| Thread tolerance | JIS Class 2 |
| Stroke length tolerance | to 800st $^{+1.4}_{0}$mm |
| Mounting** | Basic, Axial foot, Front flange, Rear flange, Front trunnion, Rear trunnion, Clevis (Used when port position is changed to 90°.) |

* Constraints associated with the allowable kinetic energy are imposed on the speeds at which the piston can be locked. To lock the piston in the stationary state for the purpose of drop prevention, the piston can be locked up to a maximum speed of 1000mm/s.
** The long stroke style is applicable to the basic style, the axial foot style, and the front flange style.

## Fine Lock Specifications

| Lock operation | Spring lock (Exhaust lock) | Spring/ pneumatic lock | Pneumatic lock (Pressurized lock) |
|---|---|---|---|
| Fluid | Air | | |
| Max. operating press. | 0.5MPa | | |
| Lock release press. | 0.3MPa or more | | 0.1MPa or more |
| Lock starting press. | 0.25MPa or less | | 0.05MPa or more |
| Lock direction | Both directions | | |

## Accessories

| Mounting | | Basic | Axial foot | Front flange | Rear flange | Front trunnion | Rear trunnion | Clevis |
|---|---|---|---|---|---|---|---|---|
| Standard | Rod end nut | ● | ● | ● | ● | ● | ● | ● |
| | Clevis pin | — | — | — | — | — | — | ● |
| Option | Single knuckle joint | ● | ● | ● | ● | ● | ● | ● |
| | Double knuckle joint (With pin) | ● | ● | ● | ● | ● | ● | ● |
| | Pivot bracket | — | — | — | — | ● | ● | ● |
| | Rod boot | ● | ● | ● | ● | ● | ● | ● |

## Standard Stroke

| Bore (mm) | Standard stroke (mm) | Long stroke (mm) |
|---|---|---|
| **20** | 25, 50, 75, 100, 125, 150, 200 | 201 to 350 |
| **25** | 25, 50, 75, 100, 125, 150, 200, 250, 300 | 301 to 400 |
| **32** | | 301 to 450 |
| **40** | | 301 to 800 |

* Intermediate strokes are available.

## Rod Boot Material

| Symbol | Material | Max. ambient temp. |
|---|---|---|
| **J** | Nylon tarpaulin | 60°C |
| **K** | Heat resistant tarpaulin | 110°C* |

* Max. ambient temperature for rod boot

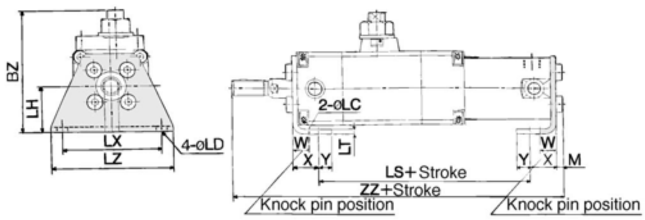
## Minimum Strokes for Auto Switch Mounting

Due to the space requirements for installing auto switches, the minimum cylinder strokes are as shown in the table below.

| Model | Number of auto switches | |
|---|---|---|
| | 1 | 2 |
| **D-B5/B6**<br>**D-C7/C8**<br>**D-H7**<br>**D-G5/K5** | 10mm | 15mm |
| **D-B59W** | 15mm | 20mm |
| **D-H7LF** | 10mm | 20mm |

## With Mounting Bracket

### Foot/CLG1LN

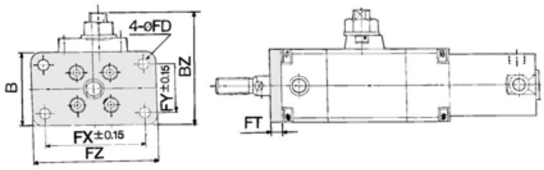



**Foot**

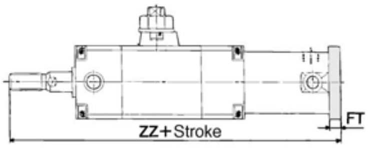
| Bore (mm) | BZ | M | W | X | Y | LC | LD | LH | LS | LT | LX | LZ | Without rod boot | With rod boot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | ZZ | ZZ |
| **20** | 63.5 | 3 | 10 | 15 | 7 | 4 | 6 | 25 | 117 | 3 | 50 | 62 | 182 | 202 |
| **25** | 74.5 | 3.5 | 10 | 15 | 7 | 4 | 6 | 28 | 127 | 3 | 57 | 70 | 197.5 | 219.5 |
| **32** | 74.5 | 3.5 | 10 | 16 | 8 | 4 | 6.6 | 28 | 128 | 3 | 60 | 74 | 200.5 | 222.5 |
| **40** | 83 | 4 | 10 | 16.5 | 8.5 | 4 | 6.6 | 33 | 142 | 3 | 68 | 84 | 226 | 246 |

∗Refer to p.3.1-30 for long stroke dimensions.

### Front flange/CLG1FN




### Rear flange/CLG1GN




**Front flange**

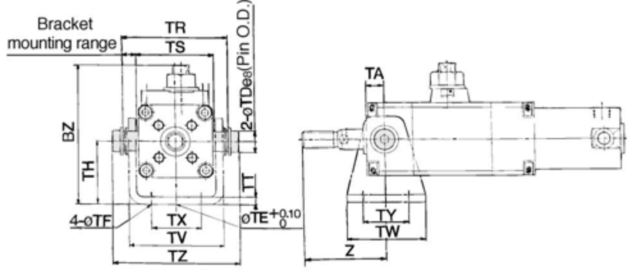
| Bore (mm) | B | BZ | FD | FT | FX | FY | FZ |
|---|---|---|---|---|---|---|---|
| **20** | 38 | 57.5 | 5.5 | 6 | 52 | 25 | 65 |
| **25** | 45 | 69 | 5.5 | 7 | 60 | 30 | 75 |
| **32** | 45 | 69 | 6.6 | 7 | 60 | 30 | 75 |
| **40** | 52 | 76 | 6.6 | 8 | 66 | 36 | 82 |

∗Refer to p.3.1-30 for long stroke dimensions.

**Rear flange**

| Bore (mm) | Without rod boot | With rod boot |
|---|---|---|
| | ZZ | ZZ |
| **20** | 182 | 202 |
| **25** | 198 | 220 |
| **32** | 201 | 223 |
| **40** | 227 | 247 |

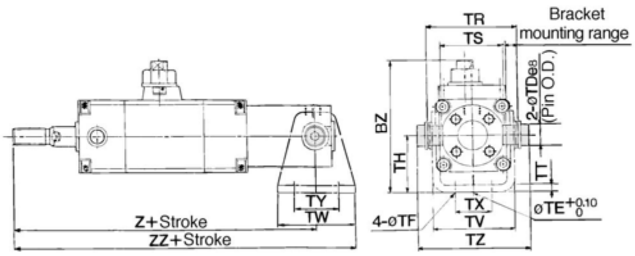
### Front trunnion/CLG1UN




**Front trunnion**

| Bore (mm) | BZ | TDe8 | TE | TF | TH | TR | TS | TT | TV | TW | TX | TY | TZ | Without rod boot | With rod boot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Z | Z |
| **20** | 69.5 | $8^{-0.025}_{-0.047}$ | 10 | 5.5 | 31 | 51 | 40 | 3.2 | 47.8 | 42 | 26 | 28 | 59.6 | 46 | 66 |
| **25** | 83.5 | $10^{-0.025}_{-0.047}$ | 10 | 5.5 | 37 | 58 | 47 | 3.2 | 54.8 | 42 | 28 | 28 | 68 | 51 | 73 |
| **32** | 85 | $12^{-0.032}_{-0.059}$ | 10 | 6.6 | 38.5 | 62.5 | 47 | 4.5 | 57.4 | 48 | 28 | 28 | 75.7 | 51 | 73 |
| **40** | 92.5 | $14^{-0.032}_{-0.059}$ | 10 | 6.6 | 42.5 | 72.5 | 54 | 4.5 | 65.4 | 56 | 36 | 30 | 85.7 | 62 | 82 |

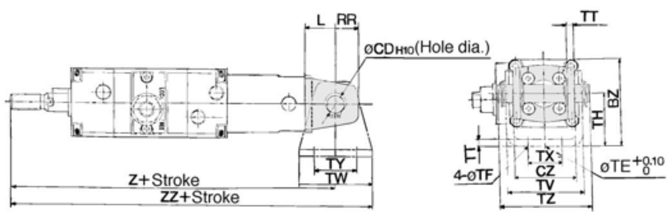
### Rear trunnion/CLG1TN




**Rear trunnion**

| Bore (mm) | BZ | TDe8 | TE | TF | TH | TR | TS | TT | TV | TW | TX | TY | TZ | Without rod boot | | With rod boot | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Z | ZZ | Z | ZZ |
| **20** | 63.5 | $8^{-0.025}_{-0.047}$ | 10 | 5.5 | 25 | 39 | 28 | 3.2 | 35.8 | 42 | 16 | 28 | 47.6 | 165 | 186 | 185 | 206 |
| **25** | 76.5 | $10^{-0.025}_{-0.047}$ | 10 | 5.5 | 30 | 43 | 33 | 3.2 | 39.8 | 42 | 20 | 28 | 53 | 180 | 201 | 202 | 223 |
| **32** | 81.5 | $12^{-0.032}_{-0.059}$ | 10 | 6.6 | 35 | 54.5 | 40 | 4.5 | 49.4 | 48 | 22 | 28 | 67.7 | 184 | 208 | 206 | 230 |
| **40** | 90 | $14^{-0.032}_{-0.059}$ | 10 | 6.6 | 40 | 65.5 | 49 | 4.5 | 58.4 | 56 | 30 | 30 | 78.7 | 209 | 237 | 229 | 257 |

### Clevis/CLG1DN




**Clevis**

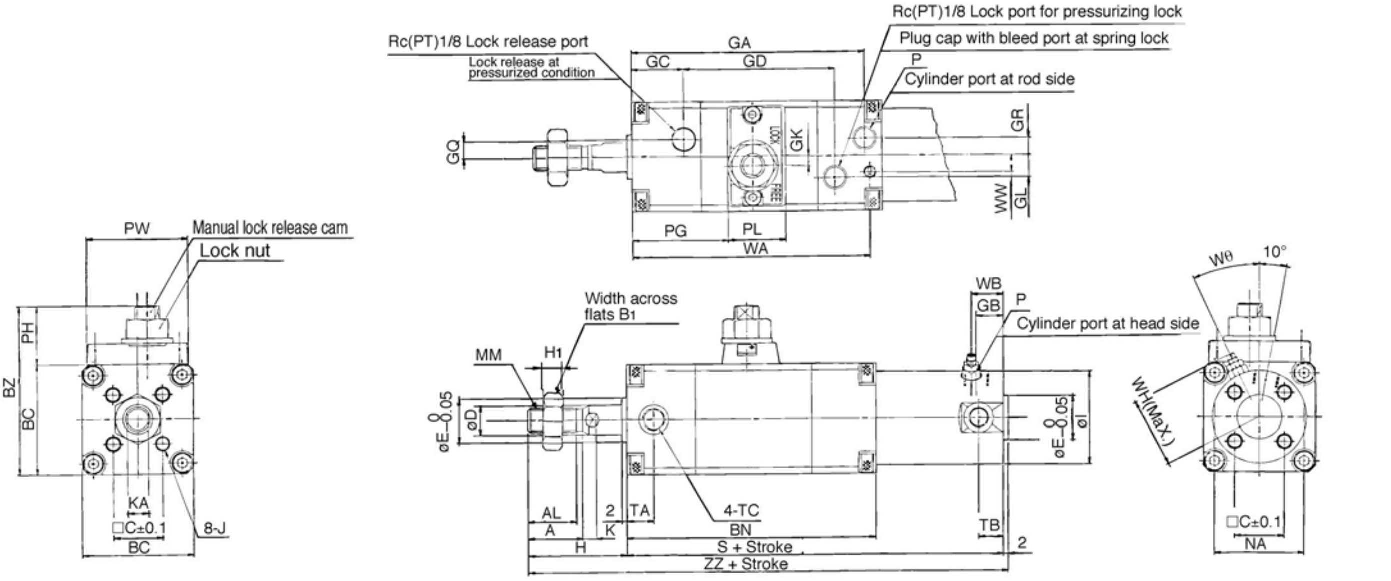
| Bore (mm) | BZ | CDH10 | CZ | L | RR | TE | TF | TH | TT | TV | TW | TX | TY | TZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 44 | $8^{+0.058}_{0}$ | 29 | 14 | 11 | 10 | 5.5 | 25 | 3.2 | 35.8 | 42 | 16 | 28 | 43.4 |
| **25** | 52.5 | $10^{+0.058}_{0}$ | 33 | 16 | 13 | 10 | 5.5 | 30 | 3.2 | 39.8 | 42 | 20 | 28 | 48 |
| **32** | 57.5 | $12^{+0.070}_{0}$ | 40 | 20 | 15 | 10 | 6.6 | 35 | 4.5 | 49.4 | 48 | 22 | 28 | 59.4 |
| **40** | 66 | $14^{+0.070}_{0}$ | 49 | 22 | 18 | 10 | 6.6 | 40 | 4.5 | 58.4 | 56 | 30 | 30 | 71.4 |

∗(Hole dia.)

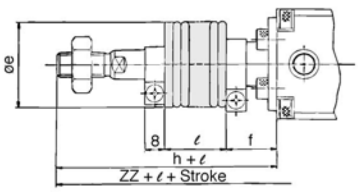
| Bore (mm) | Without rod boot | | With rod boot | |
|---|---|---|---|---|
| | Z | ZZ | Z | ZZ |
| **20** | 190 | 211 | 210 | 231 |
| **25** | 207 | 228 | 229 | 250 |
| **32** | 214 | 238 | 236 | 260 |
| **40** | 241 | 269 | 261 | 289 |

## With Air Cushion/Basic: CLG1BA

∗Refer to p.3.1-29 for mounting bracket since dimensions except GA, P, WA, WB, WH, WW, Wθ are same.




### With rod boot

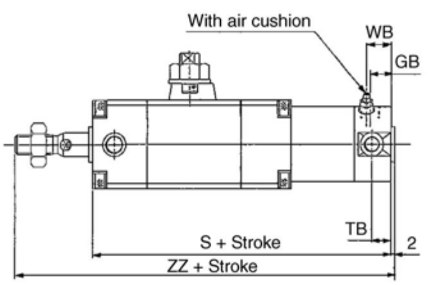



| Bore (mm) | Stroke range | AL | A | B1 | BC | BN | BZ | C | D | E | GA | GB | GC | GD | GK | GL | GQ | GR | I | J | K | KA | MM | NA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | to 200 | 15.5 | 18 | 13 | 38 | 91 | 57.5 | 14 | 8 | 12 | 85 | 10 | 19 | 54 | 3.5 | 5.5 | 4 | 4 | 26 | M4 X 0.7 depth 7 | 5 | 6 | M8 X 1.25 | 24 |
| **25** | to 300 | 19.5 | 22 | 17 | 45 | 101 | 69 | 16.5 | 10 | 14 | 95 | 10 | 20 | 62 | 4 | 9 | 7 | 7 | 31 | M5 X 0.8 depth 5 | 5.5 | 8 | M10 X 1.25 | 29 |
| **32** | to 300 | 19.5 | 22 | 17 | 45 | 102 | 69 | 20 | 12 | 18 | 95 | 10 | 21 | 62 | 4 | 9 | 7 | 7 | 38 | M5 X 0.8 depth 8 | 5.5 | 10 | M10 X 1.25 | 35.5 |
| **40** | to 300 | 27 | 30 | 19 | 52 | 111 | 76 | 26 | 16 | 25 | 103 | 10 | 23 | 67 | 4 | 11 | 8 | 8 | 47 | M6 X 1 depth 12 | 6 | 14 | M14 X 1.5 | 44 |

| Bore (mm) | Stroke range | H1 | P | PG | PH | PL | PW | S | TA | TB | TC | WA | WW | WB | WH | Wθ | Without rod boot | | With rod boot | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | H | ZZ | e | f | h | ℓ | ZZ |
| **20** | to 200 | 5 | M5 X 0.8 | 33 | 19.5 | 20 | 38 | 141 | 11 | 11 | M5 X 0.8 | 86 | 5.5 | 15 | 23 | 30° | 35 | 178 | 30 | 16 | 55 | 0.25 Stroke | 198 |
| **25** | to 300 | 6 | M5 X 0.8 | 38 | 24 | 24 | 41 | 151 | 11 | 11 | M6 X 0.75 | 96 | 7 | 15 | 25 | 30° | 40 | 193 | 30 | 17 | 62 | | 215 |
| **32** | to 300 | 6 | Rc(PT)1/8 | 39 | 24 | 24 | 41 | 154 | 11 | 10 | M8 X 1 | 97 | 7 | 15 | 28.5 | 25° | 40 | 196 | 35 | 17 | 62 | | 218 |
| **40** | to 300 | 8 | Rc(PT)1/8 | 44 | 24 | 24 | 41 | 169 | 12 | 10 | M10 X 1.25 | 105.5 | 9 | 15 | 33 | 20° | 50 | 221 | 35 | 17 | 70 | | 241 |

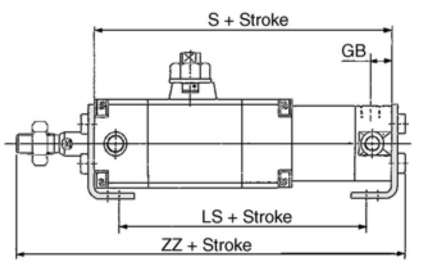
## Long stroke/Refer to p.3.1-28 and 3.1-29 for mounting dimensions except table below.

### Basic



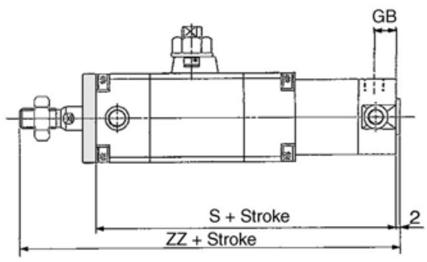

| Bore (mm) | Stroke range | GB | S | W/o rod boot ZZ | W/ rod boot ZZ | TB | WB |
|---|---|---|---|---|---|---|---|
| **20** | 201 to 350 | 12 | 149 | 186 | 206 | 11 | 16 |
| **25** | 301 to 400 | 12 | 159 | 201 | 223 | 11 | 16 |
| **32** | 301 to 450 | 12 | 162 | 204 | 226 | 11 | 16 |
| **40** | 301 to 800 | 13 | 178 | 230 | 250 | 12 | 16 |

### Foot




| Bore (mm) | Stroke range | GB | S | LS | W/o rod boot ZZ | W/ rod boot ZZ |
|---|---|---|---|---|---|---|
| **20** | 201 to 350 | 12 | 149 | 125 | 190 | 210 |
| **25** | 301 to 400 | 12 | 159 | 135 | 205.5 | 227.5 |
| **32** | 301 to 450 | 12 | 162 | 136 | 208.5 | 230.5 |
| **40** | 301 to 800 | 13 | 178 | 151 | 235 | 255 |

### Front flange



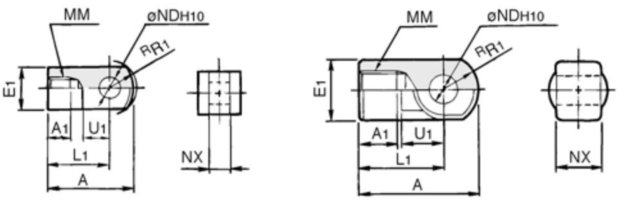

| Bore (mm) | Stroke range | GB | S | W/o rod boot ZZ | W/ rod boot ZZ |
|---|---|---|---|---|---|
| **20** | 201 to 350 | 12 | 149 | 186 | 206 |
| **25** | 301 to 400 | 12 | 159 | 201 | 223 |
| **32** | 301 to 450 | 12 | 162 | 204 | 226 |
| **40** | 301 to 800 | 13 | 178 | 230 | 250 |

# *Series* CLG1
# Accessory Dimensions

## Single Knuckle Joint

**I-G02, G03**
Material: Rolled steel

**I-G04**
Material: Casting steel

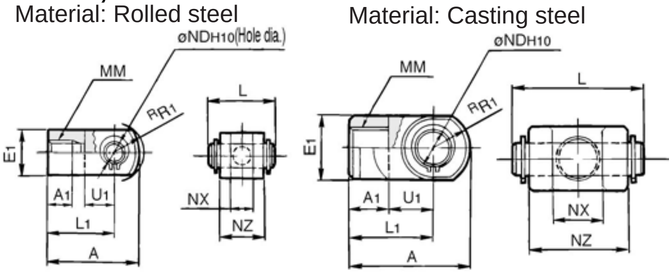



| Part No. | Tube dia. (mm) | A | $A_1$ | $E_1$ | $L_1$ | MM | $^RR_1$ | $U_1$ | $ND_{H10}$ | NX |
|---|---|---|---|---|---|---|---|---|---|---|
| **I-G02** | 20 | 34 | 8.5 | □16 | 25 | M8 X .25 | 10.3 | 11.5 | $8^{+0.058}_{0}$ | $8^{-0.2}_{-0.4}$ |
| **I-G03** | 25, 32 | 41 | 10.5 | □20 | 30 | M10 X .25 | 12.8 | 14 | $10^{+0.058}_{0}$ | $10^{-0.2}_{-0.4}$ |
| **I-G04** | 40 | 42 | 14 | ø22 | 30 | M14 X 1.5 | 12 | 14 | $10^{+0.058}_{0}$ | $18^{-0.3}_{-0.5}$ |

## Double Knuckle Joint (∗Knuckle pin and snap ring are packed.)

**Y-G02, G03**
Material: Rolled steel

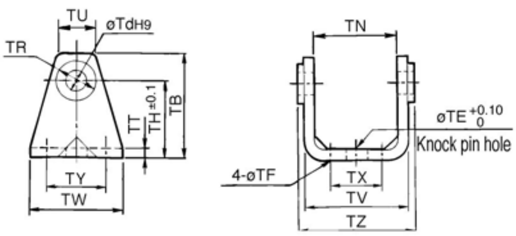
**Y-G04**
Material: Casting steel




| Part No. | Tube dia. (mm) | A | $A_1$ | $E_1$ | $L_1$ | MM | $^RR_1$ | $U_1$ | $ND_{H10}$ | NX | NZ | L | Pin part no. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Y-G02** | 20 | 34 | 8.5 | □16 | 25 | M8 X .25 | 10.3 | 11.5 | $8^{+0.058}_{0}$ | $8^{+0.4}_{+0.2}$ | 16 | 21 | IY-G02 |
| **Y-G03** | 25, 32 | 41 | 10.5 | □20 | 30 | M10 X 1.25 | 12.8 | 14 | $10^{+0.058}_{0}$ | $10^{+0.4}_{+0.2}$ | 20 | 25.6 | IY-G03 |
| **Y-G04** | 40 | 42 | 16 | ø22 | 30 | M14 X 1.5 | 12 | 14 | $10^{+0.058}_{0}$ | $18^{+0.5}_{+0.3}$ | 36 | 41.6 | IY-G04 |

## Front Side Pivot Bracket

**ø20 to ø40**
Material: Rolled steel

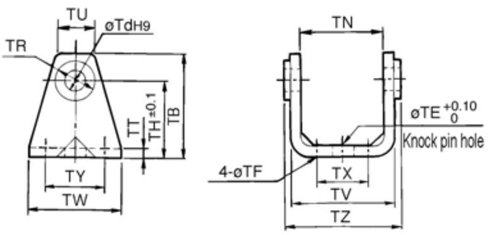



| Part No. | Tube dia. (mm) | TB | $Td_{H9}$ | TE | TF | TH | TN |
|---|---|---|---|---|---|---|---|
| **CLG-020-24** | 20 | 42 | $8^{+0.036}_{0}$ | 10 | 5.5 | 31 | $41^{+0.4}_{+0.1}$ |
| **CLG-025-24** | 25 | 48 | $10^{+0.036}_{0}$ | 10 | 5.5 | 37 | $48^{+0.4}_{+0.1}$ |
| **CLG-032-24** | 32 | 53 | $12^{+0.036}_{0}$ | 10 | 6.6 | 38.5 | $48^{+0.5}_{+0.1}$ |
| **CLG-040-24** | 40 | 60 | $14^{+0.043}_{0}$ | 10 | 6.6 | 42.5 | $56^{+0.5}_{+0.1}$ |

| Part No. | Tube dia. (mm) | TR | TT | TU | TV | TW | TX | TY | TZ |
|---|---|---|---|---|---|---|---|---|---|
| **CLG-020-24** | 20 | 13 | 3.2 | 21.2 | 47.8 | 42 | 26 | 28 | 50 |
| **CLG-025-24** | 25 | 15 | 3.2 | 21.3 | 54.8 | 42 | 28 | 28 | 57 |
| **CLG-032-24** | 32 | 17 | 4.5 | 25.6 | 57.4 | 48 | 28 | 28 | 61.4 |
| **CLG-040-24** | 40 | 21 | 4.5 | 26.3 | 65.4 | 56 | 36 | 30 | 71.4 |

## Rear Side Pivot Bracket

**ø20 to ø40**
Material: Rolled steel

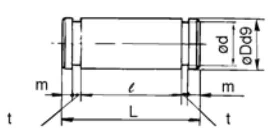



| Part No. | Tube dia. (mm) | TB | Td | TE | TF | TH | TN |
|---|---|---|---|---|---|---|---|
| **CG-020-24A** | 20 | 36 | 8 | 10 | 5.5 | 25 | (29.3) |
| **CG-025-24A** | 25 | 43 | 10 | 10 | 5.5 | 30 | (33.1) |
| **CG-032-24A** | 32 | 50 | 12 | 10 | 6.6 | 35 | (40.4) |
| **CG-040-24A** | 40 | 58 | 14 | 10 | 6.6 | 40 | (49.2) |

| Part No. | Tube dia.(mm) | TR | TT | TU | TV | TW | TX | TY | TZ |
|---|---|---|---|---|---|---|---|---|---|
| **CG-020-24A** | 20 | 13 | 3.2 | 18.1 | 35.8 | 42 | 16 | 28 | 38.3 |
| **CG-025-24A** | 25 | 15 | 3.2 | 20.7 | 39.8 | 42 | 20 | 28 | 42.1 |
| **CG-032-24A** | 32 | 17 | 4.5 | 23.6 | 49.4 | 48 | 22 | 28 | 53.8 |
| **CG-040-24A** | 40 | 21 | 4.5 | 27.3 | 58.4 | 56 | 30 | 30 | 64.6 |

## Knuckle Pin

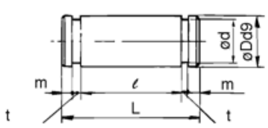
Material: Carbon steel




| Part No. | Tube dia. (mm) | Dd9 | L | d | ℓ | m | t | Used snap ring |
|---|---|---|---|---|---|---|---|---|
| **IY-G02** | 20 | $8^{-0.040}_{-0.076}$ | 21 | 7.6 | 16.2 | 1.5 | 0.9 | C shape 8 for axis |
| **IY-G03** | 25, 32 | $10^{-0.040}_{-0.076}$ | 25.6 | 9.6 | 20.2 | 1.55 | 1.15 | C shape 10 for axis |
| **IY-G04** | 40 | $10^{-0.040}_{-0.076}$ | 41.6 | 9.6 | 36.2 | 1.55 | 1.15 | C shape 10 for axis |

## Clevis Pin

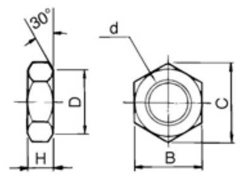
Material: Carbon steel




| Part No. | Tube dia. (mm) | Dd9 | L | d | ℓ | m | t | Used snap ring |
|---|---|---|---|---|---|---|---|---|
| **CD-G02** | 20 | $8^{-0.040}_{-0.076}$ | 43.4 | 7.6 | 38.6 | 1.5 | 0.9 | C shape 8 for axis |
| **CD-G25** | 25 | $10^{-0.040}_{-0.076}$ | 48 | 9.6 | 42.6 | 1.55 | 1.15 | C shape 10 for axis |
| **CD-G03** | 32 | $12^{-0.050}_{-0.093}$ | 59.4 | 11.5 | 54 | 1.55 | 1.15 | C shape 12 for axis |
| **CD-G04** | 40 | $14^{-0.050}_{-0.093}$ | 71.4 | 13.4 | 65 | 2.05 | 1.15 | C shape 14 for axis |

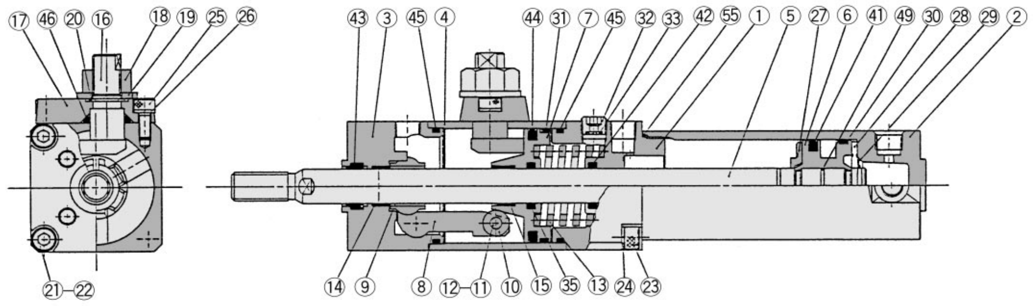
## Rod End Nut

Material: Carbon steel

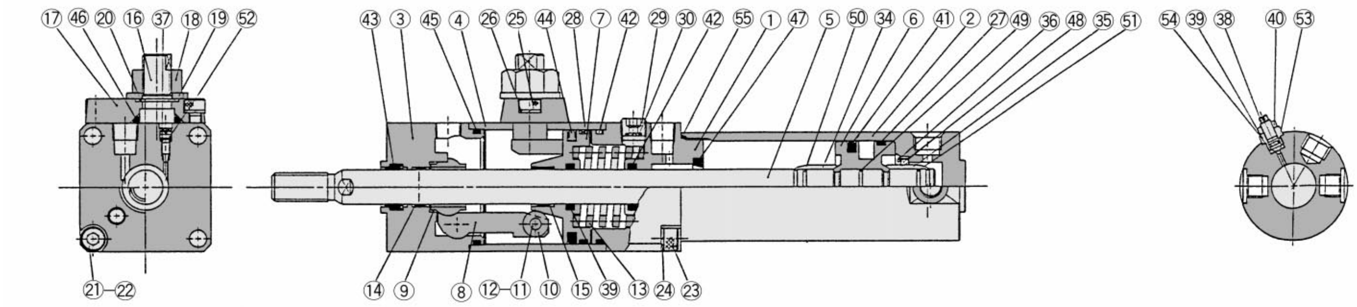



| Part No. | Tube dia. (mm) | B | C | D | d | H |
|---|---|---|---|---|---|---|
| **NT-02** | 20 | 13 | 15.0 | 12.5 | M8 X 1.25 | 5 |
| **NT-03** | 25, 32 | 17 | 19.6 | 16.5 | M10 X 1.25 | 6 |
| **NT-G04** | 40 | 19 | 21.9 | 18 | M14 X 1.5 | 8 |

## Construction



## With air cushion



### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | Rod cover | Aluminum alloy | White hard anodized |
| 2 | Tube cover | Aluminum alloy | White hard anodized |
| 3 | Cover | Carbon steel | Nitrided, chrome plated |
| 4 | Middle cover | Aluminum alloy | White hard anodized |
| 5 | Piston rod | Carbon steel* | Hard chrome plated |
| 6 | Piston | Aluminum alloy | Chromated, Hard anodized (With air cushion) |
| 7 | Brake piston | Carbon steel | Nitrided |
| 8 | Brake arm | Carbon steel | Nitrided |
| 9 | Brake shoe | Special friction material | |
| 10 | Roller | Carbon steel | Nitrided |
| 11 | Pin | Carbon steel | Heat treated |
| 12 | Snap ring | Carbon tool steel | Nickel plated |
| 13 | Brake spring | Spring steel wire | Dacrodized |
| 14 | Bushing | Oil impregnated sintered alloy | |
| 15 | Bushing | Oil impregnated sintered alloy | |
| 16 | Manual lock release cam | Chrome molybdrenum steel | Nickel plated |
| 17 | Cam guide | Carbon steel | Nitrided, coated |

*In the ø20 and ø25 cylinders with auto switches, the piston rod is made of stainless steel.

| No. | Description | Material | Note |
|---|---|---|---|
| 18 | Lock nut | Rolled steel | Nickel plated |
| 19 | Flat washer | Rolled steel | Nickel plated |
| 20 | Snap ring | Carbon tool steel | Nickel plated |
| 21 | Hex. socket head cap screw | Chrome molybdenum steel | Black zinc chromated |
| 22 | Spring washer | Steel wire | Black zinc chromated |
| 23 | Hex. socket head cap screw | Chrome molybdenum steel | Black zinc chromated |
| 24 | Spring washer | Steel wire | Black zinc chromated |
| 25 | Hex. socket head cap screw | Chrome molybdenum steel | Black zinc chromated |
| 26 | Spring washer | Steel wire | Black zinc chromated |
| 27 | Damper A | Urethane | |
| 28 | Damper B | Urethane | |
| 29 | Snap ring | Carbon tool steel | |
| 30 | Wearing | Resin | |
| 31 | Wearing | Resin | |
| 32 | Hex. socket head plug | Carbon steel | E type only |
| 33 | Element | Bronze | E type only |
| 34 | Cushion ring A | Brass | |
| 35 | Cushion ring B | Brass | |
| 36 | Seal retainer | Rolled steel | Nickel plated |
| 37 | Cushion valve A | Brass | Electroless nickel plated |
| 38 | Cushion valve B | Rolled steel | Electroless nickel plated |
| 39 | Cushion valve retainer | Rolled steel | Electroless nickel plated |
| 40 | Luck nut | Rolled steel | Nickel plated |

### Component Parts

| No. | Description | Material |
|---|---|---|
| 41 | Piston seal | NBR |
| 42 | Rod seal A | NBR |
| 43 | Rod seal B | NBR |
| 44 | Brake piston seal | NBR |
| 45 | Middle cover gasket | NBR |
| 46 | Cam gasket | NBR |
| 47 | Cushion seal A | NBR |
| 48 | Cushion seal B | NBR |
| 49 | Piston gasket | NBR |
| 50 | Cushion ring gasket A | NBR |
| 51 | Cushion ring gasket B | NBR |
| 52 | Valve seal A | NBR |
| 53 | Valve seal B | NBR |
| 54 | Gasket for valve retainer | NBR |
| 55 | Cylinder tube gasket | NBR |

Note) Contact SMC if the fine lock unit must be disassembled.

CL
MLGC
CNA
CB
CV/MVG
CXW
CXS
CXT
MX
MXU
MXS
MXQ
MXF
MXW
MXP
MG
MGP
MGQ
MGG
MGC
MGF
CY1
MY1

# Fine Lock Cylinder/Double Acting Single Rod

# *Series CLA*

CAD

**ø40, ø50, ø63, ø80, ø100**

## How to order

CL
MLGC
CNA
CB
CV/MVG
CXW
CXS
CXT
MX
MXU
MXS
MXQ
MXF
MXW
MXP
MG
MGP
MGQ
MGG
MGC
MGF
CY1
MY1

**Standard** CLA L N 50 — 100 JR — E

**With auto switch** CDLA L N 50 — 100 JR — E — A53 ☐

**Air cylinder with auto switch**

**Mounting**

| | | | |
|---|---|---|---|
| **B** | Basic | **C** | Single clevis |
| **L** | Foot | **D** | Double clevis |
| **F** | Front flange | **T** | Center trunnion |
| **G** | Rear flange | | |

**Style**

| | |
|---|---|
| **N** | Non-lube |
| **F** | Steel tube |
| **H** | Air-hydro |

**Bore size**

| | |
|---|---|
| **40** | 40mm |
| **50** | 50mm |
| **63** | 63mm |
| **80** | 80mm |
| **100** | 100mm |

**Cylinder stoke (mm)**

Refer to p.3.1-34 for details

**Number of auto switches**

| | |
|---|---|
| **—** | 2 |
| **S** | 1 |
| **n** | n |

**Auto switch**

| | |
|---|---|
| **—** | Without switch |

Refer to table below for auto switch model.

**Lock operation**

| | |
|---|---|
| **E** | Spring lock (Exhaust lock) |
| **P** | Pneumatic lock (Pressurized lock) |
| **D** | Spring and pneumatic lock |

**Cylinder**

| | | |
|---|---|---|
| Rod boot | **J** | Nylon tarpaulin |
| | **K** | Heat tarpaulin |
| Cushion | **—** | With cushion on both ends |
| | **N** | Without cushion |
| | **R** | With cushion on rod side |
| | **H** | With cushion on head side |

*Air-hydro style: Without cushion.

### Applicable Auto Switches/Refer to p.5.3-2 for further information on auto switch.

| Style | 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 (m)* 0.5 (—) | 3 (L) | 5 (Z) | None | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3 wire (NPN equiv.) | — | 5V | — | **A56** | — | ● | ● | — | — | IC | — |
| | | | | 2 wire | 24V | 12V | — | **A53** | **B53** | ● | ● | ● | — | — | PLC |
| | | | | | | 12V | 100V, 200V | **A54** | **B54** | ● | ● | ● | — | | Relay, PLC |
| | | | No | | | 5V, 12V | — | **A67** | — | ● | ● | — | — | IC | PLC |
| | | | | | | 5V, 12V | 200V or less | **A64** | **B64** | ● | ● | — | — | — | Relay, PLC |
| | | Terminal conduit | Yes | | | — | — | **A33C** | **A33** | — | — | — | ● | | PLC |
| | | | | | | | 100V, 200V | **A34C** | **A34** | — | — | — | ● | | Relay, PLC |
| | | DIN terminal | | | | | | **A44C** | **A44** | — | — | — | ● | | |
| | Diagnostic indication (2 color) | Grommet | | | | — | — | **A59W** | **B59W** | ● | ● | — | — | | |
| Solid state switch | — | Grommet | Yes | 3 wire (NPN) | 24V | 5V, 12V | — | **F59** | **G59** | ● | ● | ○ | — | IC | Relay, PLC |
| | | | | 3 wire (PNP) | | | | **F5P** | **G5P** | ● | ● | ○ | — | | |
| | | | | 2 wire | — | — | 100V, 200V | **J51** | — | ● | ● | ○ | — | — | |
| | | | | | 24V | 12V | — | **J59** | **K59** | ● | ● | ○ | — | | |
| | | Terminal conduit | | 3 wire (PNP) | | 5V, 12V | | **G39C** | **G39** | — | — | — | ● | IC | |
| | | | | 2 wire | | 12V | | **K39C** | **K39** | — | — | — | ● | — | |
| | Diagnostic indication (2 color) | Grommet | | 3 wire (NPN) | | 5V, 12V | | **F59W** | **G59W** | ● | ● | ○ | — | IC | |
| | | | | 3 wire (PNP) | | | | **F5PW** | **G5PW** | ● | ● | ○ | — | | |
| | | | | 2 wire | | 12V | | **J59W** | **K59W** | ● | ● | ○ | — | — | |
| | Water resistant (2 color) | | | | | | | **F5BA** | **G5BA** | — | ● | ○ | — | | |
| | With timer | | | 3 wire (NPN) | | 5V, 12V | | **F5NT** | **G5NT** | — | ● | ○ | — | IC | |
| | With diagnostic output (2 color) | | | 4 wire (NPN) | | | | **F59F** | **G59F** | ● | ● | ○ | — | | |
| | Latch with diagnostic output (2 color) | | | | | — | | **F5LF** | — | ● | ● | ○ | — | — | |

* Lead wire length symbol 0.5m······— (Example) A53
3m·········L (Example) A53L
5m·········Z (Example) A53Z

* Solid state switches marked with a "○" are manufactured upon receipt order.

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

## Style

| Series | Style | Action | Bore size (mm) | Lock style |
|---|---|---|---|---|
| **CLA□N** | Non-lube style | Double acting | 40, 50, 63, 80, 100 | Spring lock, Pneumatic lock, Spring and pneumatic lock |
| **CLA□H** | Air-hydro style | | | |

## Specifications

| Style | Non-lube | Air-hydro |
|---|---|---|
| Fluid | Air | Turbine oil (Lock portion is air) |
| Proof pressure | 1.5MPa | |
| Max. operating pressure | 1.0MPa | |
| Min. operating pressure | 0.08MPa | 0.2MPa |
| Piston speed | 50 to 500mm/s* | 15 to 300mm/s* |
| Ambient and fluid temperature | Without auto switch: –10°C to 70°C<br>With auto switch: –10°C to 60°C (No freezing) | |
| Cushion | Air cushion | None |
| Thread tolerance | JIS class 2 | |
| Stroke length tolerance | to 250: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$, 1001 to 1500: $^{+1.8}_{0}$ | |
| Mounting | Basic, Axial direction foot, Front flange, Rear flange, Single clevis, Double clevis, Center trunnion | |

* Constraints associated with the allowable kinetic energy are imposed on the speeds at which the piston can be locked.

## Lock Specifications

| Lock | Spring lock (Exhaust lock) | Spring/ pneumatic lock | Pneumatic lock (Pressurized lock) |
|---|---|---|---|
| Lock release pressure (MPa) | 0.3 or more | | 0.1 or more |
| Lock starting pressure (MPa) | 0.25 or less | | 0.05 or more |
| Max. operating pressure (MPa) | 0.5 | | |
| Lock direction | Both directions | | |

## Standard Stroke

| Bore size (mm) | Standard stroke (mm) | Max. stroke |
|---|---|---|
| **40** | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500 | 800 |
| **50, 63** | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600 | 1200 |
| **80** | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700 | 1400 |
| **100** | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700 | 1500 |

Note) Intermediate stroke except stroke mentioned above is also available. Contact SMC.

### Minimum Strokes for Auto Switch Mounting

Refer to p.1.9-4 because it is same as air cylinder CDA1 series (Standard/Double acting: Single Rod) style.

## ⚠ Caution

**Recommended Pneumatic Circuit/Caution on Handling**

**Refer to p.3.1-2 to 3.1-5 for details of CLA series specifications mentioned above.**

## Rod Boot Material

| Symbol | Material | Max. ambient temp. |
|---|---|---|
| **J** | Nylon tarpaulin | 60°C |
| **K** | Heat resistant tarpaulin | 110°C* |

* Maximum ambient temperature for the rod boot itself.

## Accessories

Rod end nut (Standard equipment), Single knuckle joint, Double knuckle joint, Knuckle pin*, Clevis pin*, Rod boot

* Only the Double knuckle and the double clevis are provided as standard equipment.

## Auto Switch Mounting Bracket Part No.

| Auto switch model | Bore size 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|
| **D-A5/A6/A59W<br>D-F5□/J5□/F5W□/J59W<br>D-F5NT, F5BA, F59F** | BT-04 | BT-04 | BT-06 | BT-08 | BT-08 |
| **D-A3/A44/G39/K39** | BD1-04M | BD1-05M | BD1-06M | BD1-08M | BD1-10M |
| **D-B5/B6/B59W<br>D-G5□/K59/G5□W/K59W<br>D-G5BA/G59F/G5NTL** | BA-04 | BA-05 | BA-06 | BA-08 | BA-10 |
| **D-A3□C/A44C/G39C/K39C** | BA3-040 | BA3-050 | BA3-063 | BA3-080 | BA3-100 |

* Mounting brackets are provided with D-A3□C, A44C, G39C, and K39C.
When ordering, indicate as described below, in accordance with 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 Bracket Part No.

| Bore size (mm) | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|
| Foot* | CA1-L04 | CA1-L05 | CA1-L06 | CA1-L08 | CA1-L10 |
| Flange | CA1-F04 | CA1-F05 | CA1-F06 | CA1-F08 | CA1-F10 |
| Single clevis | CA1-C04 | CA1-C05 | CA1-C06 | CA1-C08 | CA1-C10 |
| Double clevis** | CA1-D04 | CA1-D05 | CA1-D06 | CA1-D08 | CA1-D10 |

* When ordering foot brackets, 2pcs. should be ordered for each cylinder.
** Clevis pin, plain washer and cotter pin are packed with the double clevis style.

## Weight/( ): Value at steel tubing (kg)

| Bore size (mm) | | | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|---|---|
| Basic weight | Basic | | 1.82 (1.87) | 2.79 (2.83) | 4.41 (4.45) | 7.20 (7.36) | 10.29 (10.50) |
| | Foot | | 2.01 (2.06) | 3.01 (3.05) | 4.75 (4.79) | 7.87 (8.03) | 11.28 (11.49) |
| | Flange | | 2.19 (2.24) | 3.24 (3.28) | 5.20 (5.24) | 8.65 (8.81) | 12.21 (12.42) |
| | Single clevis | | 2.05 (2.10) | 3.13 (3.17) | 5.04 (5.08) | 8.31 (8.47) | 12.07 (12.28) |
| | Double clevis | | 2.09 (2.14) | 3.22 (3.26) | 5.20 (5.24) | 8.60 (8.76) | 12.59 (12.80) |
| | Trunnion | | 2.27 (2.37) | 3.32 (3.42) | 5.30 (5.50) | 8.90 (9.19) | 12.69 (13.08) |
| Additional weight per 50mm stroke | Aluminum tubing | All brackets | 0.22 | 0.28 | 0.37 | 0.52 | 0.65 |
| | Steel tubing | Mounting bracket except trunnion | 0.28 | 0.35 | 0.43 | 0.70 | 0.87 |
| | | Trunnion | 0.36 | 0.46 | 0.65 | 0.86 | 1.07 |
| Accessory | Single knuckle joint | | 0.23 | 0.26 | 0.26 | 0.60 | 0.83 |
| | Double knuckle joint | | 0.32 | 0.38 | 0.38 | 0.73 | 1.08 |
| | Knuckle pin | | 0.05 | 0.05 | 0.05 | 0.14 | 0.19 |

Calculation Example: **CLAL40-100-E** Basic weight·····················2.01(Foot style, ø40)
Additional weight··············0.22/50 stroke
Cylinder stroke·················100 stroke
2.01+0.22 X 100/50=2.45kg

## ⚠ Caution/Allowable Kinetic Energy when Locking

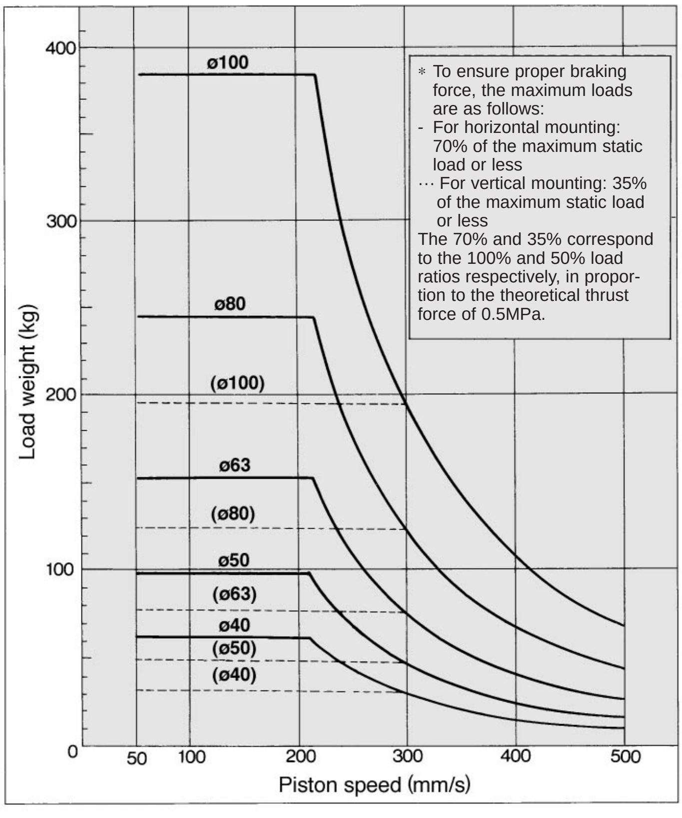
| Bore size (mm) | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|
| Allowable kinetic energy J | 1.42 | 2.21 | 3.53 | 5.69 | 8.83 |

① In terms of specific load conditions, the allowable kinetic energy indicated in the table above is equivalent to a 50% load ratio at 0.5MPa, and a piston speed of 300mm/sec. Therefore, if the operating conditions are below these values, calculations are unnecessary.
② Apply the following formula to obtain the kinetic energy of the load.

$$Ek=\frac{1}{2}m\upsilon^2$$

Ek: Kinetic energy (J)
m: Load weight (kg)
$\upsilon$: Piston speed (m/s)

③ The piston speed will exceed the average speed immediately before locking. To determine the piston speed for the purpose of obtaining the kinetic energy of the load, use 1.2 times the average speed as a guide.
④ The relationship between the speed and the load of the respective tube bores is indicated in the diagram below. Use the cylinder in the range below the line.
⑤ During locking, the lock mechanism must sustain the thrust of the cylinder itself, in addition to absorbing the energy of the load. Therefore, even within a given allowable kinetic energy level, there is an upper limit to the size of the load that can be sustained. Thus, a horizontally mounted cylinder must be operated below the solid line, and a vertically mounted cylinder must be operated below the dotted line.




## Fine Lock Cylinder with Auto Switch

Refer to p.1.9-4 for auto switch setting position and mounting height since it is same as air cylinder CDA1 series (Double acting single rod) style.

## Stopping Accuracy (Not including tolerance of control system.) Unit: mm

| Lock style | Piston speed (mm/sec) 50 | 100 | 300 | 500 |
|---|---|---|---|---|
| Spring lock | ± 0.4 | ± 0.5 | ± 1.0 | ± 2.0 |
| Pneumatic lock<br>Spring and pneumatic lock | ± 0.2 | ± 0.3 | ± 0.5 | ± 1.5 |

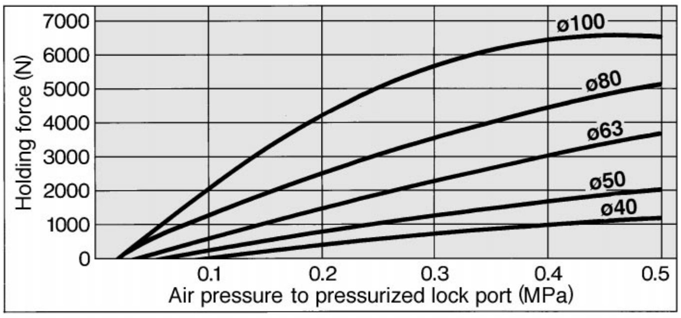
Condition/load: 25% of thrust force at 0.5MPa
Solenoid valve: mounted to the lock port

## Holding Force of Spring Lock (Max. static load)

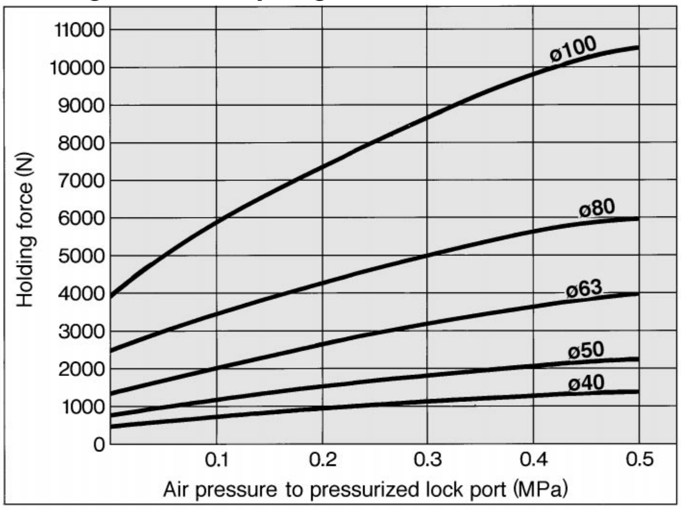
| Bore size (mm) | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|
| Holding force N | 882 | 1370 | 2160 | 3430 | 5390 |

Note) Holding force at piston rod retracted side decreases approx. 15%.

## Holding Force of Pneumatic Lock




## Holding Force of Spring and Pneumatic Lock




## ⚠ Caution

### Cautions when Locking

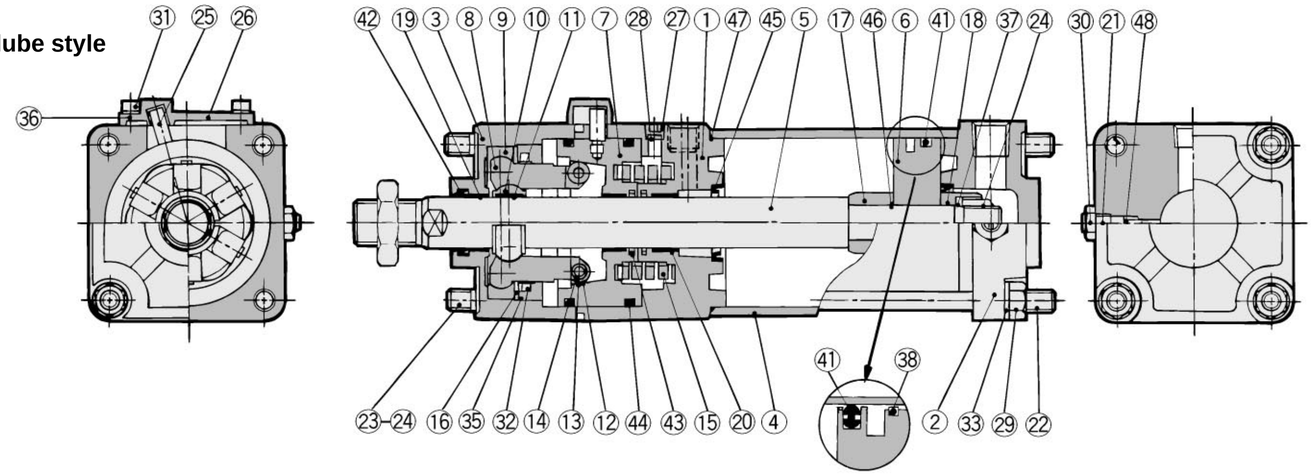
The holding force is the lock's ability to hold a static load that does not involve vibrations or impacts, when it is locked without a load. Therefore, when normally using the cylinder near the upper limit of the holding force, be aware of the points described below.

- If the piston rod slips because the lock's holding force has been exceeded, the brake shoe could be damaged, resulting in a reduced holding force or shortened life.
- To use the lock for drop prevention purposes, the load to be attached to the cylinder must be within 35% of the cylinder's holding force.
- Do not use the cylinder in the locked state to sustain a load that involves impact.

CL
MLGC
CNA
CB
CV/MVG
CXW
CXS
CXT
MX
MXU
MXS
MXQ
MXF
MXW
MXP
MG
MGP
MGQ
MGG
MGC
MGF
CY1
MY1

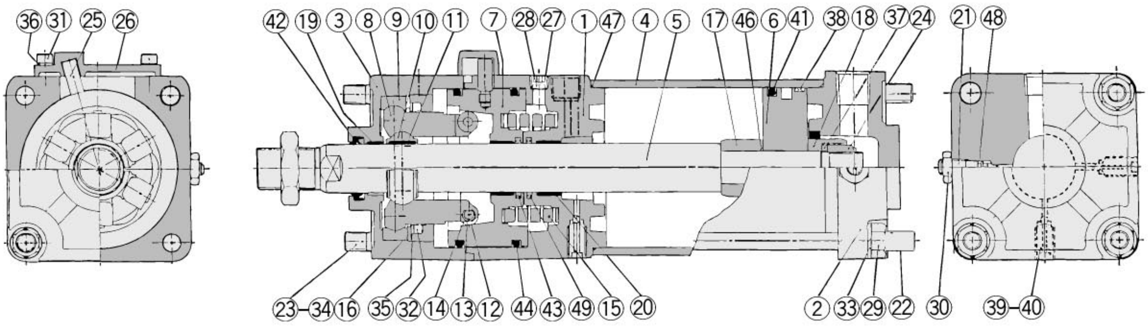
## Construction

**Non-lube style**



**Non-lube style (Long stroke)**

**Air-hydro style**



### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | Rod cover | Aluminum alloy | Black coated after hard anodized |
| 2 | Head cover | Aluminum alloy | Black coated |
| 3 | Cover | Aluminum alloy | Black coated after hard anodized |
| 4 | Cylinder tube | Aluminum alloy | Hard anodized |
| 5 | Piston rod | Carbon steel | Hard chrome plated |
| 6 | Piston | Aluminum alloy | Chromated |
| 7 | Brake piston | Carbon steel | Nitrided |
| 8 | Brake arm | Carbon steel | Nitrided |
| 9 | Arm holder | Carbon steel | Nitrided |
| 10 | Brake shoe holder | Carbon steel | Nitrided |
| 11 | Brake shoe | Special friction material | |
| 12 | Roller | Chrome molybdenum steel | Nitrided |
| 13 | Pin | Chrome bearing steel | Heat treated |
| 14 | Snap ring | Carbon tool steel | Nickel plated |
| 15 | Brake spring | Steel wire | Dacrodized |
| 16 | Retainer | Rolled steel | Zinc chromated |
| 17 | Cushion ring A | Rolled steel | Zinc chromated |
| 18 | Cushion ring B | Rolled steel | Zinc chromated |
| 19 | Bushing | Lead bronze casting | |
| 20 | Bushing | Lead bronze casting | |
| 21 | Cushion valve | Rolled steel | Electroless nickel plated |
| 22 | Tie rod | Carbon steel | Chromated |
| 23 | Unit fixing tie rod | Carbon steel | Chromated |

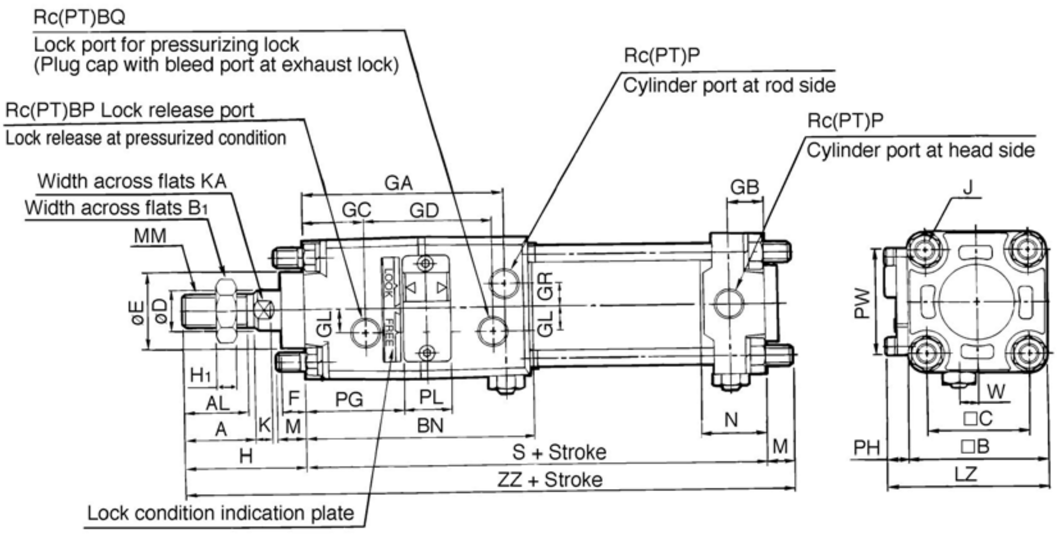
| No. | Description | Material | Note |
|---|---|---|---|
| 24 | Piston nut | Rolled steel | Zinc chromated |
| 25 | Non rotating pin | Carbon steel | Induction hardening |
| 26 | Pin guide | Carbon steel | Black coated after nitrided |
| 27 | Hex. socket head pulg | Chrome molybdenum steel | Black zinc chromated |
| 28 | Elememnt | Bronze | |
| 29 | Tie rod nut | Rolled steel | Black zinc chromated |
| 30 | Lock nut | Rolled steel | Nickel plated |
| 31 | Hex. socket head cap screw | Chrome molybdenum steel | Black zinc chromated |
| 32 | Hex. socket head cap screw | Chrome molybdenum steel | Nickel plated |
| 33 | Spring seat | Steel wire | Black zinc chromated |
| 34 | Spring seat | Steel wire | Black zinc chromated |
| 35 | Spring seat | Steel wire | Black zinc chromated |
| 36 | Spring seat | Steel wire | Black zinc chromated |
| 37 | Spring seat | Steel wire | Zinc chromated |
| 38 | Wearing | Resin | |
| 39 | Exhaust valve | Chrome molybdenum steel | |
| 40 | Check ball | Chrome bearing steel | |

### Component Parts

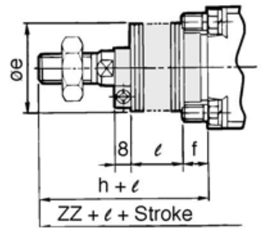
| No. | Description | Material |
|---|---|---|
| 41 | Piston seal | NBR |
| 42 | Rod seal A | NBR |
| 43 | Rod seal B | NBR |
| 44 | Brake piston seal | NBR |
| 45 | Cushion seal | NBR |
| 46 | Piston gasket | NBR |
| 47 | Tube gasket | NBR |
| 48 | Cushion valve seal | NBR |
| 49 | Rod seal C | NBR |

Note) Contact SMC if the fine lock unit must be disassembled.

## Basic/CLAB CAD




**With rod boot**



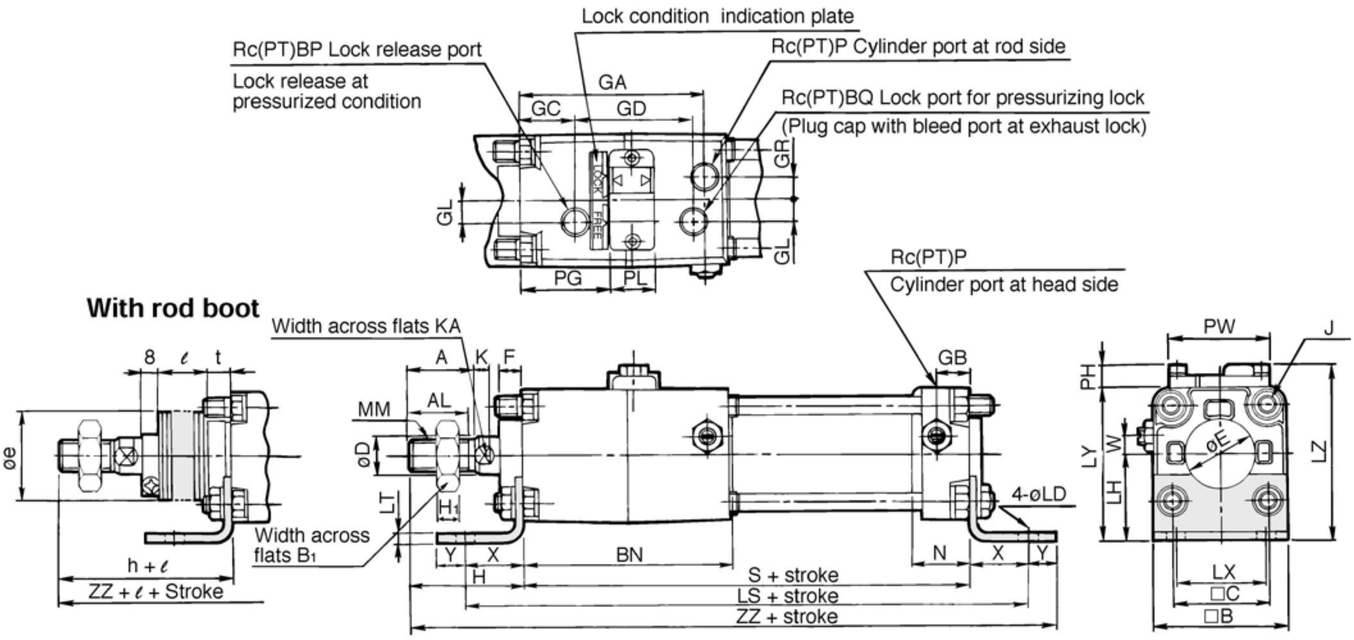

(mm)

| Bore (mm) | Stroke range (mm) | | A | AL | B | $B_1$ | BN | BP | BQ | C | D | E | F | GA | GB | GC | GD | GL | GR | $H_1$ | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Without rod boot | With rod boot | | | | | | | | | | | | | | | | | | | |
| **40** | to 500 | 20 to 500 | 30 | 27 | 60 | 22 | 96 | 1/4 | 1/4 | 44 | 16 | 32 | 10 | 85 | 15 | 26 | 54 | 10 | 10 | 8 | M8 X 1.25 |
| **50** | to 600 | 20 to 600 | 35 | 32 | 70 | 27 | 108 | 1/4 | 1/4 | 52 | 20 | 40 | 10 | 95 | 17 | 27 | 59 | 13 | 12 | 11 | M8 X 1.25 |
| **63** | to 600 | 20 to 600 | 35 | 32 | 86 | 27 | 115 | 1/4 | 1/4 | 64 | 20 | 40 | 10 | 102 | 17 | 26 | 67 | 18 | 15 | 11 | M10 X 1.25 |
| **80** | to 750 | 20 to 750 | 40 | 37 | 102 | 32 | 129 | 1/4 | 1/4 | 78 | 25 | 52 | 14 | 113 | 21 | 30 | 72 | 23 | 17 | 13 | M12 X 1.75 |
| **100** | to 750 | 20 to 750 | 40 | 37 | 116 | 41 | 140 | 1/4 | 1/4 | 92 | 30 | 52 | 14 | 124 | 21 | 31 | 76 | 25 | 19 | 16 | M12 X 1.75 |

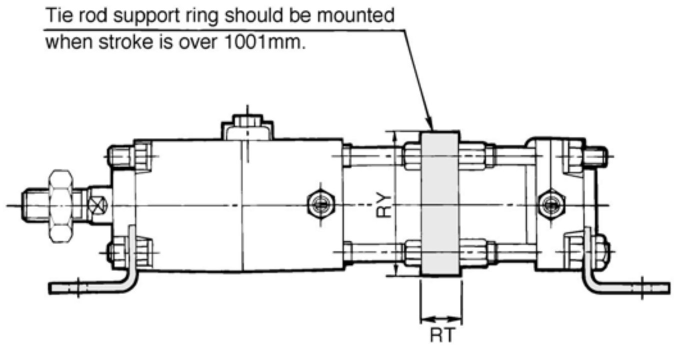
| Bore (mm) | K | KA | LZ | M | MM | N | P | PG | PH | PL | PW | S | W | Without rod boot | With rod boot | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | H | ZZ | e | f | h | ℓ | ZZ |
| **40** | 6 | 14 | 71 | 11 | M14 X 1.5 | 27 | 1/4 | 42 | 11 | 20 | 45 | 153 | 8 | 51 | 215 | 43 | 11.2 | 59 | 1/4 Stroke | 223 |
| **50** | 7 | 18 | 80 | 11 | M18 X 1.5 | 30 | 3/8 | 46 | 10 | 21 | 50 | 168 | 0 | 58 | 237 | 52 | 11.2 | 66 | 1/4 Stroke | 245 |
| **63** | 7 | 18 | 99 | 14 | M18 X 1.5 | 31 | 3/8 | 48.5 | 13 | 23 | 60 | 182 | 0 | 58 | 254 | 52 | 11.2 | 66 | 1/4 Stroke | 262 |
| **80** | 11 | 22 | 117 | 17 | M22 X 1.5 | 37 | 1/2 | 55 | 15 | 23 | 70 | 208 | 0 | 71 | 296 | 65 | 12.5 | 80 | 1/4 Stroke | 305 |
| **100** | 11 | 26 | 131 | 17 | M26 X 1.5 | 40 | 1/2 | 56.5 | 15 | 25 | 80 | 226 | 0 | 72 | 315 | 65 | 14 | 81 | 1/4 Stroke | 324 |

CAD
CLAB40··········SCLA40, #1 (#1+#11)
CLAB50··········SCLA50, #1 (#1+#11)
CLAB50··········SCLA50, #1 (#1+#11)
CLAB63··········SCLA63, #1 (#1+#11)
CLAB80··········SCLA80, #1 (#1+#11)
CLAB100········SCLA100, #1 (#1+#11)

## Foot/CLAL




## Long stroke (ø50 to ø100)




**Long stroke**

| Bore (mm) | Stroke range (mm) | RT | RY |
|---|---|---|---|
| **40** | 501 to 800 | — | — |
| **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 |

(mm)

| Bore (mm) | Stroke range (mm) | | A | AL | B | $B_1$ | BN | BP | BQ | C | D | E | F | GA | GB | GC | GD | GL | GR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Without rod boot | With rod boot | | | | | | | | | | | | | | | | | |
| **40** | to 500 | 20 to 500 | 30 | 27 | 60 | 22 | 96 | 1/4 | 1/4 | 44 | 16 | 32 | 10 | 85 | 15 | 26 | 54 | 10 | 10 |
| **50** | to 600 | 20 to 600 | 35 | 32 | 70 | 27 | 108 | 1/4 | 1/4 | 52 | 20 | 40 | 10 | 95 | 17 | 27 | 59 | 13 | 12 |
| **63** | to 600 | 20 to 600 | 35 | 32 | 86 | 27 | 115 | 1/4 | 1/4 | 64 | 20 | 40 | 10 | 102 | 17 | 26 | 67 | 18 | 15 |
| **80** | to 750 | 20 to 750 | 40 | 37 | 102 | 32 | 129 | 1/4 | 1/4 | 78 | 25 | 52 | 14 | 113 | 21 | 30 | 72 | 23 | 17 |
| **100** | to 750 | 20 to 750 | 40 | 37 | 116 | 41 | 140 | 1/4 | 1/4 | 92 | 30 | 52 | 14 | 124 | 21 | 31 | 76 | 25 | 19 |

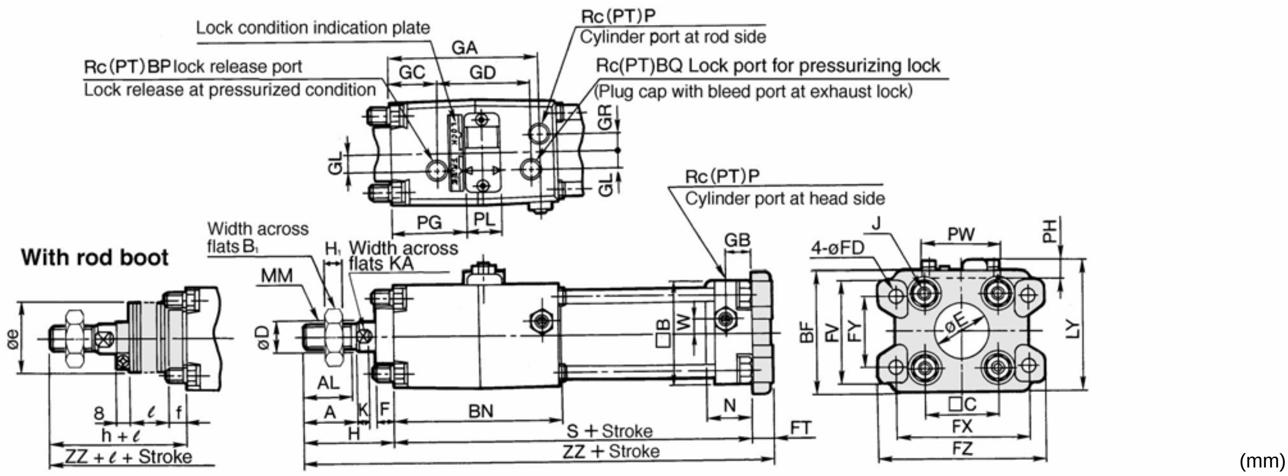
| Bore (mm) | $H_1$ | J | K | KA | LD | LH | LS | LT | LX | LY | LZ | MM | N | P | PG | PH | PL | PW | S | W | X |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40** | 8 | M8 X 1.25 | 6 | 14 | 9 | 40 | 207 | 3.2 | 42 | 70 | 81 | M14 X 1.5 | 27 | 1/4 | 42 | 11 | 20 | 45 | 153 | 8 | 27 |
| **50** | 11 | M8 X 1.25 | 7 | 18 | 9 | 45 | 222 | 3.2 | 50 | 80 | 90 | M18 X 1.5 | 30 | 3/8 | 46 | 10 | 21 | 50 | 168 | 0 | 27 |
| **63** | 11 | M10 X 1.25 | 7 | 18 | 11.5 | 50 | 250 | 3.2 | 59 | 93 | 106 | M18 X 1.5 | 31 | 3/8 | 48.5 | 13 | 23 | 60 | 182 | 0 | 34 |
| **80** | 13 | M12 X 1.75 | 11 | 22 | 13.5 | 65 | 296 | 4.5 | 76 | 116 | 131 | M22 X 1.5 | 37 | 1/2 | 55 | 15 | 23 | 70 | 208 | 0 | 44 |
| **100** | 16 | M12 X 1.75 | 11 | 26 | 13.5 | 75 | 312 | 6 | 92 | 133 | 148 | M26 X 1.5 | 40 | 1/2 | 56.5 | 15 | 25 | 80 | 226 | 0 | 43 |

| Bore (mm) | Y | Without rod boot | | With rod boot | | | | |
|---|---|---|---|---|---|---|---|---|
| | | H | ZZ | e | f | h | ℓ | ZZ |
| **40** | 13 | 51 | 244 | 43 | 11.2 | 59 | 1/4 Stroke | 252 |
| **50** | 13 | 58 | 266 | 52 | 11.2 | 66 | 1/4 Stroke | 274 |
| **63** | 16 | 58 | 290 | 52 | 11.2 | 66 | 1/4 Stroke | 298 |
| **80** | 16 | 71 | 339 | 65 | 12.5 | 80 | 1/4 Stroke | 348 |
| **100** | 17 | 72 | 358 | 65 | 14.0 | 81 | 1/4 Stroke | 367 |

CLAL40·········SCLA40, #2 (#1+#2+#11)
CLAL50·········SCLA50, #2 (#1+#2+#11)
CLAL63·········SCLA63, #2 (#1+#2+#11)
CLAL80·········SCLA80, #2 (#1+#2+#11)
CLAL100········SCLA100, #2 (#1+#2+#11)

## Rear Flange/CLAG

CAD



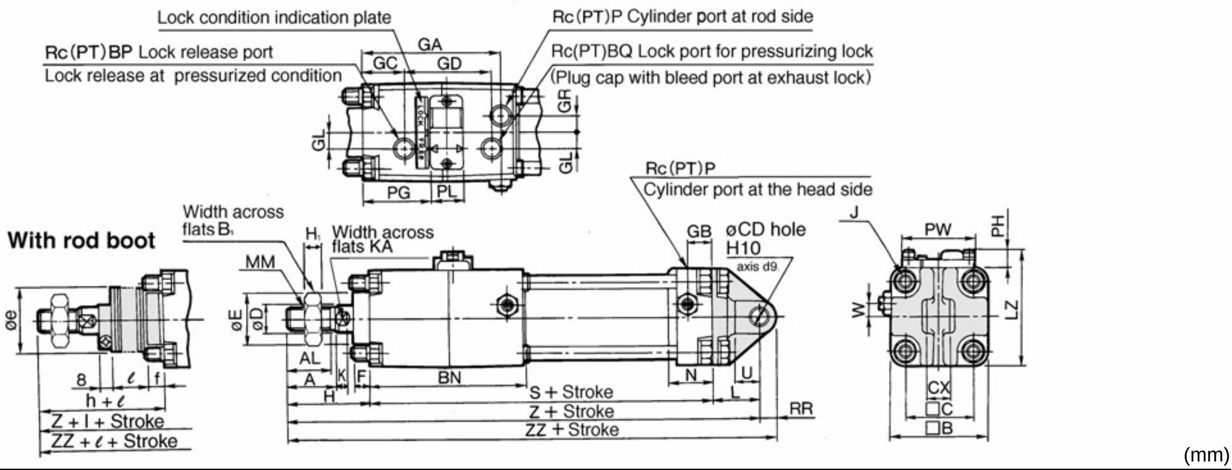

(mm)

| Bore (mm) | Stroke range (mm) | | A | AL | B | B1 | BF | BN | BP | BQ | C | D | E | F | FV | FD | FT | FX | FY | FZ | GA | GB | GC | GD | GL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W/o rod boot | W/ rod boot | | | | | | | | | | | | | | | | | | | | | | | |
| **40** | to 500 | 20 to 500 | 30 | 27 | 60 | 22 | 71 | 96 | 1/4 | 1/4 | 44 | 16 | 32 | 10 | 60 | 9 | 12 | 80 | 42 | 100 | 85 | 15 | 26 | 54 | 10 |
| **50** | to 600 | 20 to 600 | 35 | 32 | 70 | 27 | 81 | 108 | 1/4 | 1/4 | 52 | 20 | 40 | 10 | 70 | 9 | 12 | 90 | 50 | 110 | 95 | 17 | 27 | 59 | 13 |
| **63** | to 600 | 20 to 600 | 35 | 32 | 86 | 27 | 101 | 115 | 1/4 | 1/4 | 64 | 20 | 40 | 10 | 86 | 11.5 | 15 | 105 | 59 | 130 | 102 | 17 | 26 | 67 | 18 |
| **80** | to 750 | 20 to 750 | 40 | 37 | 102 | 32 | 119 | 129 | 1/4 | 1/4 | 78 | 25 | 52 | 14 | 102 | 13.5 | 18 | 130 | 76 | 160 | 113 | 21 | 30 | 72 | 23 |
| **100** | to 750 | 20 to 750 | 40 | 37 | 116 | 41 | 133 | 140 | 1/4 | 1/4 | 92 | 30 | 52 | 14 | 116 | 13.5 | 18 | 150 | 92 | 180 | 124 | 21 | 31 | 76 | 25 |

| Bore (mm) | GR | H1 | J | K | KA | LY | MM | N | P | PG | PH | PL | PW | S | W | W/o rod boot | | W/ rod boot | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | H | ZZ | e | f | h | ℓ | ZZ |
| **40** | 10 | 8 | M8 X 1.25 | 6 | 14 | 76.5 | M14 X 1.5 | 27 | 1/4 | 42 | 11 | 20 | 45 | 153 | 8 | 51 | 216 | 43 | 11.2 | 59 | 1/4 Stroke | 224 |
| **50** | 12 | 11 | M8 X 1.25 | 7 | 18 | 85.5 | M18 X 1.5 | 30 | 3/8 | 46 | 10 | 21 | 50 | 168 | 0 | 58 | 238 | 52 | 11.2 | 66 | 1/4 Stroke | 246 |
| **63** | 15 | 11 | M10 X 1.25 | 7 | 18 | 106.5 | M18 X 1.5 | 31 | 3/8 | 48.5 | 13 | 23 | 60 | 182 | 0 | 58 | 255 | 52 | 11.2 | 66 | 1/4 Stroke | 263 |
| **80** | 17 | 13 | M12 X 1.75 | 11 | 22 | 125.5 | M22 X 1.5 | 37 | 1/2 | 55 | 15 | 23 | 70 | 208 | 0 | 71 | 297 | 65 | 12.5 | 80 | 1/4 Stroke | 306 |
| **100** | 19 | 16 | M12 X 1.75 | 11 | 26 | 139.5 | M26 x 1.5 | 40 | 1/2 | 56.5 | 15 | 25 | 80 | 226 | 0 | 72 | 316 | 65 | 14.0 | 81 | 1/4 Stroke | 325 |

CAD
CLAG40·········SCLA40, #4 (#1+#4+#11)
CLAG50·········SCLA50, #4 (#1+#4+#11)
CLAG63·········SCLA63, #4 (#1+#4+#11)
CLAG80·········SCLA80, #4 (#1+#4+#11)
CLAG100········SCLA100, #4 (#1+#4+#11)

## Single Clevis/CLAC




(mm)

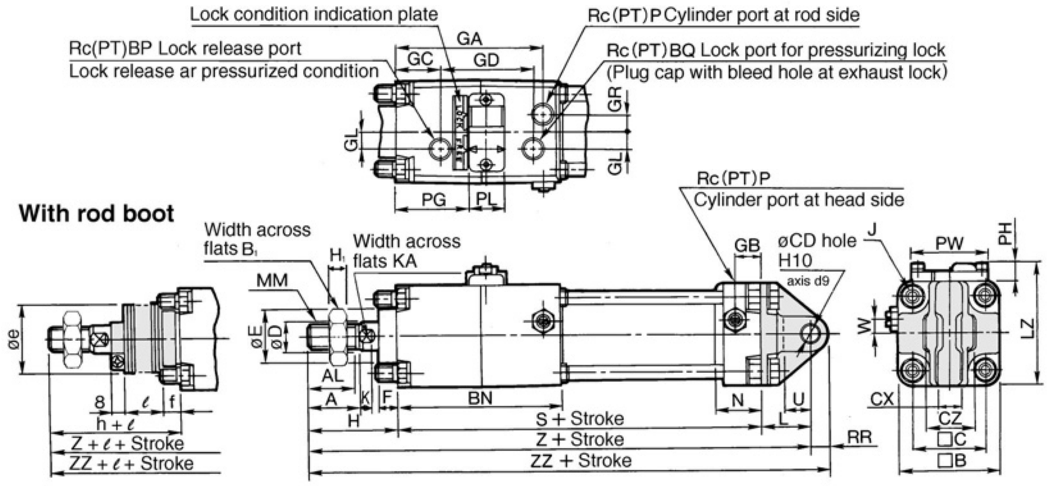
| Bore (mm) | Stroke range (mm) | | A | AL | B | B1 | BN | BP | BQ | C | CD | CX | D | E | F | GA | GB | GC | GD | GL | GR | H1 | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W/o rod boot | W/ rod boot | | | | | | | | | | | | | | | | | | | | | |
| **40** | to 500 | 20 to 500 | 30 | 27 | 60 | 22 | 96 | 1/4 | 1/4 | 44 | 10 | $15^{-0.1}_{-0.3}$ | 16 | 32 | 10 | 85 | 15 | 26 | 54 | 10 | 10 | 8 | M8 X 1.25 |
| **50** | to 600 | 20 to 600 | 35 | 32 | 70 | 27 | 108 | 1/4 | 1/4 | 52 | 12 | $18^{-0.1}_{-0.3}$ | 20 | 40 | 10 | 95 | 17 | 27 | 59 | 13 | 12 | 11 | M8 X 1.25 |
| **63** | to 600 | 20 to 600 | 35 | 32 | 86 | 27 | 115 | 1/4 | 1/4 | 64 | 16 | $25^{-0.1}_{-0.3}$ | 20 | 40 | 10 | 102 | 17 | 26 | 67 | 18 | 15 | 11 | M10 X 1.25 |
| **80** | to 750 | 20 to 750 | 40 | 37 | 102 | 32 | 129 | 1/4 | 1/4 | 78 | 20 | $31.5^{-0.1}_{-0.3}$ | 25 | 52 | 14 | 113 | 21 | 30 | 72 | 23 | 17 | 13 | M12 X 1.75 |
| **100** | to 750 | 20 to 750 | 40 | 37 | 116 | 41 | 140 | 1/4 | 1/4 | 92 | 25 | $35.5^{-0.1}_{-0.3}$ | 30 | 52 | 14 | 124 | 21 | 31 | 76 | 25 | 19 | 16 | M12 x 1.75 |

| Bore (mm) | K | KA | L | LZ | MM | N | P | PG | PH | PL | PW | RR | S | U | W | W/o rod boot | | | W/ rod boot | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | H | Z | ZZ | e | f | h | ℓ | Z | ZZ |
| **40** | 6 | 14 | 30 | 71 | M14 X 1.5 | 27 | 1/4 | 42 | 11 | 20 | 45 | 10 | 153 | 16 | 8 | 51 | 234 | 244 | 43 | 11.2 | 59 | 1/4 Stroke | 242 | 252 |
| **50** | 7 | 18 | 35 | 80 | M18 X 1.5 | 30 | 3/8 | 46 | 10 | 21 | 50 | 12 | 168 | 19 | 0 | 58 | 261 | 273 | 52 | 11.2 | 66 | 1/4 Stroke | 269 | 281 |
| **63** | 7 | 18 | 40 | 99 | M18 x 1.5 | 31 | 3/8 | 48.5 | 13 | 23 | 60 | 16 | 182 | 23 | 0 | 58 | 280 | 296 | 52 | 11.2 | 66 | 1/4 Stroke | 288 | 304 |
| **80** | 11 | 22 | 48 | 117 | M22 X 1.5 | 37 | 1/2 | 55 | 15 | 23 | 70 | 20 | 208 | 28 | 0 | 71 | 327 | 347 | 65 | 12.5 | 80 | 1/4 Stroke | 336 | 356 |
| **100** | 11 | 26 | 58 | 131 | M26 X 1.5 | 40 | 1/2 | 56.5 | 15 | 25 | 80 | 25 | 226 | 36 | 0 | 72 | 356 | 381 | 65 | 14.0 | 81 | 1/4 Stroke | 365 | 390 |

CAD
CLAC40·········SCLA40, #5 (#1+#5+#11)
CLAC50·········SCLA50, #5 (#1+#5+#11)
CLAC63·········SCLA63, #5 (#1+#5+#11)
CLAC80·········SCLA80, #5 (#1+#5+#11)
CLAC100········SCLA100, #5 (#1+#5+#11)

## Double Clevis/CLAD

CAD




(mm)

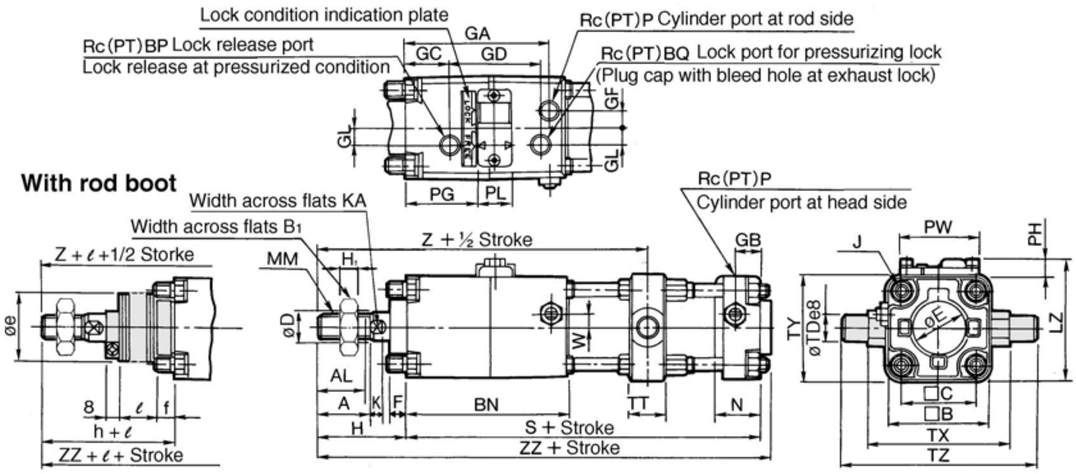
| Bore (mm) | Stroke range (mm) W/o rod boot | Stroke range (mm) W/ rod boot | A | AL | B | B1 | BN | BP | BQ | C | CD | CX | CZ | D | E | F | GA | GB | GC | GD | GL | GR | H1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40** | to 500 | 20 to 500 | 30 | 27 | 60 | 22 | 96 | 1/4 | 1/4 | 44 | 10 | $15^{+0.3}_{+0.1}$ | 29.5 | 16 | 32 | 10 | 85 | 15 | 26 | 54 | 10 | 10 | 8 |
| **50** | to 600 | 20 to 600 | 35 | 32 | 70 | 27 | 108 | 1/4 | 1/4 | 52 | 12 | $18^{+0.3}_{+0.1}$ | 38 | 20 | 40 | 10 | 95 | 17 | 27 | 59 | 13 | 12 | 11 |
| **63** | to 600 | 20 to 600 | 35 | 32 | 86 | 27 | 115 | 1/4 | 1/4 | 64 | 16 | $25^{+0.3}_{+0.1}$ | 49 | 20 | 40 | 10 | 102 | 17 | 26 | 67 | 18 | 15 | 11 |
| **80** | to 750 | 20 to 750 | 40 | 37 | 102 | 32 | 129 | 1/4 | 1/4 | 78 | 20 | $31.5^{+0.3}_{+0.1}$ | 61 | 25 | 52 | 14 | 113 | 21 | 30 | 72 | 23 | 17 | 13 |
| **100** | to 750 | 20 to 750 | 40 | 37 | 116 | 41 | 140 | 1/4 | 1/4 | 92 | 25 | $35.5^{+0.3}_{+0.1}$ | 64 | 30 | 52 | 14 | 124 | 21 | 31 | 76 | 25 | 19 | 16 |

| Bore (mm) | J | K | KA | L | LZ | MM | N | P | PG | PH | PL | PW | RR | S | U | W | W/o rod boot H | W/o rod boot Z | W/o rod boot ZZ | W/ rod boot e | W/ rod boot f | W/ rod boot h | W/ rod boot ℓ | W/ rod boot Z | W/ rod boot ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40** | M8 X 1.25 | 6 | 14 | 30 | 71 | M14 X 1.5 | 27 | 1/4 | 42 | 11 | 20 | 45 | 10 | 153 | 16 | 8 | 51 | 234 | 244 | 43 | 11.2 | 59 | 1/4 Stroke | 242 | 252 |
| **50** | M8 X 1.25 | 7 | 18 | 35 | 80 | M18 X 1.5 | 30 | 3/8 | 46 | 10 | 21 | 50 | 12 | 168 | 19 | 0 | 58 | 261 | 273 | 52 | 11.2 | 66 | 1/4 Stroke | 269 | 281 |
| **63** | M10 X 1.25 | 7 | 18 | 40 | 99 | M18 X 1.5 | 31 | 3/8 | 48.5 | 13 | 23 | 60 | 16 | 182 | 23 | 0 | 58 | 280 | 296 | 52 | 11.2 | 66 | 1/4 Stroke | 288 | 304 |
| **80** | M12 X 1.75 | 11 | 22 | 48 | 117 | M22 X 1.5 | 37 | 1/2 | 55 | 15 | 23 | 70 | 20 | 208 | 28 | 0 | 71 | 327 | 347 | 65 | 12.5 | 80 | 1/4 Stroke | 336 | 356 |
| **100** | M12 X 1.75 | 11 | 26 | 58 | 131 | M26 X 1.5 | 40 | 1/2 | 56.5 | 15 | 25 | 80 | 25 | 226 | 36 | 0 | 72 | 356 | 381 | 65 | 14.0 | 81 | 1/4 Stroke | 365 | 390 |

*Clevis pin, flat washer and cotter pin are packed.

CAD
CLAD40·········SCLA40, #6 (#1+#6+#11)
CLAD50·········SCLA50, #6 (#1+#6+#11)
CLAD63·········SCLA63, #6 (#1+#6+#11)
CLAD80········· SCLA80, #6 (#1+#6+#11)
CLAD100········SCLA100, #6 (#1+#6+#11)

## Trunnion/CLAT




(mm)

| Bore (mm) | Stroke range (mm) W/o rod boot | Stroke range (mm) W/ rod boot | A | AL | B | B1 | BN | BP | BQ | C | D | E | F | GA | GB | GC | GD | GL | GR | H1 | J | K | KA | LZ | MM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40** | 25 to 500 | 25 to 500 | 30 | 27 | 60 | 22 | 96 | 1/4 | 1/4 | 44 | 16 | 32 | 10 | 85 | 15 | 26 | 54 | 10 | 10 | 8 | M8 X 1.25 | 6 | 14 | 71 | M14 X 1.5 |
| **50** | 25 to 600 | 25 to 600 | 35 | 32 | 70 | 27 | 108 | 1/4 | 1/4 | 52 | 20 | 40 | 10 | 95 | 17 | 27 | 59 | 13 | 12 | 11 | M8 X 1.25 | 7 | 18 | 80 | M18 X 1.5 |
| **63** | 32 to 600 | 32 to 600 | 35 | 32 | 86 | 27 | 115 | 1/4 | 1/4 | 64 | 20 | 40 | 10 | 102 | 17 | 26 | 67 | 18 | 15 | 11 | M10 X 1.25 | 7 | 18 | 99 | M18 X 1.5 |
| **80** | 41 to 750 | 41 to 750 | 40 | 37 | 102 | 32 | 129 | 1/4 | 1/4 | 78 | 25 | 52 | 14 | 113 | 21 | 30 | 72 | 23 | 17 | 13 | M12 X 1.75 | 11 | 22 | 117 | M22 X 1.5 |
| **100** | 45 to 750 | 45 to 750 | 40 | 37 | 116 | 41 | 140 | 1/4 | 1/4 | 92 | 30 | 52 | 14 | 124 | 21 | 31 | 76 | 25 | 19 | 16 | M12 X 1.75 | 11 | 26 | 131 | M26 X 1.5 |

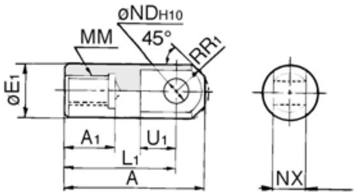
| Bore (mm) | N | P | PG | PH | PL | PW | S | W | TDe8 | TT | TX | TY | TZ | W/o rod boot H | W/o rod boot Z | W/o rod boot ZZ | W/ rod boot e | W/ rod boot f | W/ rod boot h | W/ rod boot ℓ | W/ rod boot Z | W/ rod boot ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40** | 27 | 1/4 | 42 | 11 | 20 | 45 | 153 | 8 | $15^{-0.032}_{-0.059}$ | 22 | 85 | 62 | 117 | 51 | 162 | 209 | 43 | 11.2 | 59 | 1/4 Stroke | 170 | 217 |
| **50** | 30 | 3/8 | 46 | 10 | 21 | 50 | 168 | 0 | $15^{-0.032}_{-0.059}$ | 22 | 95 | 74 | 127 | 58 | 181 | 232 | 52 | 11.2 | 66 | 1/4 Stroke | 189 | 240 |
| **63** | 31 | 3/8 | 48.5 | 13 | 23 | 60 | 182 | 0 | $18^{-0.032}_{-0.059}$ | 28 | 110 | 90 | 148 | 58 | 191 | 248 | 52 | 11.2 | 66 | 1/4 Stroke | 199 | 256 |
| **80** | 37 | 1/2 | 55 | 15 | 23 | 70 | 208 | 0 | $25^{-0.040}_{-0.073}$ | 34 | 140 | 110 | 192 | 71 | 221 | 286 | 65 | 12.5 | 80 | 1/4 Stroke | 230 | 295 |
| **100** | 40 | 1/2 | 56.5 | 15 | 25 | 80 | 226 | 0 | $25^{-0.040}_{-0.073}$ | 40 | 162 | 130 | 214 | 72 | 235 | 306 | 65 | 14.0 | 81 | 1/4 Stroke | 244 | 315 |

CAD
CLAT40········SCLA40, #7 (#1+#7+#11)
CLAT50········SCLA50, #7 (#1+#7+#11)
LAT63·········· SCLA63, #7 (#1+#7+#11)
CLAT80········· SCLA80, #7 (#1+#7+#11)
CLAT100········SCLA100, #7 (#1+#7+#11)

CL
MLGC
CNA
CB
CV/MVG
CXW
CXS
CXT
MX
MXU
MXS
MXQ
MXF
MXW
MXP
MG
MGP
MGQ
MGG
MGC
MGF
CY1
MY1

## Accessory Dimensions

### I type single knuckle joint

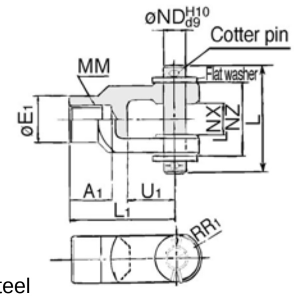



Material: Sulfur free-cutting steel

| Part No. | Tube I.D. (mm) | A | $A_1$ | ø$E_1$ | $L_1$ | MM | $R_1$ | $U_1$ | ø$ND^{H10}$ | NX |
|---|---|---|---|---|---|---|---|---|---|---|
| **I-04** | **40** | 69 | 22 | 24 | 55 | M14 X 1.5 | 15.5 | 20 | $12^{+0.070}_{0}$ | $16^{-0.1}_{-0.3}$ |
| **I-05** | **50/63** | 74 | 27 | 28 | 60 | M18 X 1.5 | 15.5 | 20 | $12^{+0.070}_{0}$ | $16^{-0.1}_{-0.3}$ |
| **I-08** | **80** | 91 | 37 | 36 | 71 | M22 X 1.5 | 22.5 | 26 | $18^{+0.070}_{0}$ | $28^{-0.1}_{-0.3}$ |
| **I-10** | **100** | 105 | 37 | 40 | 83 | M26 X 1.5 | 24.5 | 28 | $20^{+0.084}_{0}$ | $30^{-0.1}_{-0.3}$ |

### Y type double knuckle joint

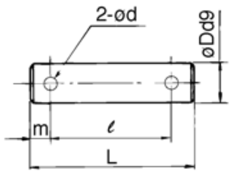
* Knuckle pin, cotter pin and flat washer are packed.




Material: Casting steel (mm)

| Part No. | Tube I.D. (mm) | $A_1$ | $E_1$ | $L_1$ | MM | $RR_1$ | $U_1$ | ND | NX | NZ | L | Cotter pin size | Flat washer |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Y-04C** | **40** | 22 | 24 | 55 | M14 X 1.5 | 13 | 25 | 12 | $16^{+0.3}_{+0.1}$ | 38 | 55.5 | ø3 X 18ℓ | "MIGAKIMARU" 12 |
| **Y-05C** | **50/63** | 27 | 28 | 60 | M18 X 1.5 | 15 | 27 | 12 | $16^{+0.3}_{+0.1}$ | 38 | 55.5 | ø3 X 18ℓ | "MIGAKIMARU" 12 |
| **Y-08C** | **80** | 37 | 36 | 71 | M22 X 1.5 | 19 | 28 | 18 | $28^{+0.3}_{+0.1}$ | 55 | 76.5 | ø4 X 25ℓ | "MIGAKIMARU" 18 |
| **Y-10C** | **100** | 37 | 40 | 83 | M26 X 1.5 | 21 | 38 | 20 | $30^{+0.3}_{+0.1}$ | 61 | 83 | ø4 X 30ℓ | "MIGAKIMARU" 20 |

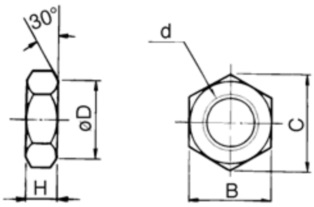
### Clevis pin/Knuckle pin




Material: Carbon steel (mm)

| Part No. | Tube I.D. | | Dd9 | L | ℓ | m | d Cut through | Used cotter pin | Used flat washer |
|---|---|---|---|---|---|---|---|---|---|
| | Clevis | Knuckle | | | | | | | |
| **CDP-2A** | **40** | – | $10^{-0.040}_{-0.076}$ | 46 | 38 | 4 | 3 | ø3 X 18ℓ | "MIGAKIMARU"10 |
| **CDP-3A** | **50** | **40/50/63** | $12^{-0.050}_{-0.093}$ | 55.5 | 47.5 | 4 | 3 | ø3 X 18ℓ | "MIGAKIMARU"12 |
| **CDP-4A** | **63** | – | $16^{-0.050}_{-0.093}$ | 71 | 61 | 5 | 4 | ø4 X 25ℓ | "MIGAKIMARU"16 |
| **CDP-5A** | – | **80** | $18^{-0.050}_{-0.093}$ | 76.5 | 66.5 | 5 | 4 | ø4 X 25ℓ | "MIGAKIMARU"18 |
| **CDP-6A** | **80** | **100** | $20^{-0.065}_{-0.117}$ | 83 | 73 | 5 | 4 | ø4 X 30ℓ | "MIGAKIMARU"20 |
| **CDP-7A** | **100** | – | $25^{-0.065}_{-0.117}$ | 88 | 78 | 5 | 4 | ø4 X 36ℓ | "MIGAKIMARU"24 |

### Rod end nut




Material: Rolled steel

| Part No. | Tube I.D. (mm) | d | H | B | C | D |
|---|---|---|---|---|---|---|
| **NT-04** | **40** | M14 X 1.5 | 8 | 22 | 25.4 | 21 |
| **NT-05** | **50/63** | M18 X 1.5 | 11 | 27 | 31.2 | 26 |
| **NT-08** | **80** | M22 X 1.5 | 13 | 32 | 37.0 | 31 |
| **NT-10** | **100** | M26 X 1.5 | 16 | 41 | 47.3 | 39 |

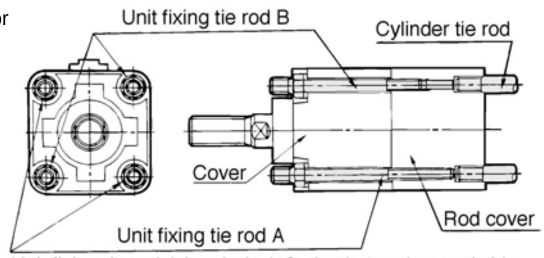
## ⚠ Caution

### Caution on Handling

① After mounting and adjusting, follow the procedures for changing the lock to the locked state shown on p.3.1-5. Rotate the pin, and put the cylinder into the locked state before using.

② **Precautions for using the basic body or replacing the support bracket:**
The lock unit and the cylinder rod cover are assembled as shown in the diagram below. Therefore, unlike the ordinary air cylinder that uses the basic type, it is not possible to mount it directly by screwing the cylinder tie rods into a machine. Furthermore, the tie rods for securing the unit could become loosened when the support bracket is replaced. If this occurs, make sure to retighten the tie rods.
Use a socket wrench when replacing the support bracket or to retighten the tie rods for securing the unit.

| Bore (mm) | Mounting bracket nut | | | Unit fixing tie rod | |
|---|---|---|---|---|---|
| | Used nut | Width across flats | Used socket | Width across flats | Used socket |
| **40** | JIS B1181 Class 3 M8 X 1.25 | 13 | JIS B4636 Socket13 | 10 | JIS B4636 Socket10 |
| **50** | | | | 13 | JIS B4636 Socket13 |
| **63** | JIS B1181 Class 3 M10 X 1.25 | 17 | JIS B4636 Socket17 | 13 | JIS B4636 Socket13 |
| **80/100** | JIS B1181 Class 3 M12 X 1.75 | 19 | JIS B4636 Socket19 | 17 | JIS B4636 Socket17 |




Unit fixing tie rod A has hole (ø2, depth 1mm) at end side.

# Fine Lock Cylinder/Double Acting Double Rod

# Series CLAW

CAD

## Non-lube Style/ø40, ø50, ø63, ø80, ø100



## How to Order

**Standard** CLAW L N 40 – 200 JJ – E

**With auto switch** CDLAW L N 40 – 200 JJ – E – A53 □

**Air cylinder with auto switch** (D)

**Double rod** (W)

**Mounting**

| | |
|---|---|
| B | Basic |
| L | Axial foot |
| F | Front flange |
| T | Center trunnion |

**Style**

| | |
|---|---|
| N | Non-lube |

**Bore size**

| | |
|---|---|
| 40 | 40mm |
| 50 | 50mm |
| 63 | 63mm |
| 80 | 80mm |
| 100 | 100mm |

**Cylinder stroke (mm)**
Refer to p.3.1-44 for details.

**Rod boot**

| | | |
|---|---|---|
| One side | J | Nylon tarpaulin |
| | K | Heat resistant tarpaulin |
| Both sides | JJ | Nylon tarpaulin |
| | KK | Heat resistant tarpaulin |

**Lock operation**

| | |
|---|---|
| E | Spring lock (Exhaust lock) |
| P | Pneumatic lock (Pressurized lock) |
| D | Spring and pneumatic lock |

**Auto switch**

| | |
|---|---|
| — | Without auto switch (Built-in magnet) |

Refer to table below for auto switch model no.

**Number of auto switches**

| | |
|---|---|
| — | 2 |
| S | 1 |
| n | n |

## Applicable Auto Switches/Refer to p.5.3-2 for further information on auto switch.

| Style | 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 (m)* 0.5 (—) | 3 (L) | 5 (Z) | None | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3 wire (NPN equiv.) | — | 5V | — | A56 | — | ● | ● | — | — | IC | — |
| Reed switch | — | Grommet | Yes | 2 wire | 24V | 12V | — | A53 | B53 | ● | ● | ● | — | — | PLC |
| Reed switch | — | Grommet | Yes | 2 wire | 24V | 12V | 100V, 200V | A54 | B54 | ● | ● | ● | — | — | Relay, PLC |
| Reed switch | — | Grommet | No | 2 wire | 24V | 5V, 12V | — | A67 | — | ● | ● | — | — | IC | PLC |
| Reed switch | — | Grommet | No | 2 wire | 24V | 5V, 12V | 200V | A64 | B64 | ● | ● | — | — | — | Relay, PLC |
| Reed switch | — | Terminal conduit | Yes | 2 wire | 24V | — | — | A33C | A33 | — | — | — | ● | — | PLC |
| Reed switch | — | Terminal conduit | Yes | 2 wire | 24V | — | 100V, 200V | A34C | A34 | — | — | — | ● | — | Relay, PLC |
| Reed switch | — | DIN Terminal | Yes | 2 wire | 24V | — | 100V, 200V | A44C | A44 | — | — | — | ● | — | Relay, PLC |
| Reed switch | Diagnostic indication (2 color) | Grommet | Yes | 2 wire | 24V | — | — | A59W | B59W | ● | ● | — | — | — | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3 Wire (NPN) | 24V | 5V, 12V | — | F59 | G59 | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3 Wire (PNP) | 24V | 5V, 12V | — | F5P | G5P | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 2 wire | — | — | 100V, 200V | J51 | — | ● | ● | ○ | — | — | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 2 wire | 24V | 12V | — | J59 | K59 | ● | ● | ○ | — | — | Relay, PLC |
| Solid state switch | — | Terminal conduit | Yes | 3 wire (NPN) | 24V | 5V, 12V | — | G39C | G39 | — | — | — | ● | IC | Relay, PLC |
| Solid state switch | — | Terminal conduit | Yes | 2 wire | 24V | 12V | — | K39C | K39 | — | — | — | ● | — | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color) | Grommet | Yes | 3 Wire (NPN) | 24V | 5V, 12V | — | F59W | G59W | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color) | Grommet | Yes | 3 Wire (PNP) | 24V | 5V, 12V | — | F5PW | G5PW | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color) | Grommet | Yes | 2 wire | 24V | 12V | — | J59W | K59W | ● | ● | ○ | — | — | Relay, PLC |
| Solid state switch | Water resistant (2 color) | Grommet | Yes | 2 wire | 24V | 12V | — | F5BA | G5BA | — | ● | ○ | — | — | Relay, PLC |
| Solid state switch | With timer | Grommet | Yes | 3 wire (NPN) | 24V | 5V, 12V | — | F5NT | G5NT | — | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | With diagnostic output (2 color) | Grommet | Yes | 4 wire (NPN) | 24V | 5V, 12V | — | F59F | G59F | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Latch with diagnostic output (2 color) | Grommet | Yes | 4 wire (NPN) | 24V | — | — | F5LF | — | ● | ● | ○ | — | — | Relay, PLC |

* Lead wire length symbol 0.5m·········— (Example) A53
3m············L (Example) A53L
5m············Z (Example) A53Z

* Solid state switches marked with a "○" are manufactured uon receipt of order.

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

## Specifications

| Bore size (mm) | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|
| Action | Double acting double rod | | | | |
| Lock action | Spring lock, Pneumatic lock, Spring and pneumatic lock | | | | |
| Style | Non-lube | | | | |
| Proof pressure | 1.5MPa | | | | |
| Max. operating pressure | 1.0MPa | | | | |
| Min. operating pressure | 0.1MPa | | | | |
| Piston speed | 50 to 500mm/sec* | | | | |
| Ambient and fluid temperature | Without auto switch: –10°C to +70°C (No freezing)<br>With auto switch: –10°C to +60°C | | | | |
| Cushion | Air cushion | | | | |
| Thread tolerance | JIS class 2 | | | | |
| Stroke length tolerance | to 250: $^{+1.0}_{0}$, 251 to 750: $^{+1.4}_{0}$ | | | | |
| Mounting | Basic, Foot, Flange, Center trunnion | | | | |

*Constraints associated with the allowable kinetic energy are imposed on the speeds at which the piston can be locked.

## Lock Specifications

| Lock style | Spring lock (Exhaust lock) | Spring/ pneumatic lock | Pneumatic lock (Pressurized lock) |
|---|---|---|---|
| Lock release pressure (MPa) | 0.3 or more | | 0.1 or more |
| Lock starting pressure (MPa) | 0.25 or less | | 0.05 or more |
| Max. operating pressure (MPa) | 0.5 | | |
| Lock direction | Both directions | | |

## Accessories/Refer to p.3.1-42 for details.

| Mounting | | Basic | Foot | Flange | Center trunnion |
|---|---|---|---|---|---|
| Standard | Rod end nut | ● | ● | ● | ● |
| Option | Single knuckle joint | ● | ● | ● | ● |
| | Double knuckle joint (with pin) | ● | ● | ● | ● |
| | Rod boot | ● | ● | ● | ● |

* Dimensions are same as CLA series (standard). Refer to p.3.1-42.

## Standard Stroke

(mm)

| 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 |

Note) Intermediate strokes are also available. Contact SMC.

## ⚠ Caution

Recommended Pneumatic Circuit/Caution on Handling

**Refer to p.3.1-2 to 3.1-5 for CLA series specifications.**

## Minimum Strokes for Auto Switch Mounting

Refer to p.1.9-4 for minimum strokes for auto switch mounting because it is same as air cylinder CA1 series (Standard/Double acting: Single rod style).

### Fine Lock Cylinder with Auto Switch

Refer to p.1.9-14 for auto switch setting position and mounting height because it is same as air cylinder CDA1 series (Double acting single rod style).

## Rod Boot Material

| Symbol | Material | Max. ambient temp. |
|---|---|---|
| **J** | Nylon tarpaulin | 60°C |
| **K** | Heat resistant tarpaulin | 110°C* |

* Maximum ambient temp. for the rod boot itself.

## Auto Switch Mounting Bracket

Refer to p.3.1-46 for auto switch mounting bracket (Band) when auto switch is mounted.

## Mounting Bracket

Refer to p.3.1-46 for part no. of mounting bracket except basic style.

## Weight/ ( ): Value at steel tubing

(kg)

| Bore size (mm) | | | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|---|---|
| Basic weight | Basic | | 1.96 (2.01) | 3.02 (3.07) | 4.67 (4.71) | 7.66 (7.82) | 10.99 (11.21) |
| | Foot | | 2.15 (2.20) | 3.24 (3.29) | 5.01 (5.05) | 8.33 (8.49) | 11.98 (12.20) |
| | Flange | | 2.33 (2.38) | 3.49 (3.52) | 5.46 (5.50) | 9.11 (9.28) | 12.91 (13.13) |
| | Trunnion | | 2.41 (2.51) | 3.55 (3.66) | 5.56 (5.76) | 9.36 (9.65) | 13.39 (13.78) |
| Additional weight per 50mm stroke | Al tubing | All brackets | 0.30 | 0.40 | 0.50 | 0.71 | 0.92 |
| | Steel tubing | Mounting bracket except trunnion | 0.35 | 0.47 | 0.55 | 0.89 | 1.15 |
| | | Trunnion | 0.44 | 0.58 | 0.77 | 1.06 | 1.35 |
| Accessory | Single knuckle joint | | 0.23 | 0.26 | 0.26 | 0.60 | 0.83 |
| | Double knuckle joint (with pin) | | 0.37 | 0.43 | 0.43 | 0.87 | 1.27 |

Calculation Example: Weight**CLAWL40-100-E**
- Basic weight·····················2.15(Foot, 100stroke)
- Additional weight··············0.30/50 stroke
- Cylinder stroke·················100 stroke

2.15+0.30 X 100/50=2.75kg

## ⚠Caution/Allowable Kinetic Energy when Locking

| Bore size (mm) | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|
| Allowable kinetic energy J | 1.42 | 2.21 | 3.53 | 5.69 | 8.83 |

① In terms of specific load conditions, the allowable kinetic energy indicated in the table above is equivalent to a 50% load ratio at 0.5MPa, and a piston speed of 300mm/sec. Therefore, if the operating conditions are below these values, calculations are unnecessary.

② Apply the following formula to obtain the kinetic energy of the load.

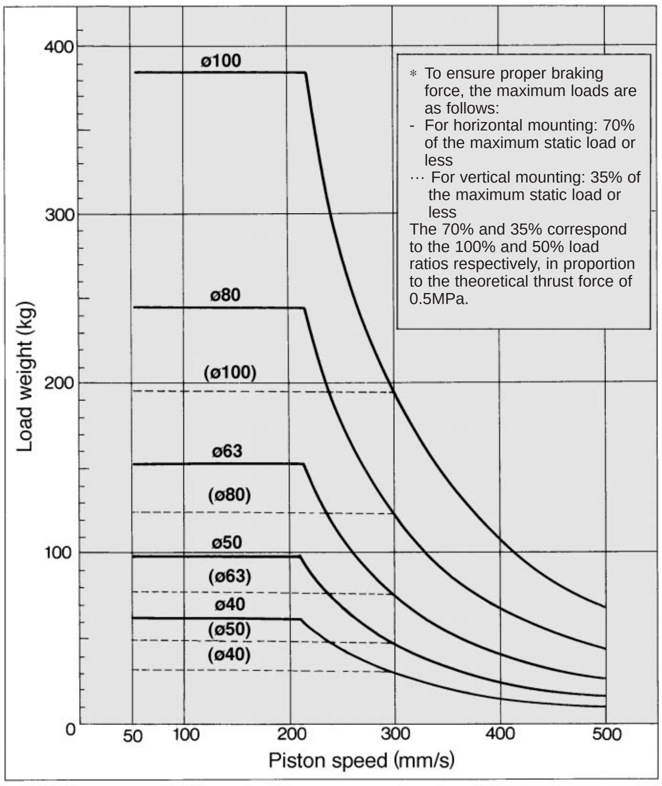
$$Ek=\frac{1}{2}m\upsilon^2$$

Ek: Load kinetic energy (J)
m: Load weight (kg)
$\upsilon$: Piston speed (m/s)

③ The piston speed will exceed the average speed immediately before locking. To determine the piston speed, use 1.2 times the average speed as a guide.

④ The relationship between the speed and the load is indicated in the diagram below. Use the cylinder in the range below the line.

⑤ During locking, the lock mechanism must sustain the thrust of the cylinder, in addition to absorbing the energy of the load. Therefore, there is an upper limit to the size of the load that can be sustained. Thus, a horizontally mounted cylinder must be operated below the solid line, and a vertically mounted cylinder must be operated below the dotted line.




## Stopping Accuracy (Not including tolerance of control system.)

Unit: mm

| Lock style | Piston speed mm/sec | | | |
|---|---|---|---|---|
| | 50 | 100 | 300 | 500 |
| Spring lock | ±0.4 | ±0.5 | ±1.0 | ±2.0 |
| Pneumatic lock, Spring and pneumatic lock | ±0.2 | ±0.3 | ±0.5 | ±1.5 |

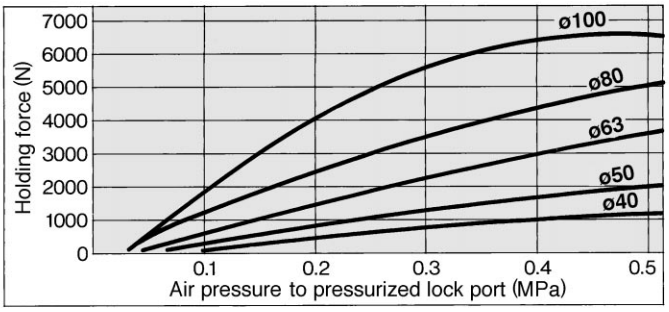
Condition/load: 25% of output force at 0.5MPa
Solenoid valve: mounted to the lock port

## Holding Force of Spring Lock (Max. Static Load)

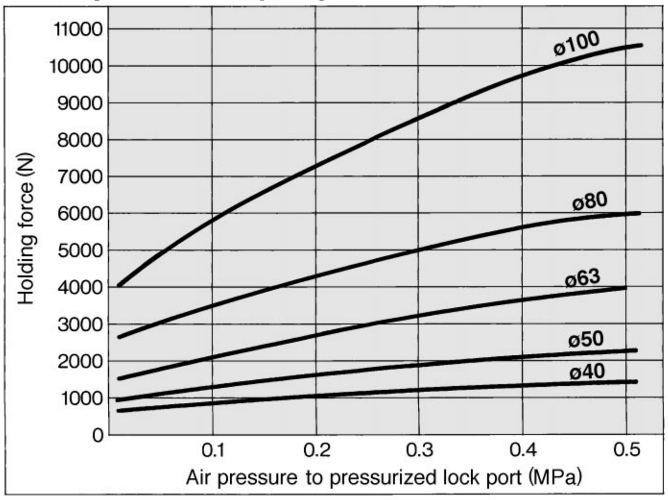
| Bore size (mm) | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|
| Holding force N | 882 | 1370 | 2160 | 3430 | 5390 |

Note) Holding force at piston rod retracted side decreases approx. 15%.

## Holding Force of Pneumatic Lock




## Holding Force of Spring and Pneumatic Lock




## ⚠Caution

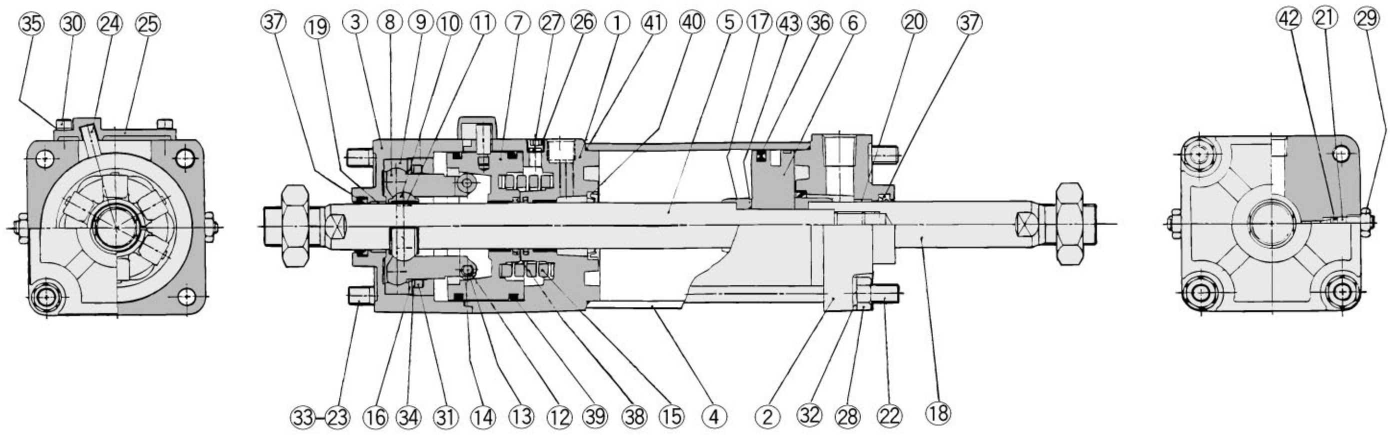
### Cautions when Locking

The holding force is the lock's ability to hold a static load that does not involve vibrations or impacts, when it is locked without a load. Therefore, when normally using the cylinder near the upper limit of the holding force, be aware of the points described below.

- If the piston rod slips because the lock's holding force has been exceeded, the brake shoe could be damaged, resulting in a reduced holding force or shortened life.
- To use the lock for drop prevention purposes, the load to be attached to the cylinder must be within 35% of the cylinder's holding force.
- Do not use the cylinder in the locked state to sustain a load that involves impact.

CL
MLGC
CNA
CB
CV/MVG
CXW
CXS
CXT
MX
MXU
MXS
MXQ
MXF
MXW
MXP
MG
MGP
MGQ
MGG
MGC
MGF
CY1
MY1

## Construction




## Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Rod cover A | Aluminum alloy | Black coated after hard anodized |
| ② | Rod cover B | Aluminum alloy | Black coated |
| ③ | Cover | Aluminum alloy | Black coated after hard anodized |
| ④ | Cylinder tube | Aluminum alloy | Hard anodized |
| ⑤ | Piston rod A | Carbon steel | Hard chrome plated |
| ⑥ | Piston | Aluminum alloy | Chromated |
| ⑦ | Brake piston | Carbon steel | Nitrided |
| ⑧ | Brake arm | Carbon steel | Nitrided |
| ⑨ | Arm holder | Carbon steel | Nitrided |
| ⑩ | Brake shoe holder | Carbon steel | Nitrided |
| ⑪ | Brake shoe | Special friction material | |
| ⑫ | Roller | Chrome molybdenum steel | Nitrided |
| ⑬ | Pin | Chrome bearing steel | Heat treated |
| ⑭ | Snap ring | Carbon tool steel | Nickel plated |
| ⑮ | Brake spring | Steel wire | Dacrodized |
| ⑯ | Retainer | Rolled steel | Zinc chromated |
| ⑰ | Cushion ring B | Rolled steel | Zinc chromated |
| ⑱ | Piston rod B | Carbon steel | Hard chrome plated |

| No. | Description | Material | Note |
|---|---|---|---|
| ⑲ | Bushing | Lead bronze casting | |
| ⑳ | Bushing | Lead bronze casting | |
| ㉑ | Cushion valve | Rolled steel | Electroless nickel plated |
| ㉒ | Tie rod | Carbon steel | Chromated |
| ㉓ | Unit fixing tie rod | Carbon steel | Chromated |
| ㉔ | Non rotating pin | Carbon steel | Induction hardening |
| ㉕ | Pin guide | Carbon steel | Black coated after nitrided |
| ㉖ | Hex. socket head plug | Chrome molybdenum steel | Black zinc chromated |
| ㉗ | Element | Bronze | |
| ㉘ | Tie rod nut | Carbon steel | Black zinc chromated |
| ㉙ | Lock nut | Carbon steel | Nickel plated |
| ㉚ | Hex. socket head cap screw | Chrome molybdenum steel | Black zinc chromated |
| ㉛ | Hex. socket head cap screw | Chrome molybdenum steel | Nickel plated |
| ㉜ | Spring seat | Steel wire | Black zinc chromated |
| ㉝ | Spring seat | Steel wire | Black zinc chromated |
| ㉞ | Spring seat | Steel wire | Black zinc chromated |
| ㉟ | Spring seat | Steel wire | Black zinc chromated |

## Component Parts

| No. | Description | Material |
|---|---|---|
| ㊱ | Piston seal | NBR |
| ㊲ | Rod seal A | NBR |
| ㊳ | Rod seal B | NBR |
| ㊴ | Brake piston seal | NBR |
| ㊵ | Cushion seal | NBR |
| ㊶ | Tube gasket | NBR |
| ㊷ | Cushion valve seal | NBR |
| ㊸ | Piston gasket | NBR |

Note) Contact SMC if the fine lock unit must be disassembled.

## Mounting Bracket Part No.

| Bore (mm) | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|
| Foot* | CA1-L04 | CA1-L05 | CA1-L06 | CA1-L08 | CA1-L10 |
| Flange | CA1-F04 | CA1-F05 | CA1-F06 | CA1-F08 | CA1-F10 |

* When ordering foot brackets, 2pcs. should be ordered for each cylinder.

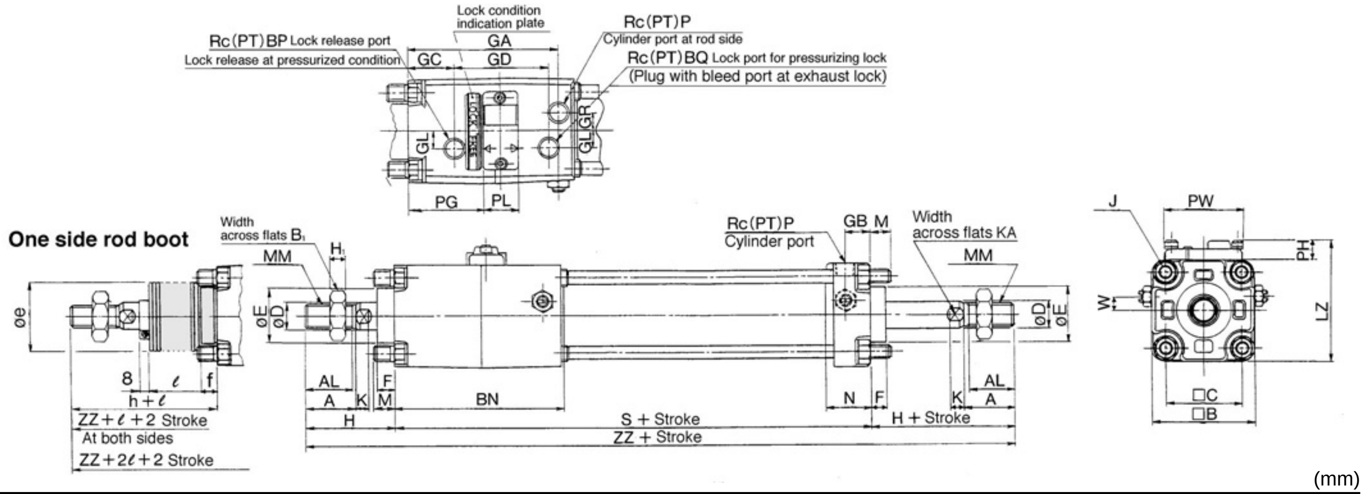
## Auto Switch Mounting Bracket Part No. (Band Mounting)

| Auto switch model | Bore size | | | | |
|---|---|---|---|---|---|
| | 40 | 50 | 63 | 80 | 100 |
| **D-A5/A6/A59W<br>D-F5□/J5□/F5□W/J59W<br>D-F5NTL, F5BAL, F59F** | BT-04 | BT-04 | BT-06 | BT-08 | BT-08 |
| **D-A3/A44/G39/K39** | BD1-04M | BD1-05M | BD1-06M | BD1-08M | BD1-10M |
| **D-B5/B6/B59W<br>D-G5□/K59/G5□W/K59W<br>D-G5BAL/G59F/G5NTL** | BA-04 | BA-05 | BA-06 | BA-08 | BA-10 |
| **D-A3□C/A44C/G39C/K39C*** | BA3-040 | BA3-050 | BA3-063 | BA3-080 | BA3-100 |

* Mounting brackets are provided with D-A3□C, A44C, G39C, and K39C. When ordering, indicate as described below, in accordance with the cylinder size. To order the mounting brackets separately, use the part number shown above.
(Example) ø40/D-A3□C-4, 50/D-A3□C-5
ø63/D-A3□C-6, ø80/D-A3□C-8, ø100/D-A3□C-10

[Stainless steel mounting bolt set]
The set of stainless steel mounting screws (with set screw) described below is available and can be used depending on the operating environment. (The mounting bracket and band for auto switches must be ordered separately, as they are not included.)
BBA1: For D-A5/A6/F5/J5
BBA3: For D-B5/B6/G5/K5
The stainless steel bolts described above are used when the D-F5BAL/G5BAL type switch is shipped mounted on a cylinder. When the switches are shipped as individual parts, the BBA1 and BBA3 set are included.

## Basic/CLAWB

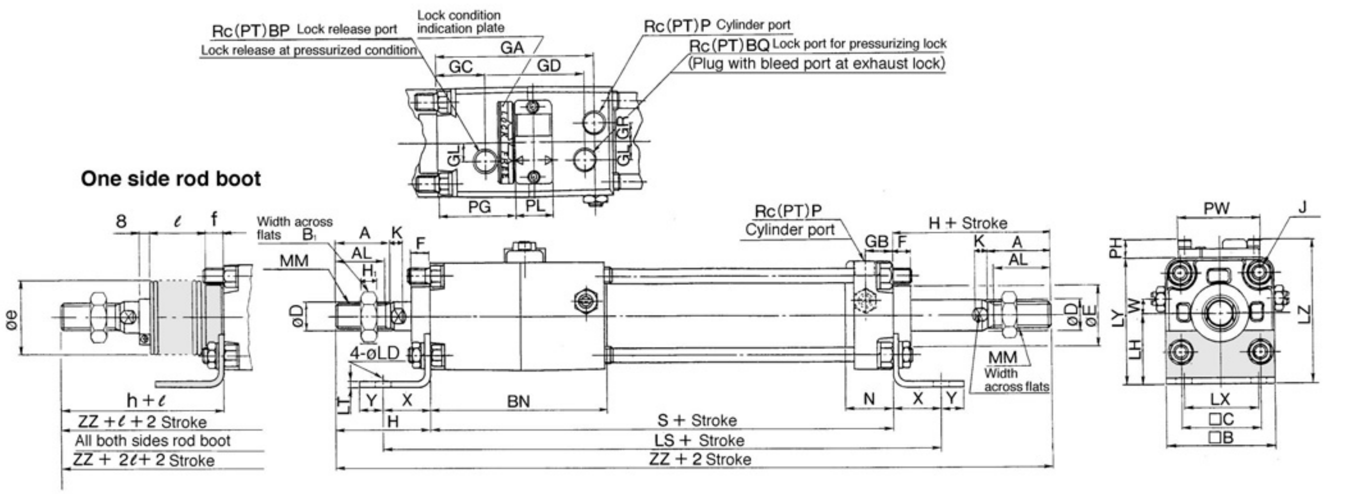



(mm)

| Bore (mm) | Stroke range (mm) | | A | AL | B | B1 | BN | BP | BQ | C | D | E | F | GA | GB | GC | GD | GL | GR | H1 | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W/o rod boot | W/ rod boot | | | | | | | | | | | | | | | | | | | |
| **40** | to 500 | 20 to 500 | 30 | 27 | 60 | 22 | 96 | 1/4 | 1/4 | 44 | 16 | 32 | 10 | 85 | 15 | 26 | 54 | 10 | 10 | 8 | M8 X 1.25 |
| **50** | to 600 | 20 to 600 | 35 | 32 | 70 | 27 | 108 | 1/4 | 1/4 | 52 | 20 | 40 | 10 | 95 | 17 | 27 | 59 | 13 | 12 | 11 | M8 X 1.25 |
| **63** | to 600 | 20 to 600 | 35 | 32 | 86 | 27 | 115 | 1/4 | 1/4 | 64 | 20 | 40 | 10 | 102 | 17 | 26 | 67 | 18 | 15 | 11 | M10 X 1.25 |
| **80** | to 750 | 20 to 750 | 40 | 37 | 102 | 32 | 129 | 1/4 | 1/4 | 78 | 25 | 52 | 14 | 113 | 21 | 30 | 72 | 23 | 17 | 13 | M12 X 1.75 |
| **100** | to 750 | 20 to750 | 40 | 37 | 116 | 41 | 140 | 1/4 | 1/4 | 92 | 30 | 52 | 14 | 124 | 21 | 31 | 76 | 25 | 19 | 16 | M12 X 1.75 |

| Bore (mm) | K | KA | LZ | M | MM | N | P | PG | PH | PL | PW | S | W | W/o rod boot | | W/ rod boot (One side) | | | | | | (Both sides) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | H | ZZ | e | f | h | ℓ | ZZ | ZZ |
| **40** | 6 | 14 | 71 | 11 | M14 X 1.5 | 27 | 1/4 | 42 | 11 | 20 | 45 | 153 | 8 | 51 | 255 | 43 | 11.2 | 59 | 1/4 Stroke | 263 | 271 |
| **50** | 7 | 18 | 80 | 11 | M18 X1.5 | 30 | 3/8 | 46 | 10 | 21 | 50 | 168 | 0 | 58 | 284 | 52 | 11.2 | 66 | 1/4 Stroke | 292 | 300 |
| **63** | 7 | 18 | 99 | 14 | M18 X 1.5 | 31 | 3/8 | 48.5 | 13 | 23 | 60 | 182 | 0 | 58 | 298 | 52 | 11.2 | 66 | 1/4 Stroke | 306 | 314 |
| **80** | 11 | 22 | 117 | 17 | M22 X 1.5 | 37 | 1/2 | 55 | 15 | 23 | 70 | 208 | 0 | 71 | 350 | 65 | 12.5 | 80 | 1/4 Stroke | 359 | 368 |
| **100** | 11 | 26 | 131 | 17 | M26 X1.5 | 40 | 1/2 | 56.5 | 15 | 25 | 80 | 226 | 0 | 72 | 370 | 65 | 14 | 81 | 1/4 Stroke | 379 | 388 |

## Foot/CLAWL

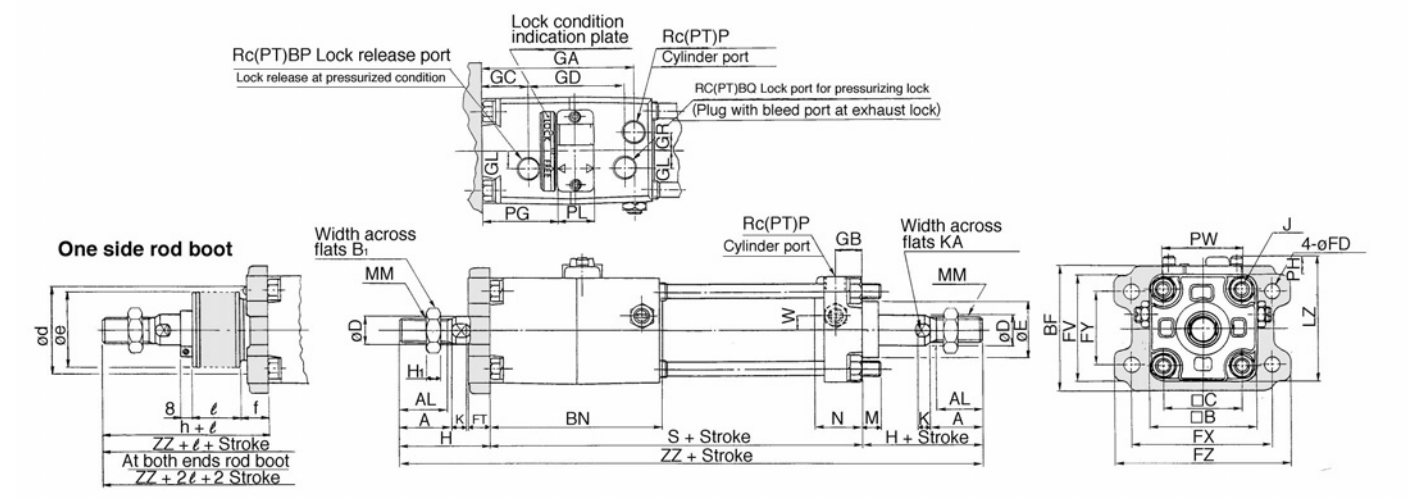



(mm)

| Bore (mm) | Stroke range (mm) | | A | AL | B | B1 | BN | BP | BQ | C | D | E | F | GA | GB | GC | GD | GL | GR | H1 | J | K | KA | LD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W/o rod boot | W/ rod boot | | | | | | | | | | | | | | | | | | | | | | |
| **40** | to 500 | 20 X 500 | 30 | 27 | 60 | 22 | 96 | 1/4 | 1/4 | 44 | 16 | 32 | 10 | 85 | 15 | 26 | 54 | 10 | 10 | 8 | M8 X 1.25 | 6 | 14 | 9 |
| **50** | to 600 | 20 X 600 | 35 | 32 | 70 | 27 | 108 | 1/4 | 1/4 | 52 | 20 | 40 | 10 | 95 | 17 | 27 | 59 | 13 | 12 | 11 | M8 X 1.25 | 7 | 18 | 9 |
| **63** | to 600 | 20 X 600 | 35 | 32 | 86 | 27 | 115 | 1/4 | 1/4 | 64 | 20 | 40 | 10 | 102 | 17 | 26 | 67 | 18 | 15 | 11 | M10 X 1.25 | 7 | 18 | 11.5 |
| **80** | to 750 | 20 X 750 | 40 | 37 | 102 | 32 | 129 | 1/4 | 1/4 | 78 | 25 | 52 | 14 | 113 | 21 | 30 | 72 | 23 | 17 | 13 | M12 X 1.75 | 11 | 22 | 13.5 |
| **100** | to 750 | 20 X 750 | 40 | 37 | 116 | 41 | 140 | 1/4 | 1/4 | 92 | 30 | 52 | 14 | 124 | 21 | 31 | 76 | 25 | 19 | 16 | M12 X 1.75 | 11 | 26 | 13.5 |

| Bore (mm) | LH | LS | LT | LX | LY | LZ | MM | N | P | PG | PH | PL | PW | S | W | X | Y | W/o rod boot | | W/ rod boot (One side) | | | | | | (Both sides) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | H | ZZ | e | f | h | ℓ | ZZ | ZZ |
| **40** | 40 | 207 | 3.2 | 42 | 70 | 81 | M14 X 1.5 | 27 | 1/4 | 42 | 11 | 20 | 45 | 153 | 8 | 27 | 13 | 51 | 255 | 43 | 11.2 | 59 | 1/4 Stroke | 263 | 271 |
| **50** | 45 | 222 | 3.2 | 50 | 80 | 90 | M18 X 1.5 | 30 | 3/8 | 46 | 10 | 21 | 50 | 168 | 0 | 27 | 13 | 58 | 284 | 52 | 11.2 | 66 | 1/4 Stroke | 292 | 300 |
| **63** | 50 | 250 | 3.2 | 59 | 93 | 106 | M18 X 1.5 | 31 | 3/8 | 48.5 | 13 | 23 | 60 | 182 | 0 | 34 | 16 | 58 | 298 | 52 | 11.2 | 66 | 1/4 Stroke | 306 | 314 |
| **80** | 65 | 296 | 4.5 | 76 | 116 | 131 | M22 X 1.5 | 37 | 1/2 | 55 | 15 | 23 | 70 | 208 | 0 | 44 | 16 | 71 | 350 | 65 | 12.5 | 80 | 1/4 Stroke | 359 | 368 |
| **100** | 75 | 312 | 6 | 92 | 133 | 148 | M26 X 1.5 | 40 | 1/2 | 56.5 | 15 | 25 | 80 | 226 | 0 | 43 | 17 | 72 | 370 | 65 | 14.0 | 81 | 1/4 Stroke | 379 | 388 |

## Flange/CLAWF

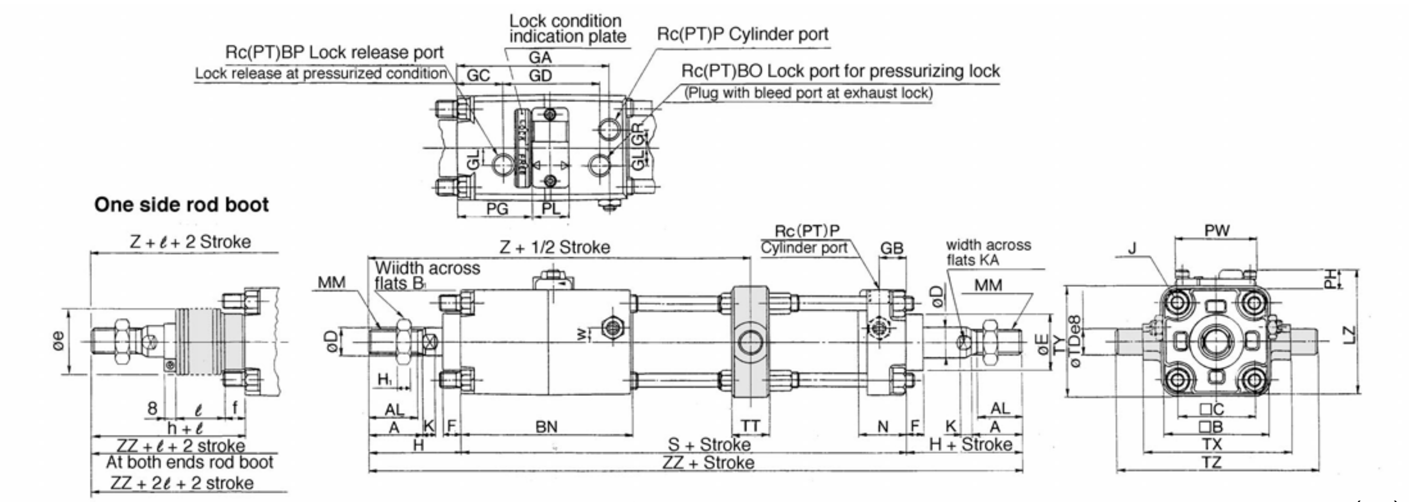



(mm)

| Bore (mm) | Stroke range (mm) | | A | AL | B | B1 | BF | BN | BP | BQ | C | D | E | FV | FD | FT | FX | FY | FZ | GA | GB | GC | GD | GL | GR | H1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W/o rod boot | W/ rod boot | | | | | | | | | | | | | | | | | | | | | | | | |
| **40** | to 500 | 20 to 500 | 30 | 27 | 60 | 22 | 71 | 96 | 1/4 | 1/4 | 44 | 16 | 32 | 60 | 9 | 12 | 80 | 42 | 100 | 85 | 15 | 26 | 54 | 10 | 10 | 8 |
| **50** | to 600 | 20 to 600 | 35 | 32 | 70 | 27 | 81 | 108 | 1/4 | 1/4 | 52 | 20 | 40 | 70 | 9 | 12 | 90 | 50 | 110 | 95 | 17 | 27 | 59 | 13 | 12 | 11 |
| **63** | to 600 | 20 to 600 | 35 | 32 | 86 | 27 | 101 | 115 | 1/4 | 1/4 | 64 | 20 | 40 | 86 | 11.5 | 15 | 105 | 59 | 130 | 102 | 17 | 26 | 67 | 18 | 15 | 11 |
| **80** | to 750 | 20 to 750 | 40 | 37 | 102 | 32 | 119 | 129 | 1/4 | 1/4 | 78 | 25 | 52 | 102 | 13.5 | 18 | 130 | 76 | 160 | 113 | 21 | 30 | 72 | 23 | 17 | 13 |
| **100** | to 750 | 20 to 750 | 40 | 37 | 116 | 41 | 133 | 140 | 1/4 | 1/4 | 92 | 30 | 52 | 116 | 13.5 | 18 | 150 | 92 | 180 | 124 | 21 | 31 | 76 | 25 | 19 | 16 |

| Bore (mm) | J | K | KA | LZ | M | MM | N | P | PG | PH | PL | PW | S | W | W/o rod boot | | W/ rod boot (One side) | | | | | | (Both sides) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | H | ZZ | d | e | f | h | ℓ | ZZ | ZZ |
| **40** | M8 X 1.25 | 6 | 14 | 71 | 11 | M14 X 1.5 | 27 | 1/4 | 42 | 11 | 20 | 45 | 153 | 8 | 51 | 255 | 52 | 43 | 15 | 59 | 1/4 Stroke | 263 | 271 |
| **50** | M8 X 1.25 | 7 | 18 | 80 | 11 | M18 X 1.5 | 30 | 3/8 | 46 | 10 | 21 | 50 | 168 | 0 | 58 | 284 | 58 | 52 | 15 | 66 | 1/4 Stroke | 292 | 300 |
| **63** | M10 X 1.25 | 7 | 18 | 99 | 14 | M18 X 1.5 | 31 | 3/8 | 48.5 | 13 | 23 | 60 | 182 | 0 | 58 | 298 | 58 | 52 | 17.5 | 66 | 1/4 Stroke | 306 | 314 |
| **80** | M12 X 1.75 | 11 | 22 | 117 | 17 | M22 X 1.5 | 37 | 1/2 | 55 | 15 | 23 | 70 | 208 | 0 | 71 | 350 | 80 | 65 | 21.5 | 80 | 1/4 Stroke | 359 | 368 |
| **100** | M12 X 1.75 | 11 | 26 | 131 | 17 | M26 X 1.5 | 40 | 1/2 | 56.5 | 15 | 25 | 80 | 226 | 0 | 72 | 370 | 80 | 65 | 21.5 | 81 | 1/4 Stroke | 379 | 388 |

## Trunnion/CLAWT




(mm)

| Bore (mm) | Stroke range | | A | AL | B | B1 | BN | BP | BQ | C | D | E | F | GA | GB | GC | GD | GL | GR | H1 | J | K | KA | LZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W/o rod boot | W/ rod boot | | | | | | | | | | | | | | | | | | | | | | |
| **40** | 25 X 500 | 25 X 500 | 30 | 27 | 60 | 22 | 96 | 1/4 | 1/4 | 44 | 16 | 32 | 10 | 85 | 15 | 26 | 54 | 10 | 10 | 8 | M8 X 1.25 | 6 | 14 | 71 |
| **50** | 25 X 600 | 25 X 600 | 35 | 32 | 70 | 27 | 108 | 1/4 | 1/4 | 52 | 20 | 40 | 10 | 95 | 17 | 27 | 59 | 13 | 12 | 11 | M8 X 1.25 | 7 | 18 | 80 |
| **63** | 32 X 600 | 32 X 600 | 35 | 32 | 86 | 27 | 115 | 1/4 | 1/4 | 64 | 20 | 40 | 10 | 102 | 17 | 26 | 67 | 18 | 15 | 11 | M10 X 1.25 | 7 | 18 | 99 |
| **80** | 41 X 750 | 41 X 750 | 40 | 37 | 102 | 32 | 129 | 1/4 | 1/4 | 78 | 25 | 52 | 14 | 113 | 21 | 30 | 72 | 23 | 17 | 13 | M12 X 1.75 | 11 | 22 | 117 |
| **100** | 45 X 750 | 45 X 750 | 40 | 37 | 116 | 41 | 140 | 1/4 | 1/4 | 92 | 30 | 52 | 14 | 124 | 21 | 31 | 76 | 25 | 19 | 16 | M12 X 1.75 | 11 | 26 | 131 |

| Bore (mm) | MM | N | P | PG | PH | PL | PW | S | TDe8 | TT | TX | TY | TZ | W | W/o out rod boot | | | W/ rod boot (One side) | | | | | | (Both sides) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | H | Z | ZZ | e | f | h | ℓ | Z | ZZ | Z | ZZ |
| **40** | M14 X 1.5 | 27 | 1/4 | 42 | 11 | 20 | 45 | 153 | $15^{-0.032}_{-0.059}$ | 22 | 85 | 62 | 117 | 8 | 51 | 162 | 255 | 43 | 11.2 | 59 | 1/4 Stroke | 170 | 263 | 178 | 271 |
| **50** | M18 X 1.5 | 30 | 3/8 | 46 | 10 | 21 | 50 | 168 | $15^{-0.032}_{-0.059}$ | 22 | 95 | 74 | 127 | 0 | 58 | 181 | 284 | 52 | 11.2 | 66 | 1/4 Stroke | 189 | 292 | 197 | 300 |
| **63** | M18 X 1.5 | 31 | 3/8 | 48.5 | 13 | 23 | 60 | 182 | $18^{-0.032}_{-0.059}$ | 28 | 110 | 90 | 148 | 0 | 58 | 191 | 298 | 52 | 11.2 | 66 | 1/4 Stroke | 199 | 306 | 207 | 314 |
| **80** | M22 X 1.5 | 37 | 1/2 | 55 | 15 | 23 | 70 | 208 | $25^{-0.040}_{-0.073}$ | 34 | 140 | 110 | 192 | 0 | 71 | 221 | 350 | 65 | 12.5 | 80 | 1/4 Stroke | 230 | 359 | 239 | 368 |
| **100** | M26 X 1.5 | 40 | 1/2 | 56.5 | 15 | 25 | 80 | 226 | $25^{-0.040}_{-0.073}$ | 40 | 162 | 130 | 214 | 0 | 72 | 235 | 370 | 65 | 14.0 | 81 | 1/4 Stroke | 244 | 379 | 253 | 388 |

# 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 style 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

**Standard** CL1 L [ ] 100 — 200 F — JN

**With auto switch** CDL1 L [ ] 100 — 200 F — JN — A33 [ ]

**Air cylinder with auto switch** (D)

**Lock-up Cylinder** (L1)

### Mounting

| | | | |
|---|---|---|---|
| **B** | Basic | **C** | Single clevis |
| **L** | Foot | **D** | Double clevis |
| **F** | Front flange | **T** | Center trunnion |
| **G** | Rear flange | | |

### Tube material

| Symbol | Bore size | Tube material |
|---|---|---|
| — Note) | ø40 to ø100 | Aluminum tube |
| | ø125 to ø160 | Aluminum tube |
| **F*** | ø40 to ø160 | Steel tube |

Note) Auto switch can not be mounted on steel tube.

### Bore size

| Symbol | Bore size | Symbol | Bore size |
|---|---|---|---|
| **40** | 40mm | **100** | 100mm |
| **50** | 50mm | **125** | 125mm |
| **63** | 63mm | **140** | 140mm |
| **80** | 80mm | **160** | 160mm |

### Cylinder stroke(mm)

Refer to p.3.1-50 for details.

### Lock-up directions

| | |
|---|---|
| **F** | Lock at piston forward |
| **B** | Lock at piston backward |

* Refer to Made to Order "-X51" for both sides lock.

### Cylinder

| | | |
|---|---|---|
| Rod boot | **J** | Nylon tarpaulin |
| | **K** | Heat resistant tarpaulin |
| Cushion | **N** | Without cushion |
| | **R** | Rod side cushion |
| | **H** | Head side cushion |
| | **—** | Both ends cushion |

* Indicate in alphabetical order when 2 or more symbols are applicable.

### Auto switch

| | |
|---|---|
| **—** | Without auto switch (Built-in magnet) |

Refer to table below for auto switch model.

### Number of auto switches

| | |
|---|---|
| **—** | 2 |
| **3** | 3 |
| **S** | 1 |
| **n** | n |

## Applicable Auto Switches/Refer to p.5.3-2 for further information on auto switch.

| Style | Special function | Electrical entry | Indicator | Wiring (Output) | Load voltage DC | | Load voltage AC | Auto switch model: Tie rod mounting | Bore | Auto switch model: Band mounting | Bore | Lead wire(m)* 0.5 (–) | 3 (L) | 5 (Z) | None | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reed switch | — | Grommet | Yes | 3 wire (NPN equiv.) | — | 5V | — | **A56** | ø40 to ø160 | — | ø40 to ø100 | ● | ● | — | — | IC | — |
| Reed switch | — | Grommet | Yes | 2 wire | 24V | 12V | — | **A53** | ø40 to ø160 | **B53** | ø40 to ø100 | ● | ● | ● | — | — | PLC |
| Reed switch | — | Grommet | Yes | 2 wire | 24V | 12V | 100V, 200V | **A54** | ø40 to ø160 | **B54** | ø40 to ø100 | ● | ● | ● | — | — | Relay, PLC |
| Reed switch | — | Grommet | No | 2 wire | 24V | 5V, 12V | — | **A67** | ø40 to ø160 | — | ø40 to ø100 | ● | ● | — | — | IC | PLC |
| Reed switch | — | Grommet | No | 2 wire | 24V | 12V | 200V or less | **A64** | ø40 to ø160 | **B64** | ø40 to ø100 | ● | ● | — | — | — | Relay, PLC |
| Reed switch | — | Terminal conduit | Yes | 2 wire | 24V | 12V | — | **A33C** | ø40 to ø100 | **A33** | ø40 to ø160 | — | — | — | ● | — | PLC |
| Reed switch | — | Terminal conduit | Yes | 2 wire | 24V | 12V | 100V, 200V | **A34C** | ø40 to ø100 | **A34** | ø40 to ø160 | — | — | — | ● | — | Relay, PLC |
| Reed switch | — | DIN terminal | Yes | 2 wire | 24V | 12V | 100V, 200V | **A44C** | ø40 to ø100 | **A44** | ø40 to ø160 | — | — | — | ● | — | Relay, PLC |
| Reed switch | Diagnostic indication (2 color) | Grommet | Yes | 2 wire | 24V | — | — | **A59W** | ø40 to ø160 | **B59W** | ø40 to ø100 | ● | ● | — | — | — | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3 wire (NPN) | 24V | 5V, 12V | — | **F59** | ø40 to ø160 | **G59** | ø40 to ø100 | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 3 wire (PNP) | 24V | 5V, 12V | — | **F5P** | ø40 to ø160 | **G5P** | ø40 to ø100 | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 2 wire | — | — | 100V, 200V | **J51** | ø40 to ø160 | — | ø40 to ø100 | ● | ● | ○ | — | — | Relay, PLC |
| Solid state switch | — | Grommet | Yes | 2 wire | 24V | 12V | — | **J59** | ø40 to ø160 | **K59** | ø40 to ø100 | ● | ● | ○ | — | — | Relay, PLC |
| Solid state switch | — | Terminal conduit | Yes | 3 wire(NPN) | 24V | 5V, 12V | — | **G39C** | ø40 to ø160 | **G39** | ø40 to ø160 | — | — | — | ● | IC | Relay, PLC |
| Solid state switch | — | Terminal conduit | Yes | 2 wire | 24V | 12V | — | **K39C** | ø40 to ø160 | **K39** | ø40 to ø160 | — | — | — | ● | — | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color) | Grommet | Yes | 3 wire(NPN) | 24V | 5V, 12V | — | **F59W** | ø40 to ø160 | **G59W** | ø40 to ø100 | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color) | Grommet | Yes | 3 wire(PNP) | 24V | 5V, 12V | — | **F5PW** | ø40 to ø160 | **G5PW** | ø40 to ø100 | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Diagnostic indication (2 color) | Grommet | Yes | 2 wire | 24V | 12V | — | **J59W** | ø40 to ø160 | **K59W** | ø40 to ø100 | ● | ● | ○ | — | — | Relay, PLC |
| Solid state switch | Water resistant (2 color) | Grommet | Yes | 2 wire | 24V | 12V | — | **F5BA** | ø40 to ø160 | **G5BA** | ø40 to ø100 | — | ● | ○ | — | — | Relay, PLC |
| Solid state switch | With timer | Grommet | Yes | 3 wire(NPN) | 24V | 5V, 12V | — | **F5NT** | ø40 to ø160 | **G5NT** | ø40 to ø100 | — | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | With diagnostic output (2 color) | Grommet | Yes | 4 wire (NPN) | 24V | 5V, 12V | — | **F59F** | ø40 to ø160 | **G59F** | ø40 to ø100 | ● | ● | ○ | — | IC | Relay, PLC |
| Solid state switch | Latch with diagnostic output (2 color) | Grommet | Yes | 4 wire (NPN) | 24V | — | — | **F5LF** | ø40 to ø160 | — | ø40 to ø100 | ● | ● | ○ | — | — | Relay, PLC |

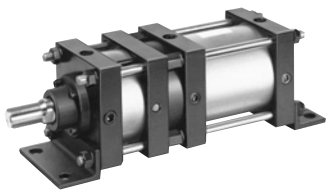
* Lead wire length symbol 0.5m······— (Example) A53
3m·········L (Example) A53L
5m·········Z (Example) A53Z

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



CL
MLGC
CNA
CB
CV/MVG
CXW
CXS
CXT
MX
MXU
MXS
MXQ
MXF
MXW
MXP
MG
MGP
MGQ
MGG
MGC
MGF
CY1
MY1

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



## Model

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

## Specifications

| Bore size (mm) | ø40 to ø100 | ø125 to ø160 |
|---|---|---|
| Fluid | Air | |
| Proof pressure | 1.5MPa | 1.57MPa |
| Max. operating pressure | 1.0MPa | 0.97MPa |
| Min. operating pressure | 0.08MPa | |
| Piston speed | 50 to 200mm/s* | |
| Ambient and fluid temperature | Without auto switch –10 to +70°C<br>With auto switch –10 to +60°C<br>(No condensation) | Without auto switch 0 to +70°C<br>With auto switch 0 to +60°C<br>(No condensation) |
| Lubrication | Non-lube | |
| Cushion | Air cushion | |
| Thread tolerance | JIS Class 2 | |
| Stroke length tolerance | to 250 $^{+1.0}_{0}$, 251 to 1000 $^{+1.0}_{0}$, 1001 to 1500 $^{+1.0}_{0}$, 1501 to 1600 $^{+1.0}_{0}$ | |
| Mounting | Basic, Axial foot, Front flange, Rear flange, Single clevis, Double clevis, Center trunnion | |

* Make sure to operate the cylinder in such a way that the piston speed does not exceed 200mm/s during locking.
* The maximum speed of 500mm/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.

## Lock-up Unit Specifications

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

## Stopping Accuracy

**(Not including tolerance of control system)**

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

## Lock-up Unit Style

| 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 |

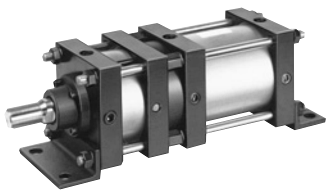
## Max. Stroke

Refer to p.1.9-3 for maximum stroke of CA1 series ø40 to ø100 and p.1.10-3 for maximum stroke of CS1 series ø120 to ø160.

## Minimum Strokes for Auto Switch Mounting

Refer to following pages for minimum strokes for auto switch mounting.
- Bore size ø40 to ø100: p.1.9-4
- Bore size ø125 to ø160: p.1.10-8

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



## Model

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

## Specifications

| Bore size (mm) | ø40 to ø100 | ø125 to ø160 |
|---|---|---|
| Fluid | Air | |
| Proof pressure | 1.5MPa | 1.57MPa |
| Max. operating pressure | 1.0MPa | 0.97MPa |
| Min. operating pressure | 0.08MPa | |
| Piston speed | 50 to 200mm/s* | |
| Ambient and fluid temperature | Without auto switch –10 to +70°C<br>With auto switch –10 to +60°C<br>(No condensation) | Without auto switch 0 to +70°C<br>With auto switch 0 to +60°C<br>(No condensation) |
| Lubrication | Non-lube | |
| Cushion | Air cushion | |
| Thread tolerance | JIS Class 2 | |
| Stroke length tolerance | to 250 $^{+1.0}_{0}$, 251 to 1000 $^{+1.0}_{0}$, 1001 to 1500 $^{+1.0}_{0}$, 1501 to 1600 $^{+1.0}_{0}$ | |
| Mounting | Basic, Axial foot, Front flange,<br>Rear flange, Single clevis,<br>Double clevis, Center trunnion | |

* Make sure to operate the cylinder in such a way that the piston speed does not exceed 200mm/s during locking.
* The maximum speed of 500mm/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.

## Lock-up Unit Specifications

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

## Stopping Accuracy

**(Not including tolerance of control system)**

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

## Lock-up Unit Style

| 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 |

## Max. Stroke

Refer to p.1.9-3 for maximum stroke of CA1 series ø40 to ø100 and p.1.10-3 for maximum stroke of CS1 series ø120 to ø160.

## Minimum Strokes for Auto Switch Mounting

Refer to following pages for minimum strokes for auto switch mounting.
- Bore size ø40 to ø100: p.1.9-4
- Bore size ø125 to ø160: p.1.10-8

## Accessories

| Mounting bracket | | Basic | Foot | Front flange | Rear flange | Single clevis | Double clevis | Center trunnion |
|---|---|---|---|---|---|---|---|---|
| Standard | Rod end nut* | ● | ● | ● | ● | ● | ● | ● |
| | Clevis pin | — | — | — | — | — | ● | — |
| Option | Single knuckle joint | ● | ● | ● | ● | ● | ● | ● |
| | Double knuckle joint (with pin) | ● | ● | ● | ● | ● | ● | ● |
| | Rod boot | ● | ● | ● | ● | ● | ● | ● |

* ø125 to ø160: Option

## Rod Boot Material

| Symbol | Material | Max. ambient temp. |
|---|---|---|
| **J** | Nylon tarpaulin | 60°C |
| **K** | Heat resistant tarpaulin | 110°C* |

* Maximum ambient temperature for the itself

## Lock-up Cylinder with Auto Switch

Refer to following pages for auto switch setting position and mounting height.


- Bore size/ø40 to ø100: p.1.9-14
- Bore size/ø125 to ø160: p.1.10-20


## Weight

(kg)

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

Calculation Example: **CL1L125-500F**

- Basic weight···32.21(ø125, Foot style)
- Additional weight····1.77/100 stroke
  32.21+1.77/100 X 100/50=41.06kg

*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 p.1.9-4 and 1.10-4.

## Auto Switch Mounting Bracket Part No.

| Auto switch model | Bore size (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **40** | **50** | **63** | **80** | **100** | **125** | **140** | **160** |
| **D-A5/A6/A59W<br>D-F5□/J5□/F5NT<br>D-F5□W/J59W<br>D-F5BAL/F59F** | BT-04 | BT-04 | BT-06 | BT-08 | BT-08 | BT-12 | BT-12 | BT-16 |
| **D-A3/A44<br>D-G39/K39** | BD1-04M | BD1-05M | BD1-06M | BD1-08M | BD1-10M | BS1-125 | BS1-140 | BS1-160 |
| **D-B5/B6/B59W<br>D-G5□/K59/G5BA<br>D-G5□W/K59W<br>D-G59F/G5NT** | BA-04 | BA-05 | BA-06 | BA-08 | BA-10 | – | – | – |
| **D-A3□C/A44C<br>D-G39C/K39C** | BA3-040 | BA3-050 | BA3-063 | BA3-080 | BA3-100 | – | – | – |

* Mounting brackets are provided with D-A3□C, A44C, G39C, and K39C. When ordering, indicate as described below, in accordance with 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.

[Stainless steel mounting bolt set]
The set of stainless steel mounting screws (with set screw) described below is available and can be used depending on the operating environment. (The mounting bracket and band for auto switches must be ordered separately, as they are not included.)
BBA1: For D-A5/A6/F5/J5
BBA3: For D-B5/B6/G5/K5
The stainless steel bolts described above are used when the D-F5BAL/G5BAL type switch is shipped mounted on a cylinder. When the switches are shipped as individual parts, the BBA1 and BBA3 set are included.

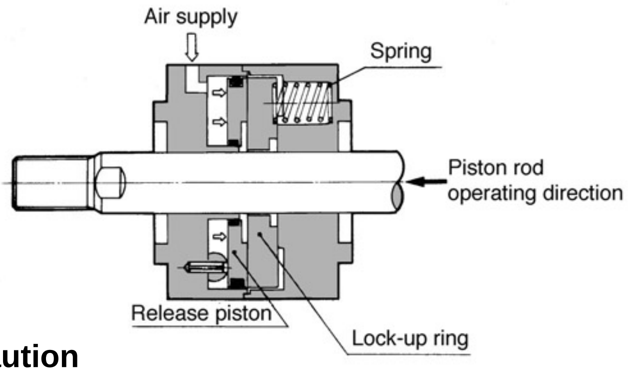
## Mounting Bracket Part No.

| Bore size (mm) | | **40** | **50** | **63** | **80** | **100** | **125** | **140** | **160** |
|---|---|---|---|---|---|---|---|---|---|
| Foot* | 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 | | | |
| Front flange** | | CA-F04 | CA-F05 | CA-F06 | CA-F08 | CA-F10 | CS1-F12 | CS1-F14 | CS1-F16 |
| Rear flange | | 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 |

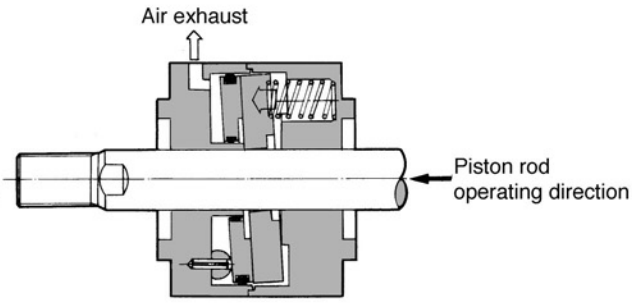
* To order foot brackets for 1 cylinder, order 1 foot bracket each for the rod side and the head side for cylinders ø40 to ø100, and 2 foot brackets for cylinders ø125 to ø160.
** The ø125 to ø160 front flange styles use the long stroke flanges of the CS1 series.
*** Clevis pin, flat washer and cotter pin are packed with the double clevis style.

## Construction

**Lock released condition**




**Locked condition**

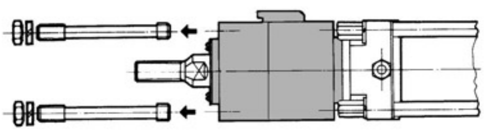



## ⚠ Caution
## Precautions for Changing The Lock-up Direction

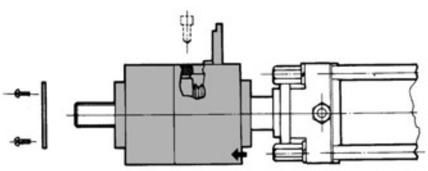
### ø40 to ø100

The lock-up is unidirectional. However, the lock-up direction can be changed easily. To change the direction, pay particular attention to the following precautions:
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 0.08MPa 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 0.2MPa to 0.3MPa 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.

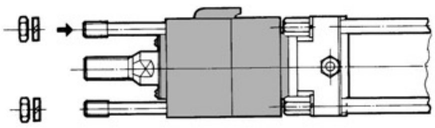


### ⚠ Caution

When the lock-up unit is not secured by the tie-rods, the air pressure applied to the lock-up port should be between 0.2MPa and 0.3MPa. 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.

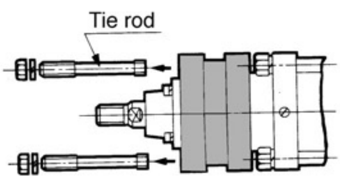
④ Install the four tie-rods, with their shorter threaded portion oriented towards the rod cover, and tighten them with uniform torque. Until the installation and adjustment have been completed, never pull out the unlocking bolt (or release the air pressure).



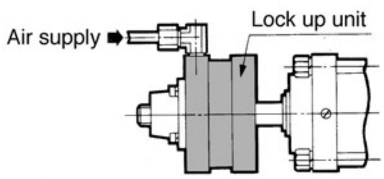
The processes described above complete the changing of the lock-up direction. Before using the cylinder, make sure that the lock-up operates properly.

### ø125 to ø160

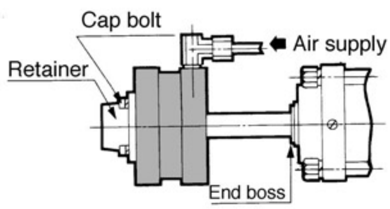
① Loosen the tie-rod nuts and pull out the four tie-rods.



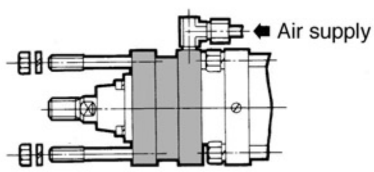

② Apply air pressure of 0.2MPa to 0.3MPa to disengage the lock and pull out the lock-up unit from the piston rod.




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 lock-up unit into the piston rod and fit it into the end boss portion of the rod cover.

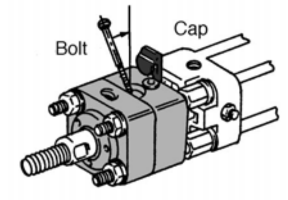



④ Install the four tie-rods, with their shorter threaded portion oriented towards the rod cover, and tighten them with uniform torque. Maintain the application of air pressure until the installation and adjustment have been completed, and never actuate the lock in the meantime.



## Manual Lock Release (ø40 to ø100)

To manually disengage the lock, perform the following steps:
① Open the rubber cap.
② Apply 0.2MPa to 0.3MPa 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

**Refer to p.3.1-4 to 3.1-5 for recommended pneumatic circuits, stopping accuracy and cautions on handling.**

### ⚠ 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 30mm, 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 lock-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 1.0mm. 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 200mm/s (When locking)

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

### ⚠ Caution

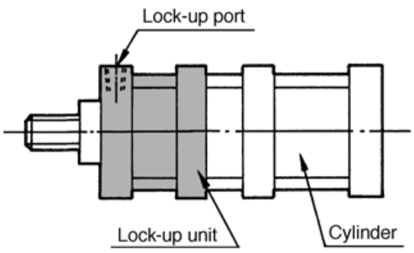
**Cautions on Handling**

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
Make sure not to scratch or gouge the sliding portion of the piston 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.

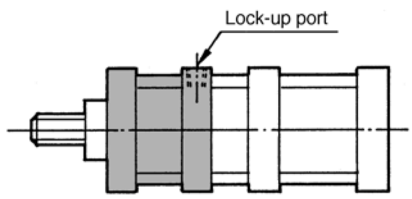
**Recommended Pneumatic Circuit**

Refer to p.3.1-4 for the recommended air pressure circuit.
① Operating the air pressure circuit
Instead of the conventional reciprocal air cylinder circuit, use an air pressure 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 diagram below.




**Forward direction lock**

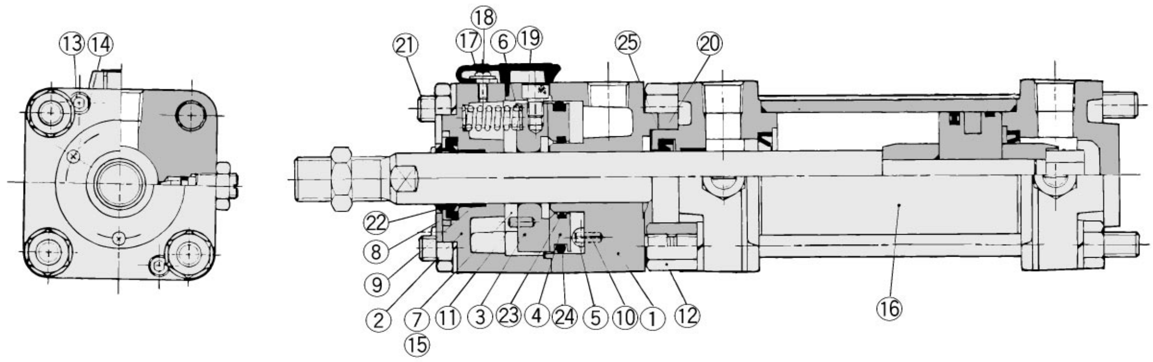



**Backward direction lock**

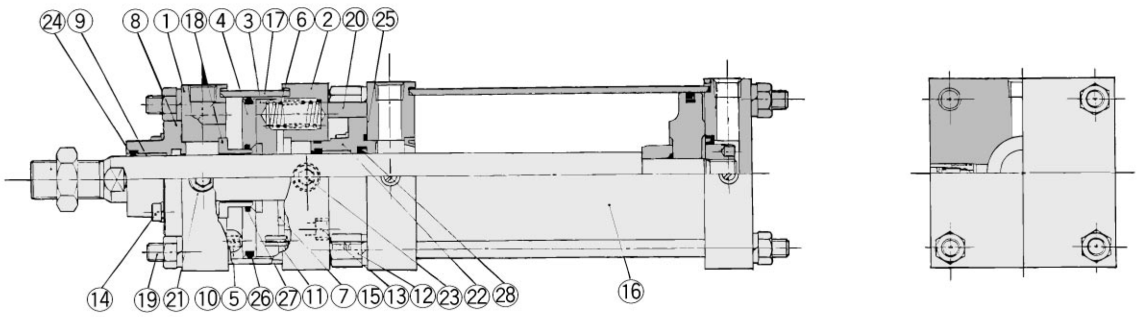
ø125 to ø160
For cylinders ø40 to ø100, verify the portion that is stamped on the cap of the lock.
③ Maximum speed and maximum load
Never lock up a cylinder that involves a kinetic energy that exceeds the maximum speed or the maximum load indicated in the specifications.
④ After completing the installation adjustment, do not forget to remove the bolt that was used for disengaging the lock. (ø40 to ø100 only)

## Construction

### CL1ø40 to ø100




### CL1ø125 to ø160




### Component Parts/CL1ø40 to ø100

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Body | Aluminum alloy | Black coated |
| ② | Cover | Aluminum alloy | Black coated |
| ③ | Lock 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 | Stainless steel | Heat treated |
| ⑧ | Retainer | Rolled steel | Black zinc chromated |
| ⑨ | Bushing | Lead bronze casting | |
| ⑩ | Spring pin | Carbon steel | JIS B2808 |
| ⑪ | Spring pin for non-rotating | Carbon steel | JIS B2808 |
| ⑫ | Long nut | Rolled steel | Black zinc chromated |
| ⑬ | Unit fixing hex. socket head cap screw | Chrome molybdenum steel | |
| ⑭ | Retainer machine screw | Rolled steel | |
| ⑮ | Hex. socket counter sunk head screw | Chrome molybdenum steel | |
| ⑯ | Non lube air cylinder | | CA1□N series |
| ⑰ | Cap | Nylon | |
| ⑱ | Cap screw | Rolled steel | |
| ⑲ | Release bolt | Chrome molybdenum steel | |
| ⑳ | Spacer | Aluminum alloy | Black coated |
| ㉑ | Unit fixing tie rod | Carbon steel | Chromated |
| ㉒ | Scraper | NBR | |
| ㉓ | O ring | NBR | |
| ㉔ | O ring | NBR | |
| ㉕ | Rod seal | NBR | |

Note) Contact SMC if the fine lock-up unit must be disassembled.

### Component Parts/CL1ø125 to ø160

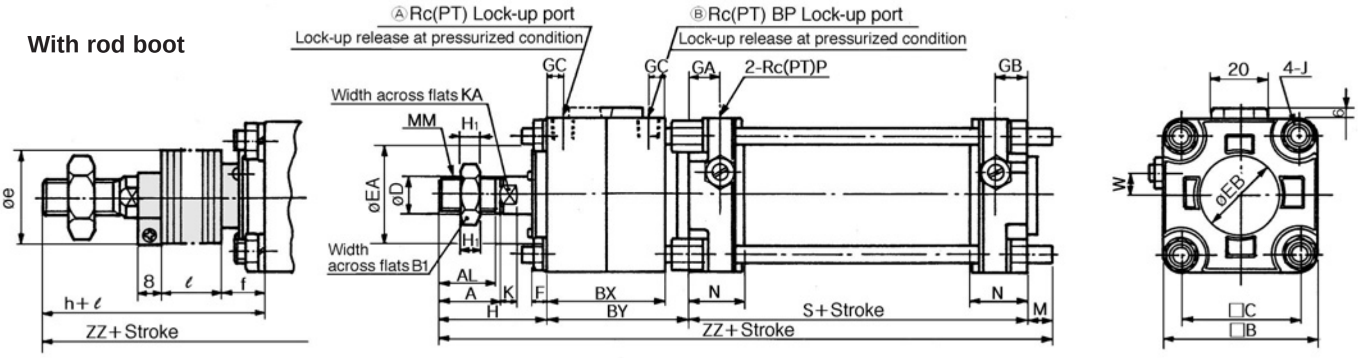
| No. | Description | Material | Note |
|---|---|---|---|
| ① | Body | Rolled steel | Black coated |
| ② | Cover | Rolled steel | Black coated |
| ③ | Lock up ring | Carbon steel | Heat treated |
| ④ | Release piston | Rolled steel | Zinc chromated |
| ⑤ | Pivot | Carbon steel | Heat treated |
| ⑥ | Spring | Steel wire | Zinc chromated |
| ⑦ | Stopper | Stainless steel | Heat treated |
| ⑧ | Retainer | Casting steel | Black coated |
| ⑨ | Bushing | Lead bronze casting | —— |
| ⑩ | Spring pin | Carbon steel | JIS B2808 |
| ⑪ | Spring pin | Carbon steel | JIS B2808 |
| ⑫ | Long nut | Rolled steel | Black zinc chromated |
| ⑬ | Unit fixing hex. socket head cap screw | Chrome molybdenum steel | Zinc chromated |
| ⑭ | Hex. socket head cap screw | Chrome molybdenum steel | Black zinc chromated |
| ⑮ | Hex. socket counter sunk head screw | Chrome molybdenum steel | Zinc chromated |
| ⑯ | Non lube air cylinder | —— | CA1□N series |
| ⑰ | Brake tube | Carbon steel piping | Inside: Hard chrome plated |
| ⑱ | Sleeve | Rolled steel | Zinc chromated |
| ⑲ | Unit fixing tie rod | Carbon steel | Chromated |
| ⑳ | Spacer | Rolled steel | Black coated |
| ㉑ | Hexagon socket head plug | Rolled steel | Black zinc chromated |
| ㉒ | Retainer | Casting steel | Black coated |
| ㉓ | Element | Sintered metal BC | —— |
| ㉔ | Wiper ring | NBR | |
| ㉕ | Retainer gasket | NBR | |
| ㉖ | O ring | NBR | |
| ㉗ | O ring | NBR | |
| ㉘ | Rod seal | NBR | |

Note) Contact SMC if the fine lock-up unit must be disassembled.

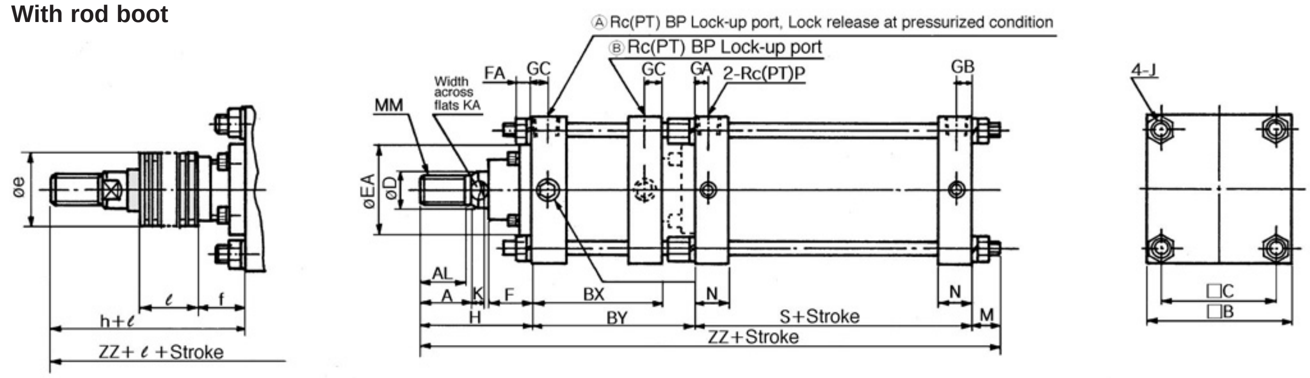
## Basic/(B)

### ø40 to ø100

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




### ø125 to ø160




(mm)

| Bore (mm) | Stroke range (mm) W/o rod boot | Stroke range (mm) W/ rod boot | A | AL | B | B1 | BX | BY | BP | C | D | EA | EB | F | FA | GA | GB | GC | H1 | J | K | KA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40** | 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** | 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** | 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** | 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** | 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** | 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** | 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** | 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 (mm) | M | MM | N | P | S | W | W/o rod boot H | W/o rod boot ZZ | W/ rod boot e | W/ rod boot f | W/ rod boot h | W/ rod boot ℓ | W/ rod boot 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 |

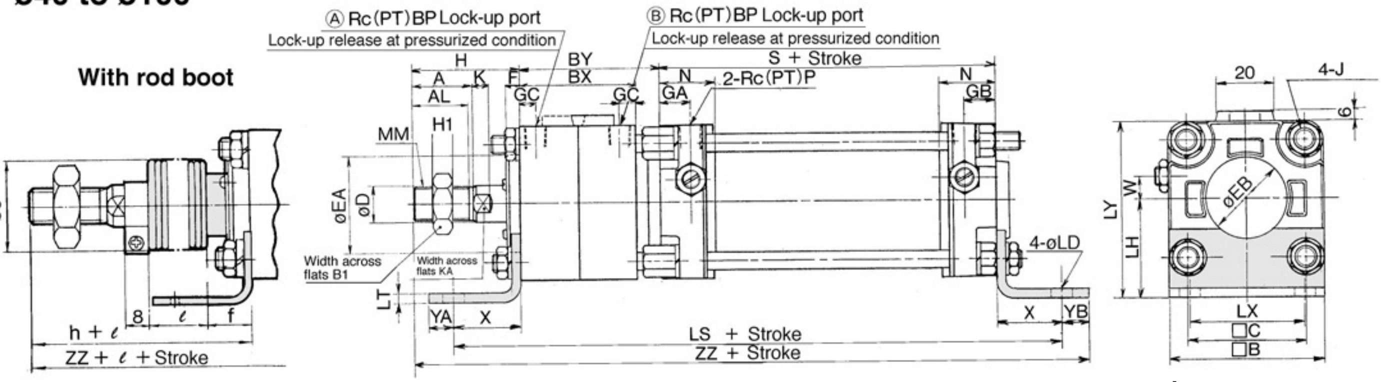
* In installing an air cylinder, if a hole must be made to accommodate the rod portion, make sure to machine a hole that is larger than the boot outer diameter "øe"

## Axial Foot/(L)

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

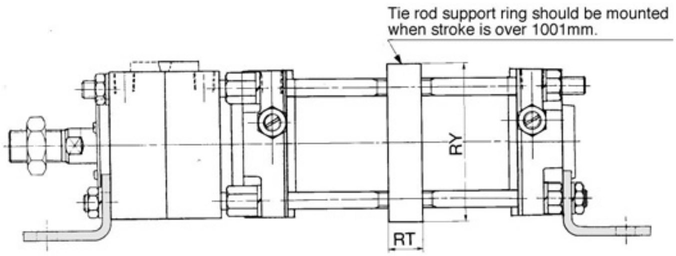
### ø40 to ø100

**With rod boot**




**Long stroke**

### ø50 to ø100



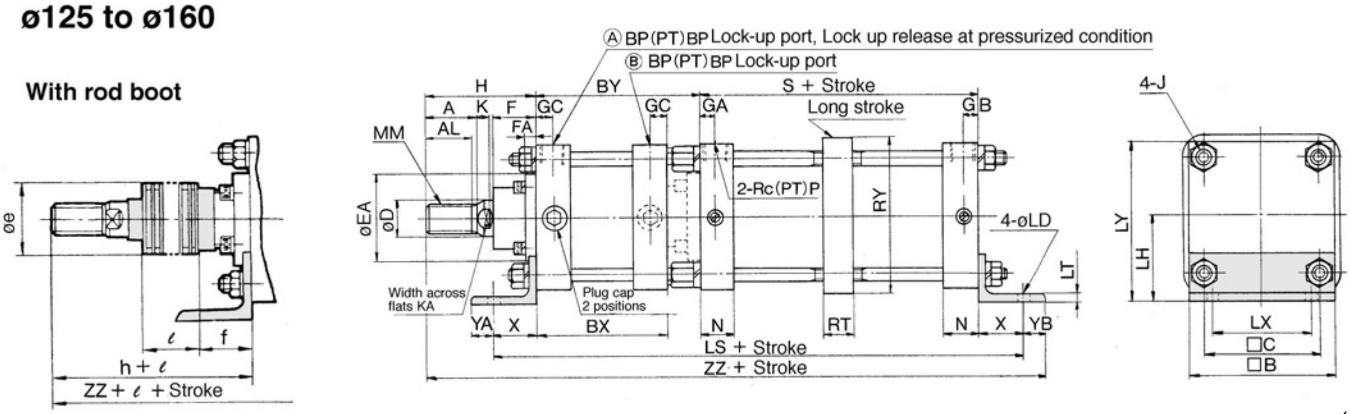

**Long stroke**

| Bore (mm) | Stroke range (mm) | PT | RY |
|---|---|---|---|
| 40 | 501 to 800 | — | — |
| 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**




(mm)

| Bore (mm) | Stroke range (mm) Without rod boot | With rod boot | A | AL | B | B1 | BX | BY | BP | C | D | EA | EB | F | FA | GA | GB | GC | H1 | J | K | KA | LD | LH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 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 | 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 | 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 | 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 | 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 | to 1400 | 30 to1400 | 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 | 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 | 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 |

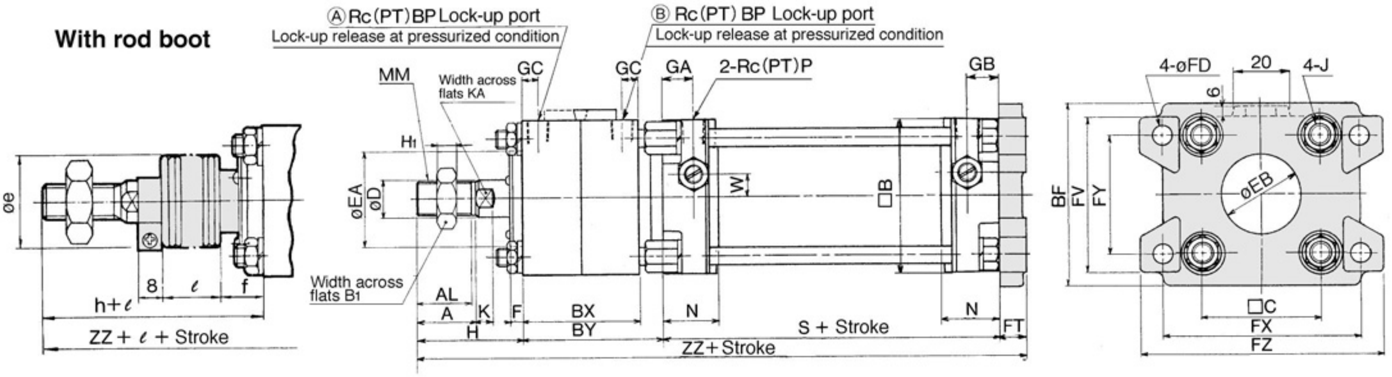
| Bore (mm) | LS | LT | LX | LY | MM | N | P | S | W | X | YA | YB | Without rod boot H | ZZ | With rod boot e | f | h | ℓ | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 207 | 3.2 | 42 | 70 | M14 X 1.5 | 27 | 1/4 | 84 | 8 | 27 | 13 | 13 | 51 | 244 | 36 | 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 | 1/4 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 | 1/4 Stroke | 456 |
| 160 | 373 | 9 | 118 | 197 | M36 X 1.5 | 39 | 3/4 | 106 | — | 50 | 25 | 25 | 120 | 468 | 75 | 40 | 141 | 1/4 Stroke | 489 |

## Rear Flange/(G)

### ø40 to 100

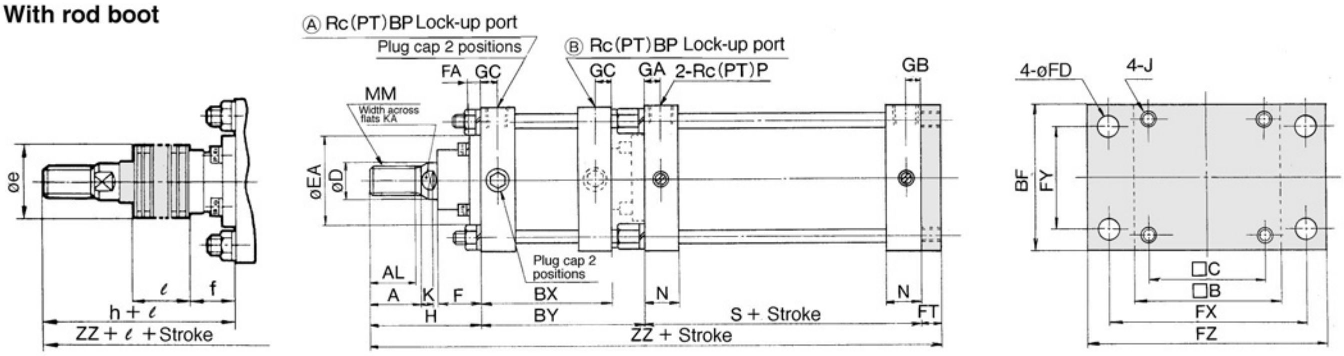
Ⓐ Lock-up at piston forward Ⓑ Lock-up at piston backward

With rod boot




### ø125 to ø160

With rod boot




(mm)

| Bore (mm) | Stroke range (mm) | | A | AL | B | B1 | BF | BF | BX | BY | C | D | EA | EB | F | FA | FD | FT | FX | FY | FZ | FV | GA | GB | GC | H1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W/o rod boot | W/ rod boot | | | | | | | | | | | | | | | | | | | | | | | | |
| **40** | 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** | 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** | 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** | 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** | 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** | 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** | 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** | 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 | — |

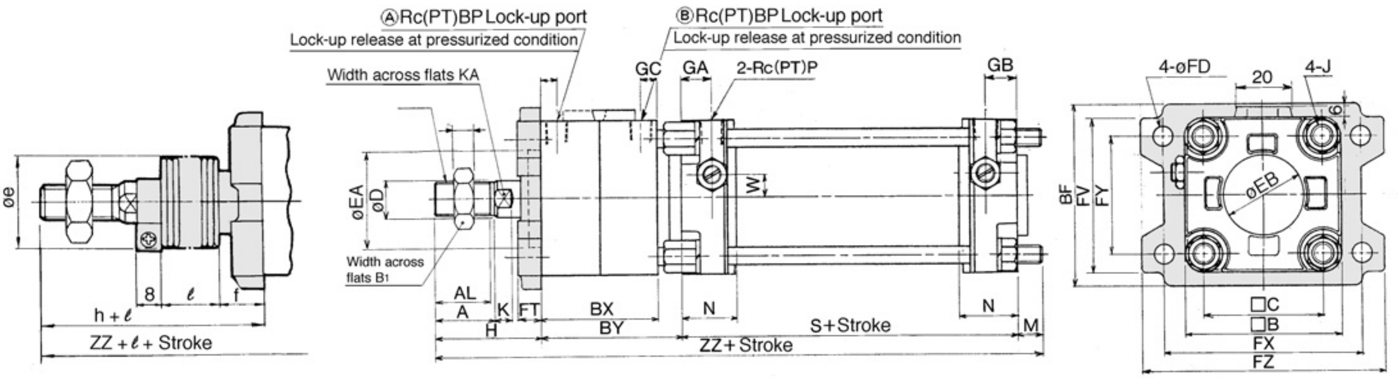
| Bore (mm) | J | K | KA | MM | N | P | S | W | W/o rod boot | | W/ rod boot | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | H | ZZ | e | f | h | ℓ | ZZ |
| **40** | M8 X 1.25 | 6 | 14 | M14 X 1.5 | 27 | 1/4 | 84 | 8 | 51 | 216 | 36 | 16.5 | 59 | 1/4 Stroke | 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 |

## Front Flange/(F)

### ø40 to ø100

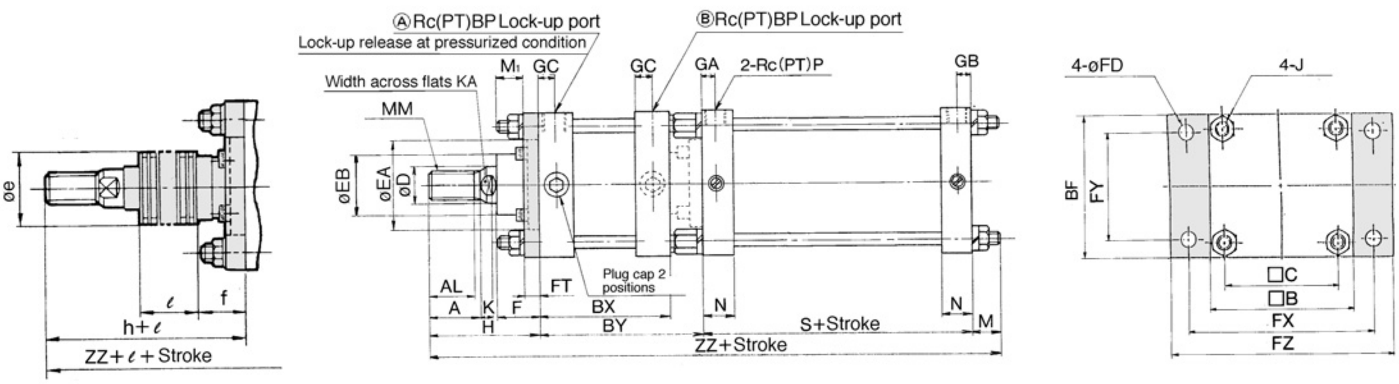
Ⓐ Lock-up at piston forward Ⓑ Lock-up at piston backward

**With rod boot**




### ø120 to ø160

**With rod boot**




(mm)

| Bore (mm) | Stroke range (mm) W/o rod boot | Stroke range (mm) W/ rod boot | Long stroke range (mm) | A | AL | B | $B_1$ | BF | BP | BX | BY | C | D | EA | EB | F | FD | FT | FX | FY | FZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40** | 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** | 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** | 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** | 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** | 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** | 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** | to 1400 | 30 to 1400 | —— | 50 | 47 | 161 | — | 160 | 1/2 | 121 | 150 | 128 | 36 | 90 | 59 | 43 | 19 | 20 | 212 | 112 | 255 |
| **160** | to 1400 | 30 to 1400 | —— | 56 | 53 | 182 | — | 180 | 3/4 | 133 | 167 | 144 | 40 | 90 | 59 | 43 | 19 | 20 | 236 | 118 | 275 |

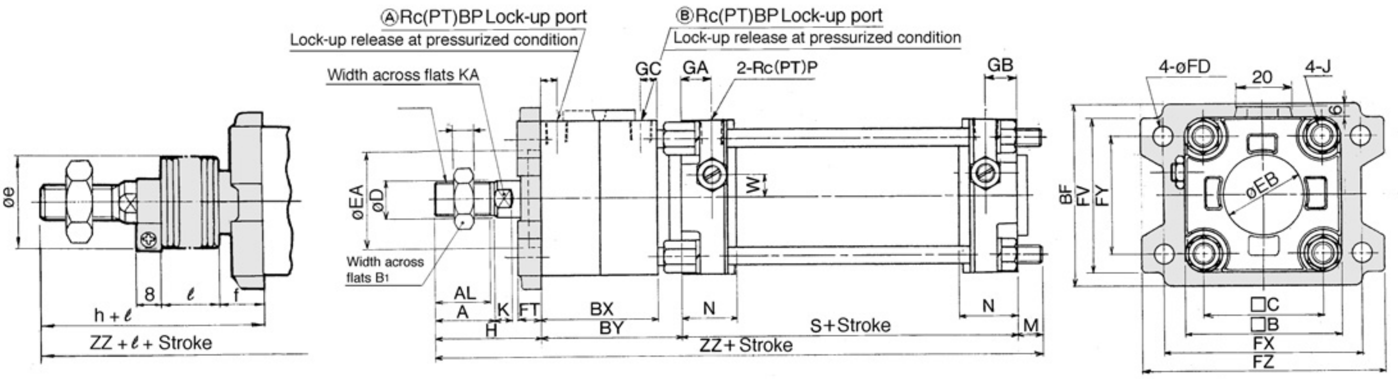
| Bore (mm) | FV | GA | GB | GC | $H_1$ | J | K | KA | M | $M_1$ | MM | N | P | S | W | W/o rod boot H | W/o rod boot ZZ | W/ rod boot e | W/ rod boot f | W/ rod boot h | W/ rod boot ℓ | W/ rod boot ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40** | 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 | 1/4 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 | 1/4 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 | 1/4 Stroke | 440 |

## Front Flange/(F)

### ø40 to ø100

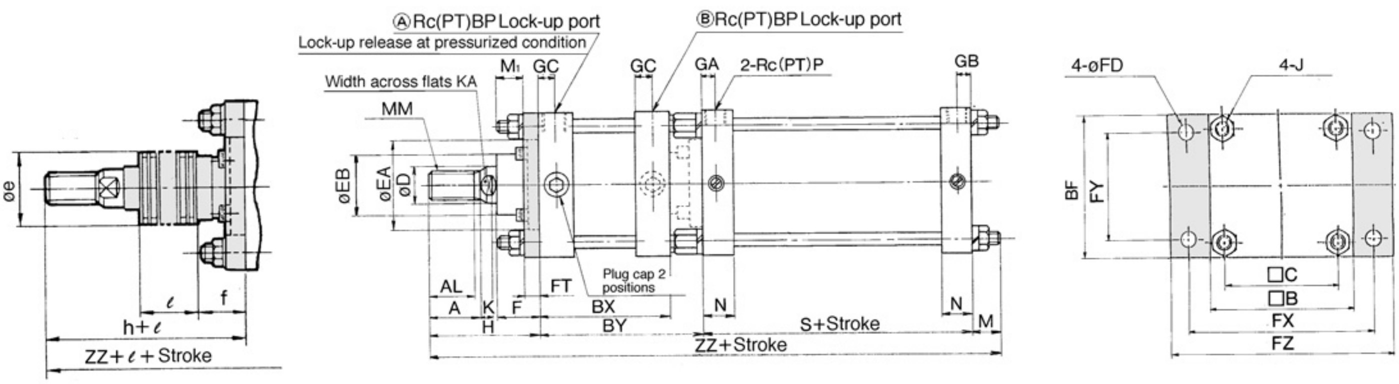
Ⓐ Lock-up at piston forward Ⓑ Lock-up at piston backward

**With rod boot**




### ø120 to ø160

**With rod boot**




(mm)

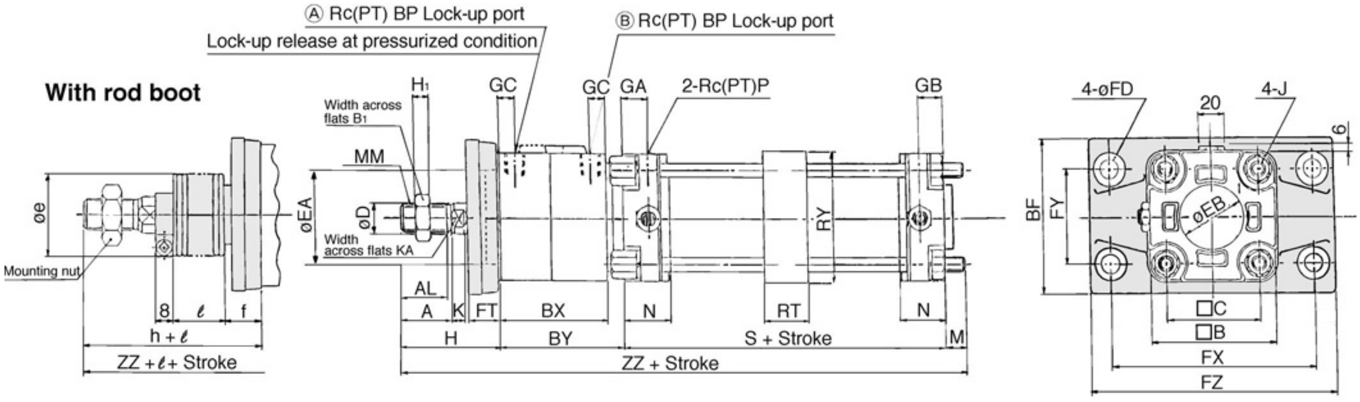
| Bore (mm) | Stroke range (mm) | | Long stroke range (mm) | A | AL | B | B1 | BF | BP | BX | BY | C | D | EA | EB | F | FD | FT | FX | FY | FZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W/o rod boot | W/ rod boot | | | | | | | | | | | | | | | | | | | |
| **40** | 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** | 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** | 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** | 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** | 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** | 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** | to 1400 | 30 to 1400 | —— | 50 | 47 | 161 | — | 160 | 1/2 | 121 | 150 | 128 | 36 | 90 | 59 | 43 | 19 | 20 | 212 | 112 | 255 |
| **160** | to 1400 | 30 to 1400 | —— | 56 | 53 | 182 | — | 180 | 3/4 | 133 | 167 | 144 | 40 | 90 | 59 | 43 | 19 | 20 | 236 | 118 | 275 |

| Bore (mm) | FV | GA | GB | GC | H1 | J | K | KA | M | M1 | MM | N | P | S | W | W/o rod boot | | W/ 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 | 1/4 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 | 1/4 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 | 1/4 Stroke | 440 |

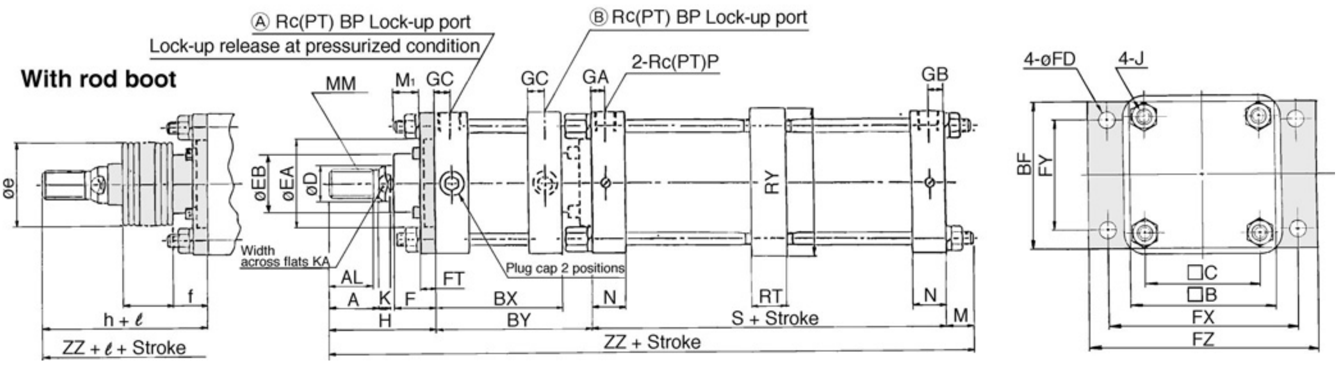
## Front Flange (F)/Long Stroke

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

### ø50 to ø100




### ø125 to ø160




(mm)

| Bore (mm) | Stroke range | A | AL | B | $B_1$ | BF | BP | BX | BY | C | D | EA | EB | F | FD | FT | FX | FY | FZ | GA | GB | GC | $H_1$ | 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 | 18.5 | — | M16 X 1.5 | 17 | 36 |

| Bore (mm) | Stroke range | M | $M_1$ | MM | N | P | RT | RY | S | W | W/o rod boot | | W/ 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 to1500 | 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 |

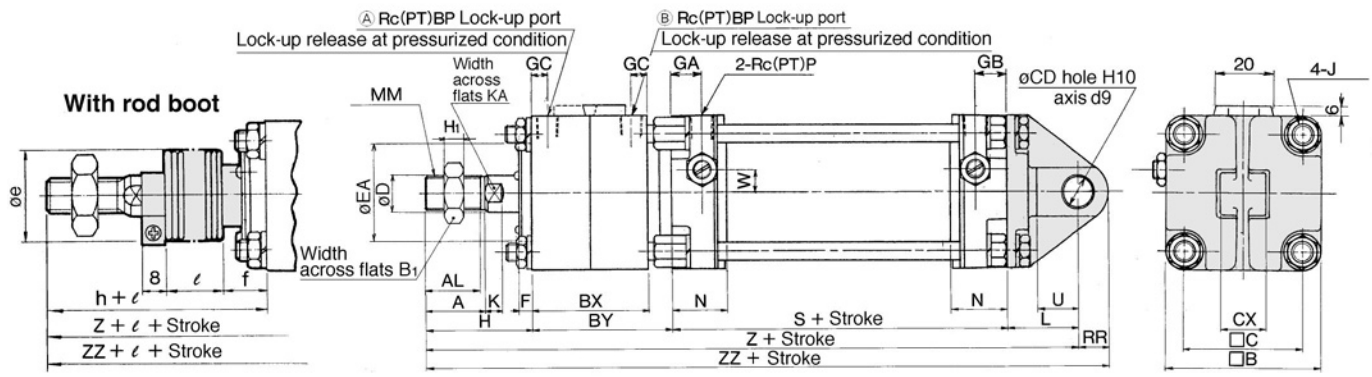
Note) ø125 to ø160 with auto switch and ø40 are not available.

CL
MLGC
CNA
CB
CV/MVG
CXW
CXS
CXT
MX
MXU
MXS
MXQ
MXF
MXW
MXP
MG
MGP
MGQ
MGG
MGC
MGF
CY1
MY1

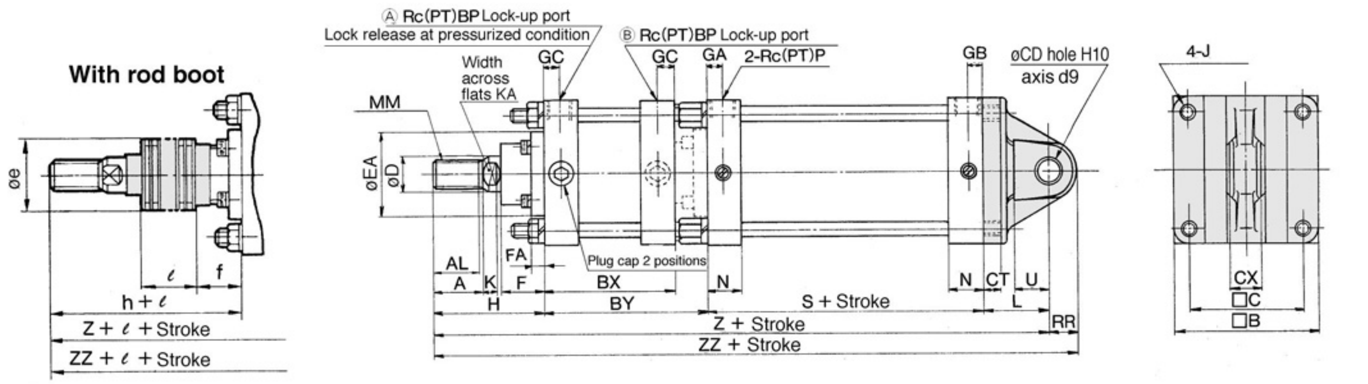
## Single Clevis/(C)

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

### ø40 to ø100




### ø125 to ø160




(mm)

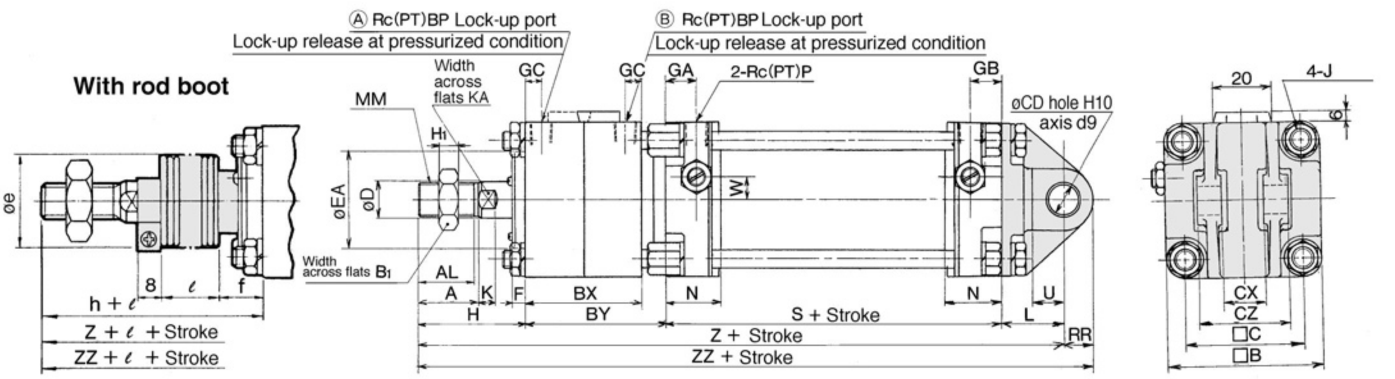
| Bore (mm) | Stroke range (mm) W/o rod boot | W/ rod boot | A | AL | B | $B_1$ | BP | BX | BY | C | CD | CT | CX | D | EA | F | FA | GA | GB | GC | $H_1$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40** | to 500 | 20 to 500 | 30 | 27 | 60 | 22 | 1/4 | 59 | 69 | 44 | 10 | — | $15.0^{-0.1}_{-0.3}$ | 16 | 40 | 6.5 | — | 15 | 15 | 11 | 8 |
| **50** | to 600 | 20 to 600 | 35 | 32 | 70 | 27 | 1/4 | 67 | 78 | 52 | 12 | — | $18.0^{-0.1}_{-0.3}$ | 20 | 50 | 6.0 | — | 17 | 17 | 11 | 11 |
| **63** | to 600 | 20 to 600 | 35 | 32 | 86 | 27 | 1/4 | 73 | 84 | 64 | 16 | — | $25.0^{-0.1}_{-0.3}$ | 20 | 55 | 6.0 | — | 17 | 17 | 11 | 11 |
| **80** | to 750 | 20 to 750 | 40 | 37 | 102 | 32 | 1/4 | 77 | 92 | 78 | 20 | — | $31.5^{-0.1}_{-0.3}$ | 25 | 65 | 8.0 | — | 21 | 21 | 11 | 13 |
| **100** | to 750 | 20 to 750 | 40 | 37 | 116 | 41 | 1/4 | 85 | 100 | 92 | 25 | — | $35.5^{-0.1}_{-0.3}$ | 30 | 80 | 8.0 | — | 21 | 21 | 11 | 16 |
| **125** | to 1000 | 30 to 1000 | 50 | 47 | 145 | — | 1/2 | 112.5 | 141.5 | 115 | 25 | 17 | $32.0^{-0.1}_{-0.3}$ | 36 | 90 | 43 | 14 | 16 | 16 | 16 | — |
| **140** | to 1000 | 30 to 1000 | 50 | 47 | 161 | — | 1/2 | 121 | 150 | 128 | 28 | 17 | $36.0^{-0.1}_{-0.3}$ | 36 | 90 | 43 | 14 | 16 | 16 | 16 | — |
| **160** | to 1200 | 30 to 1200 | 56 | 53 | 182 | — | 3/4 | 133 | 167 | 144 | 32 | 20 | $40.0^{-0.1}_{-0.3}$ | 40 | 90 | 43 | 14 | 18.5 | 18.5 | 18.5 | — |

| Bore (mm) | J | K | KA | L | MM | N | P | RR | S | U | W | W/o rod boot H | Z | ZZ | W/ rod boot 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 | 1/4 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 | 1/4 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 | 1/4 Stroke | 494 | 530 |

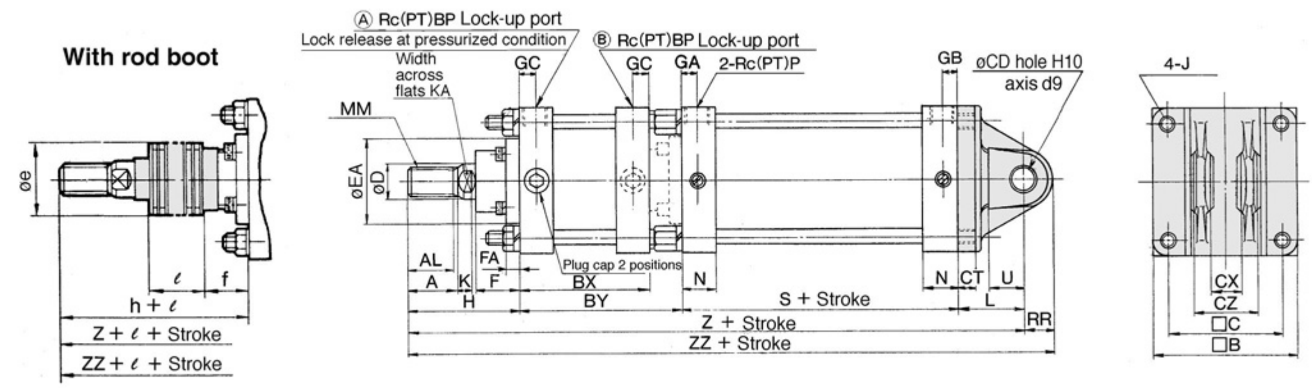
## Double Clevis/(D)

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

### ø40 to ø100




### ø125 to ø160




(mm)

| Bore (mm) | Stroke range (mm) W/o rod boot | Stroke range (mm) W/ rod boot | A | AL | B | $B_1$ | BP | BX | BY | C | CD | CT | CX | CZ | D | EA | F | FA | GA | GB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40** | to 500 | 20 to 500 | 30 | 27 | 60 | 22 | 1/4 | 59 | 69 | 44 | 10 | — | 15.0 $^{+0.3}_{+0.1}$ | 29.5 | 16 | 40 | 6.5 | — | 15 | 15 |
| **50** | to 600 | 20 to 600 | 35 | 32 | 70 | 27 | 1/4 | 67 | 78 | 52 | 12 | — | 18.0 $^{+0.3}_{+0.1}$ | 38 | 20 | 50 | 6.0 | — | 17 | 17 |
| **63** | to 600 | 20 to 600 | 35 | 32 | 86 | 27 | 1/4 | 73 | 84 | 64 | 16 | — | 25.0 $^{+0.3}_{+0.1}$ | 49 | 20 | 55 | 6.0 | — | 17 | 17 |
| **80** | to 750 | 20 to 750 | 40 | 37 | 102 | 32 | 1/4 | 77 | 92 | 78 | 20 | — | 31.5 $^{+0.3}_{+0.1}$ | 61 | 25 | 65 | 8.0 | — | 21 | 21 |
| **100** | to 750 | 20 to 750 | 40 | 37 | 116 | 41 | 1/4 | 85 | 100 | 92 | 25 | — | 35.5 $^{+0.3}_{+0.1}$ | 64 | 30 | 80 | 8.0 | — | 21 | 21 |
| **125** | to 1000 | 30 to 1000 | 50 | 47 | 145 | — | 1/2 | 112.5 | 141.5 | 115 | 25 | 17 | 32.0 $^{+0.3}_{+0.1}$ | 64 $^{0}_{-0.2}$ | 36 | 90 | 43 | 14 | 16 | 16 |
| **140** | to 1000 | 30 to 1000 | 50 | 47 | 161 | — | 1/2 | 121 | 150 | 128 | 28 | 17 | 36.0 $^{+0.3}_{+0.1}$ | 72 $^{0}_{-0.2}$ | 36 | 90 | 43 | 14 | 16 | 16 |
| **160** | to 1200 | 30 to 1200 | 56 | 53 | 182 | — | 3/4 | 133 | 167 | 144 | 32 | 20 | 40.0 $^{+0.3}_{+0.1}$ | 80 $^{0}_{-0.2}$ | 40 | 90 | 43 | 14 | 18.5 | 18.5 |

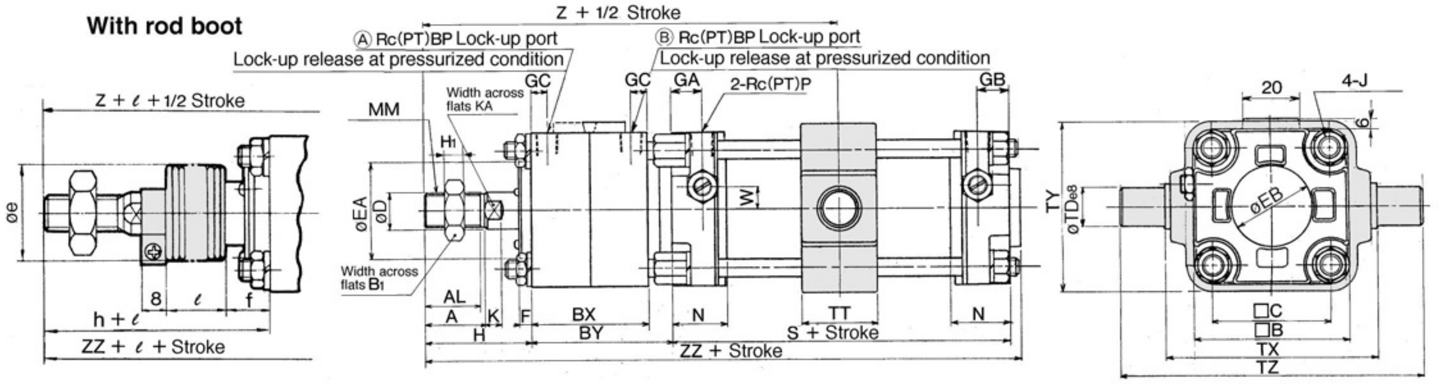
| Bore (mm) | GC | $H_1$ | J | K | KA | L | MM | N | P | RR | S | U | W | W/o rod boot H | W/o rod boot Z | W/o rod boot ZZ | W/ rod boot e | W/ rod boot f | W/ rod boot h | W/ rod boot ℓ | W/ rod boot Z | W/ rod boot ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **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 X1.75 | 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 packed with the double clevis style.

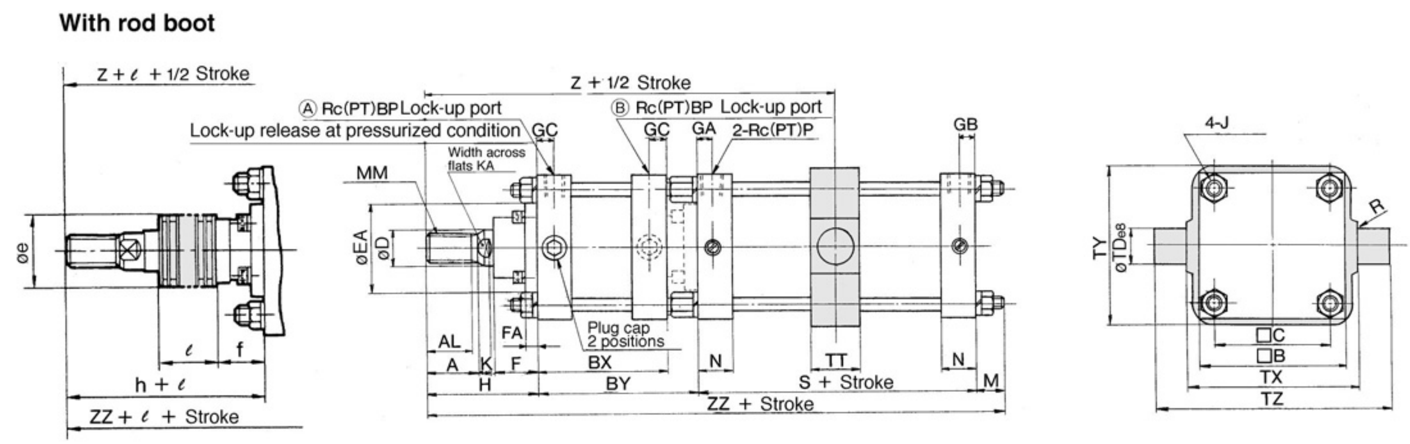
## Center Trunnion/(T)

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

### ø40 to ø100




### ø125 to ø160




(mm)

| Bore (mm) | Stroke range (mm) W/o rod boot | Stroke range (mm) W/ rod boot | A | AL | B | $B_1$ | BP | BX | BY | C | D | EA | EB | F | FA | GA | GB | GC | $H_1$ | J | K | KA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40** | 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** | 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** | 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** | 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** | 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 (mm) | M | MM | N | P | R | S | $TD_{e8}$ | TT | TX | TY | TZ | W | W/o rod boot H | W/o rod boot Z | W/o rod boot ZZ | W/ rod root e | W/ rod root f | W/ rod root h | W/ rod root ℓ | W/ rod root Z | W/ rod root ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40** | — | M14 X 1.5 | 27 | 1/4 | — | 84 | $15^{-0.032}_{-0.059}$ | 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 | $15^{-0.032}_{-0.059}$ | 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 | $18^{-0.032}_{-0.059}$ | 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 | $25^{-0.040}_{-0.073}$ | 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 | $25^{-0.040}_{-0.073}$ | 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 | $32^{-0.050}_{-0.089}$ | 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 | $36^{-0.050}_{-0.089}$ | 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 | $40^{-0.050}_{-0.089}$ | 60 | 212 | 204 | 292 | — | 120 | 340 | 415 | 75 | 40 | 141 | 1/5 Stroke | 361 | 436 |

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