

# Cylinder with Lock

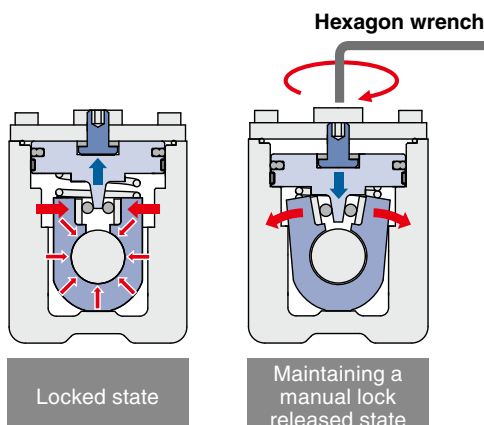
ø32, ø40, ø50, ø63, ø80, ø100

New

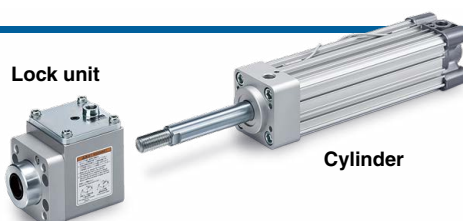
RoHS

Lock can be manually operated with a hexagon wrench.

Can be easily mounted onto equipment



The lock unit and the cylinder can be separated. Improved ease of maintenance



Holding force improved by **15%**

(C(P)95N, ø50: 1370 N → **C(P)96N: 1570 N**)

Stopping accuracy

**within  $\pm 1$  mm**

(With ø50 and 30 kg of load)

Overall length reduced by

**27.5 mm max.**

(Compared with a C(P)95N, ø100, 100 mm stroke)

Lock Unit

Applicable rod size: ø12 to ø30



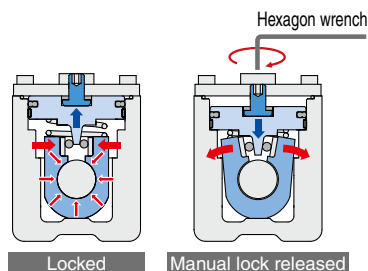
**CP96N/C96N Series**

**SVC**

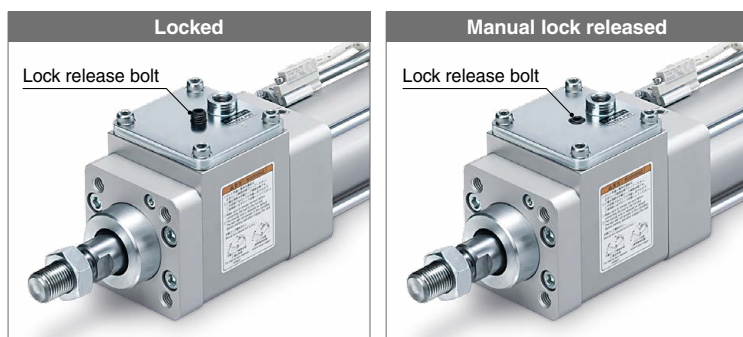
CAT.ES20-259A

# A locking cylinder ideal for intermediate stops,

- Built-in manual lock release holding mechanism
- It is possible to release the locked state with a hexagon wrench and hold the released state without pressurizing the unlock port.
- Simple construction



- The condition of the lock release bolt allows for visual confirmation of whether the cylinder is in a locked or manual lock released state.



Refer to page 52 for the manual lock release.

## Overall length reduced by 27.5 mm max.

Up to 27.5 mm shorter compared with the C(P)95N series



### Overall length reduced [mm]

| Bore size [mm] | C(P)96N | C(P)95N | Reduction |
|----------------|---------|---------|-----------|
| 32             | 204     | 216     | 12        |
| 40             | 229     | 240     | 11        |
| 50             | 254     | 268     | 14        |
| 63             | 273.5   | 297     | 23.5      |
| 80             | 328     | 349     | 21        |
| 100            | 356.5   | 384     | 27.5      |

\* For basic type dimensions

## Improved holding force

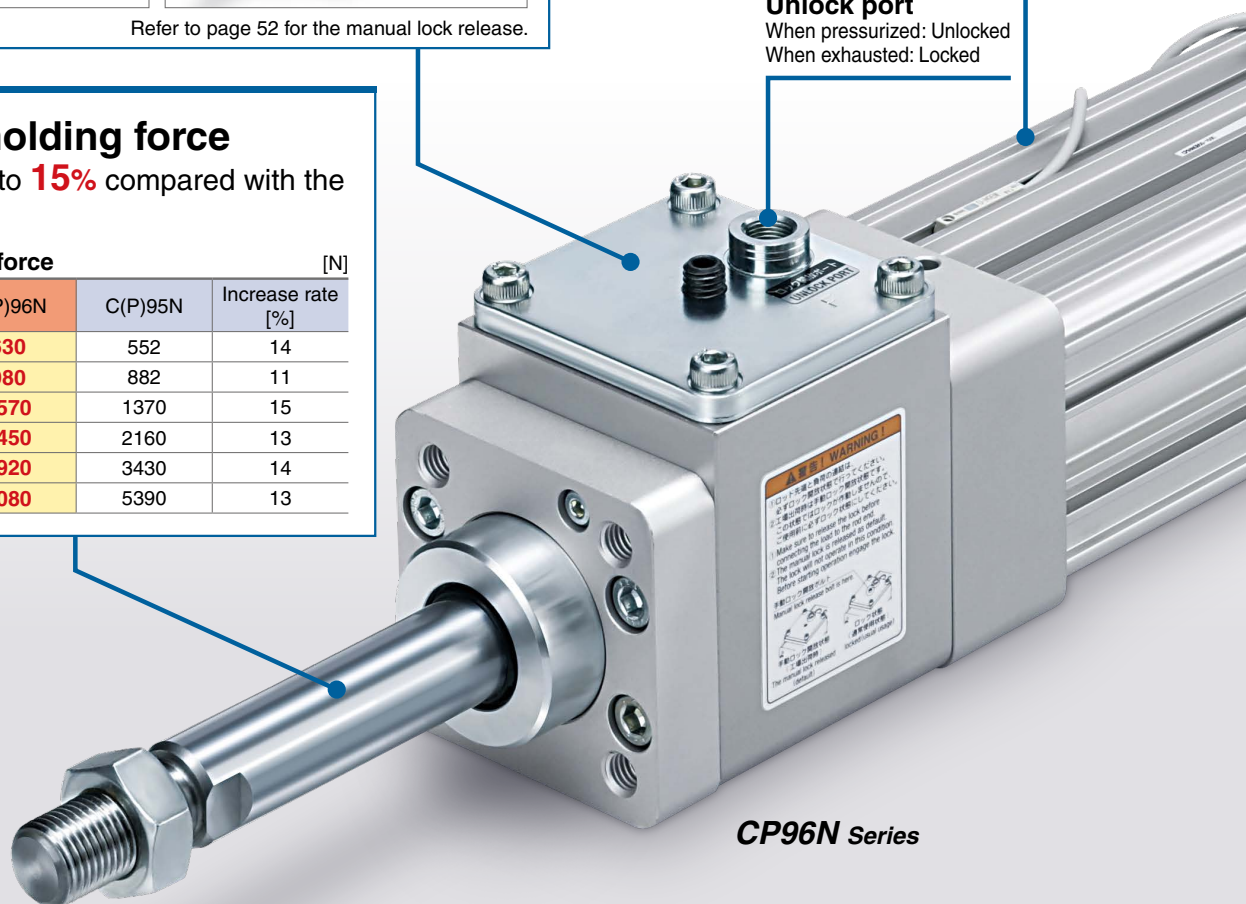
Improved by up to 15% compared with the C(P)95N series

### Improved holding force

| Bore size [mm] | C(P)96N | C(P)95N | Increase rate [%] |
|----------------|---------|---------|-------------------|
| 32             | 630     | 552     | 14                |
| 40             | 980     | 882     | 11                |
| 50             | 1570    | 1370    | 15                |
| 63             | 2450    | 2160    | 13                |
| 80             | 3920    | 3430    | 14                |
| 100            | 6080    | 5390    | 13                |

### Unlock port

When pressurized: Unlocked  
When exhausted: Locked



CP96N Series

# emergency stops, and drop prevention

## Compact auto switches are mountable.

- Solid state auto switch:  
D-M9□
- Reed auto switch:  
D-A9□
- Magnetic field-resistant auto switch:  
D-P3DWA  
D-P4DW

\* Only applicable to the C96N



The lock unit and the cylinder are separable in order to improve maintainability.



Refer to pages 52 and 53 for the replacement procedure.

## Air cushion + Bumper cushion Combined structure

- The cushion stroke time can now be reduced with the double cushioning, which improves the cycle time.
- The bumper cushion reduces the metal noise that occurs when the piston stops at the end of the stroke.



C96N Series

## Part numbers for products with a rod end bracket and/or a pivot bracket are available.

It is not necessary to order a bracket for the applicable cylinder separately.

\* Rod end brackets and pivot brackets are shipped together with the product but do not come assembled.

Example) CP96ND **D** 40-100C- **N W** -M9BW

• Mounting

### Pivot bracket

|            |               |
|------------|---------------|
| <b>Nil</b> | No bracket    |
| <b>N</b>   | Pivot bracket |

\* Applicable only to D (Double clevis) and T (Center trunnion) mounting types  
\* T (Center trunnion) is only applicable to the C96N.

### Double clevis



### Center trunnion



### Rod end bracket

|            |            |
|------------|------------|
| <b>Nil</b> | No bracket |
| <b>W</b>   | Rod clevis |

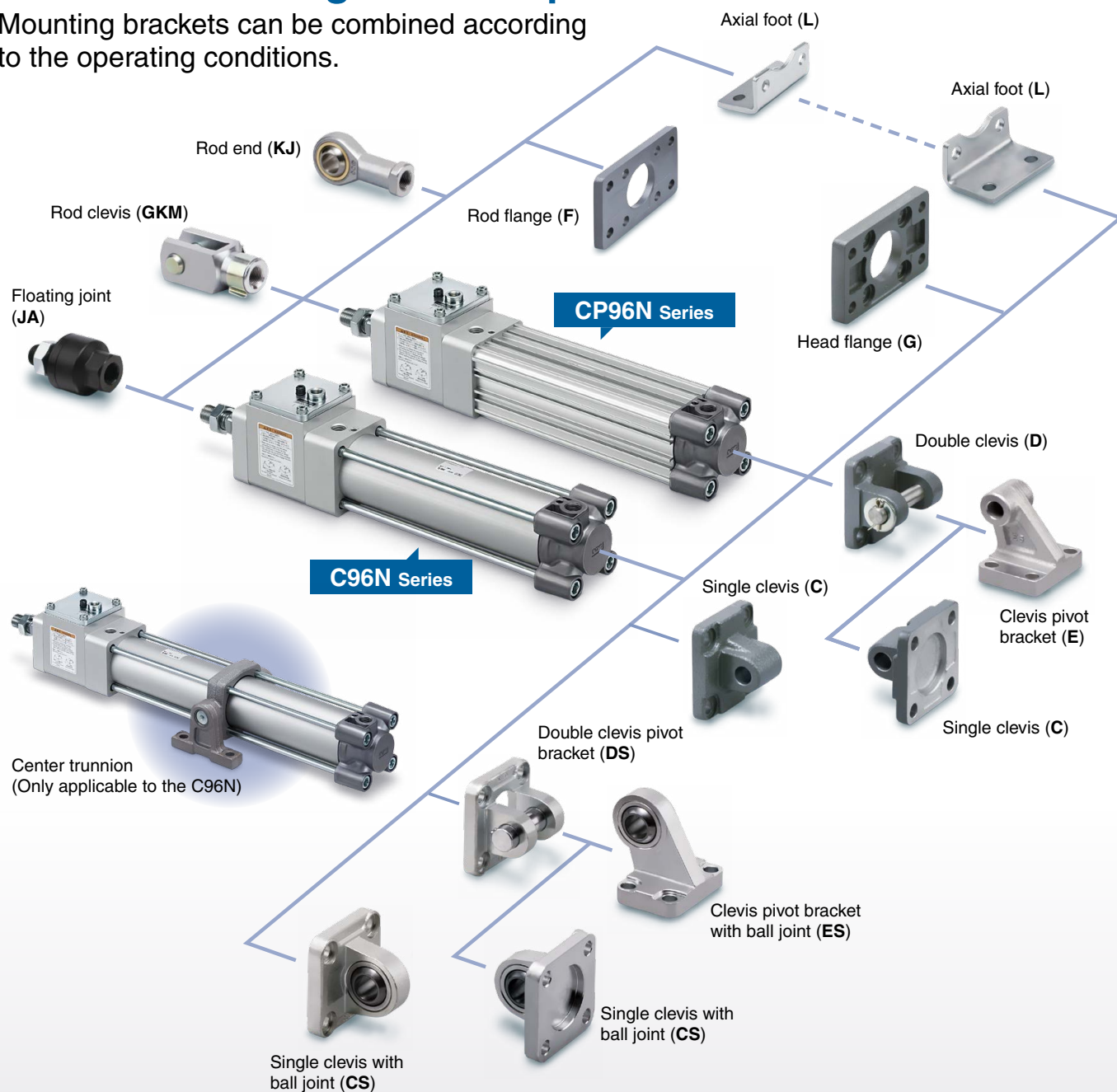
### With rod end bracket W: Rod clevis





## Various mounting bracket options

Mounting brackets can be combined according to the operating conditions.



### Series Variations

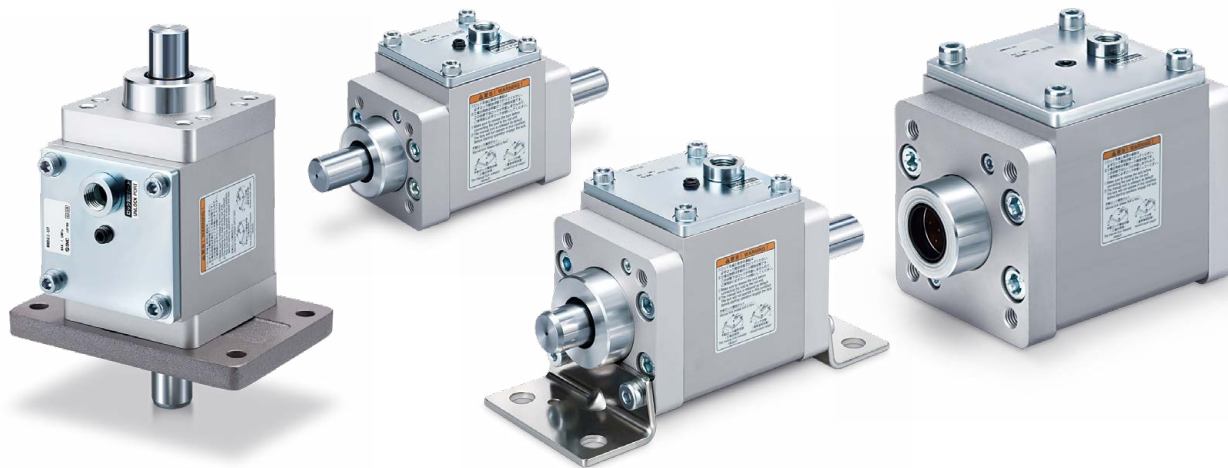
| Type                  | Action                                                                                                        | Bore size [mm] |    |    |    |    |     | Page |
|-----------------------|---------------------------------------------------------------------------------------------------------------|----------------|----|----|----|----|-----|------|
|                       |                                                                                                               | 32             | 40 | 50 | 63 | 80 | 100 |      |
| Standard CP96N Series |  Double acting, Single rod | ●              | ●  | ●  | ●  | ●  | ●   | 9    |
|                       |  Double acting, Double rod | ●              | ●  | ●  | ●  | ●  | ●   |      |
| Standard C96N Series  |  Double acting, Single rod | ●              | ●  | ●  | ●  | ●  | ●   | 25   |
|                       |  Double acting, Double rod | ●              | ●  | ●  | ●  | ●  | ●   |      |



## Lock Unit

**A safety mechanism can be designed if required.  
It can also be combined with a wide variety of actuators.**

- Prevents the workpiece from falling
- Retains the workpiece position even when the air supply is shut off due to power failure, etc.



| Lock unit model                             | MWB□32-UT                                                  | MWB□40-UT | MWB□50-UT | MWB□63-UT | MWB□80-UT | MWB□100-UT |
|---------------------------------------------|------------------------------------------------------------|-----------|-----------|-----------|-----------|------------|
| Applicable rod size [mm]*1                  | ø12 f8                                                     | ø16 f8    | ø20 f8    | ø20 f8    | ø25 f8    | ø30 f8     |
| Bore size of combinable cylinder [mm]       | ø32                                                        | ø40       | ø50       | ø63       | ø80       | ø100       |
| Lock holding force*2 (Max. static load) [N] | 630                                                        | 980       | 1,570     | 2,450     | 3,920     | 6,080      |
| Made to order common specifications         | With coil scraper (-XC35), Made of stainless steel (-XC68) |           |           |           |           |            |

\*1 The applicable rod size affects the holding force, so use a rod with the rod size tolerance shown in the table above.

\*2 The holding force (max. static load) shows the maximum capability and does not show the normal holding capability. Be sure to select a cylinder using the method described in Model Selection (page 6).

## Part numbers for lock units with an applicable rod are now available.

It is not necessary to order a rod for the lock unit separately.

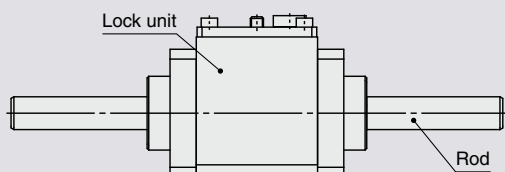
\* Rod is shipped together with the product.

Example) **MWB** **B** **40** - **UT** - **500**

Lock unit

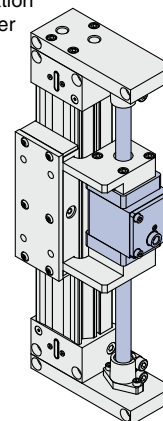
Rod length

\* Refer to page 43 for details on rod lengths.



## Application Example

Example of combination with a rodless cylinder



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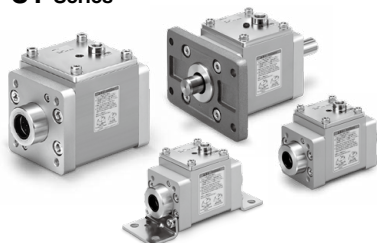
### CP96N Series



### C96N Series



### MWB-UT Series



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#### ● C96N Series/Double Acting, Single Rod/Double Rod

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#### ● MWB-UT Series/Lock Unit

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#### ● Simple Specials .....

Change of Rod End Shape (-XA0 to XA30)

#### ● Made to Order Common Specifications .....

With Coil Scraper (-XC35)

Made of Stainless Steel (For Lock Unit, With Hard Chrome Plating)(-XC68)

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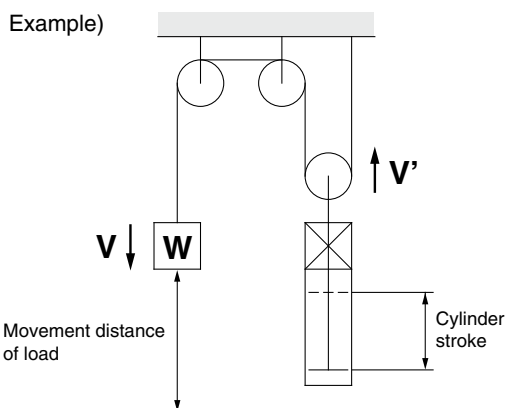
|                           |            |
|---------------------------|------------|
| Safety Instructions ..... | Back cover |
|---------------------------|------------|

# CP96N/C96N Series Model Selection

## Precautions on Model Selection

### ⚠ Caution

1. In order that the originally selected maximum speed shall not be exceeded, be certain to use a speed controller to adjust the total movement distance of the load so that movement takes place in no less than the applicable movement time.  
The movement time is the time that is necessary for the load to travel the total movement distance from the start without any intermediate stops.
2. In cases where the cylinder stroke and the movement distance of the load are different (double speed mechanism etc.), use the movement distance of the load for selection purposes.



3. The following selection example and procedures are based on use at the intermediate stop (including emergency stops during operation). However, when the cylinder is in a locked state, kinetic energy does not act upon it. Under these conditions, use the load mass at the maximum speed ( $V$ ) of 100 mm/s shown in graphs [5] to [7] on page 7 depending on the operating pressure and select models.

## Selection Example

- Load mass :  $m = 50 \text{ kg}$
- Movement distance :  $st = 500 \text{ mm}$
- Movement time :  $t = 2 \text{ s}$
- Load condition : Vertical downward = Load in direction of rod extension
- Operating pressure :  $P = 0.4 \text{ MPa}$

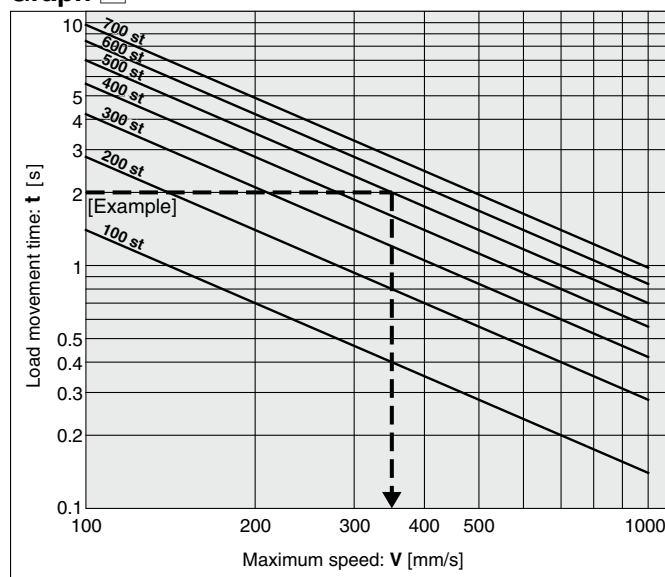
Step 1: From graph [1], find the maximum movement speed of the load  
 $\therefore$  Maximum speed :  $V \approx 350 \text{ mm/s}$ .

Step 2: Select graph [6] (Refer to page 7.) based upon the load conditions and operating pressure, and then from the intersection of the maximum speed  $V = 350 \text{ mm/s}$  found in Step 1, and the load mass  $m = 50 \text{ kg}$ .  
 $\therefore \phi 63 \rightarrow$  Select a C(P)96N63 or larger bore size.

## Step 1 Find the maximum load speed $V$ .

Find the maximum load speed:  $V$  [mm/s] from the load movement time:  $t$  [s] and the movement distance:  $st$  [mm].

Graph [1]



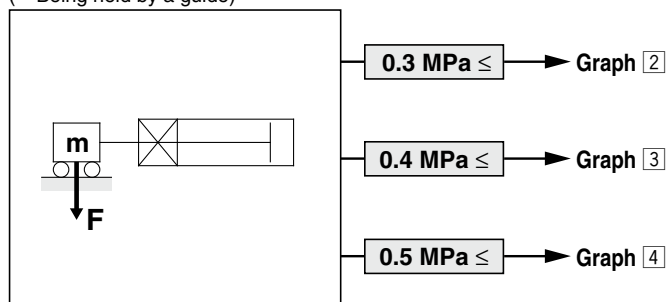
## Step 2 Find the bore size.

Select a graph based upon the load condition and operating pressure, and then find the point of intersection for the maximum speed found in Step 1 and the load mass. Select the bore size on the above the point of intersection.

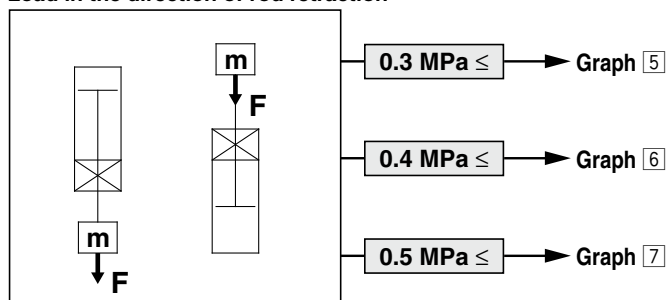
### Load Condition

### Operating Pressure

Load in the direction at the right angle to rod  
 (\* Being held by a guide)



Load in the direction of rod extension  
 Load in the direction of rod retraction



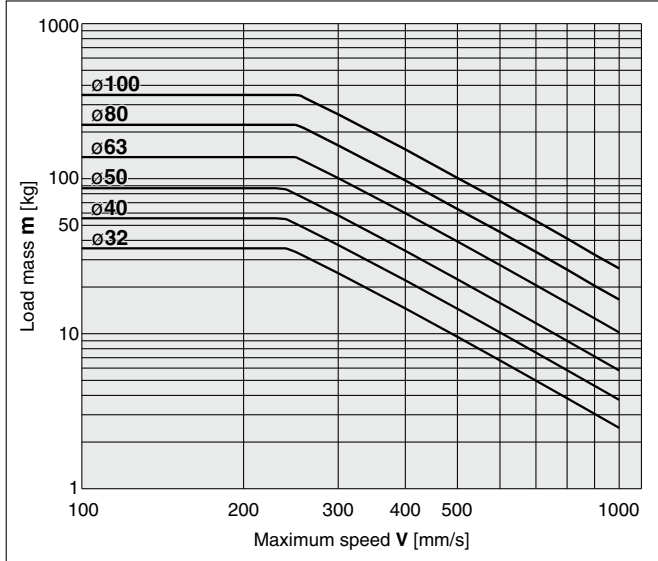


# CP96N/C96N Series

## Selection Graph

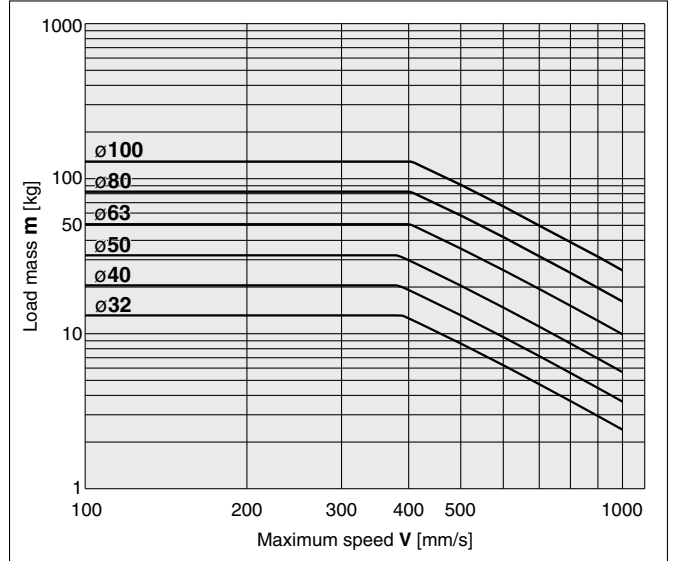
Graph 2

$0.3 \text{ MPa} \leq P < 0.4 \text{ MPa}$



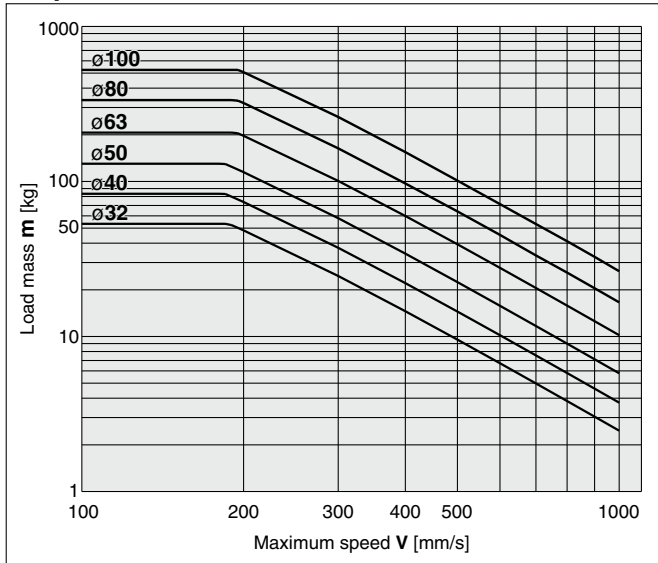
Graph 5

$0.3 \text{ MPa} \leq P < 0.4 \text{ MPa}$



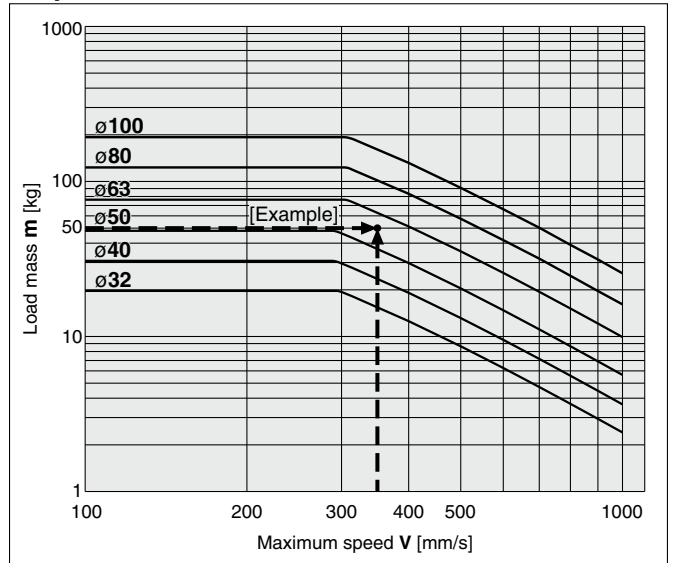
Graph 3

$0.4 \text{ MPa} \leq P < 0.5 \text{ MPa}$



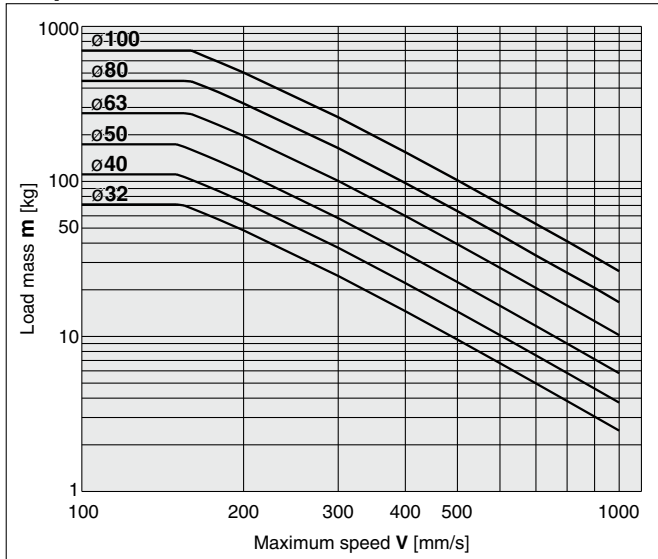
Graph 6

$0.4 \text{ MPa} \leq P < 0.5 \text{ MPa}$



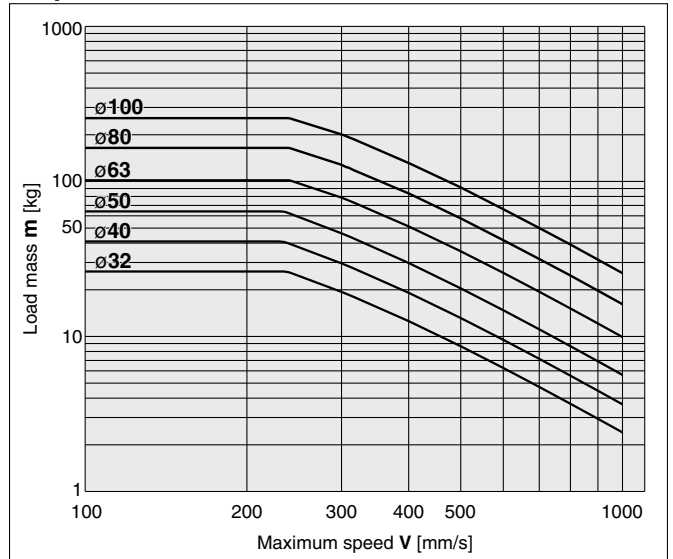
Graph 4

$0.5 \text{ MPa} \leq P$



Graph 7

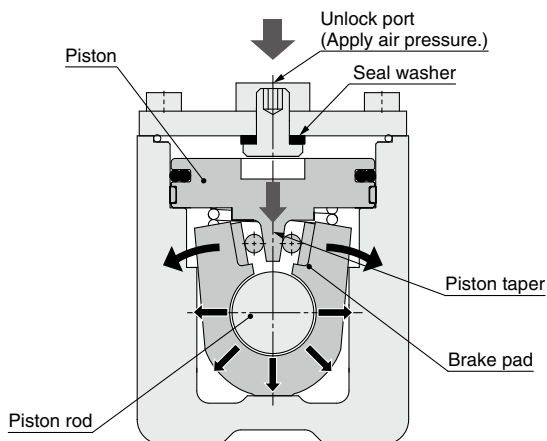
$0.5 \text{ MPa} \leq P$



# CP96N/C96N Series

## Working Principle

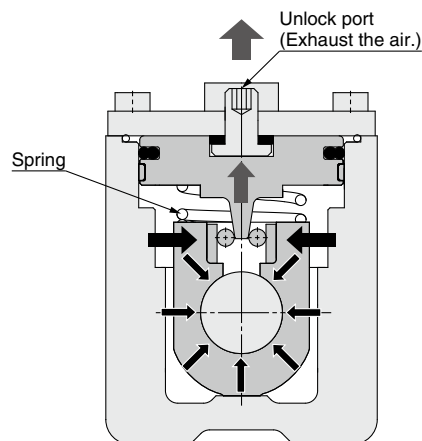
### Normal Operation (Operation pressurized by air)



#### Unlocked (when air pressure is applied)

When air is supplied to the unlock port, the piston moves downward, the brake pad is opened by the tapered portion at the bottom of the piston and the piston rod will be free to move. This is the lock released state.

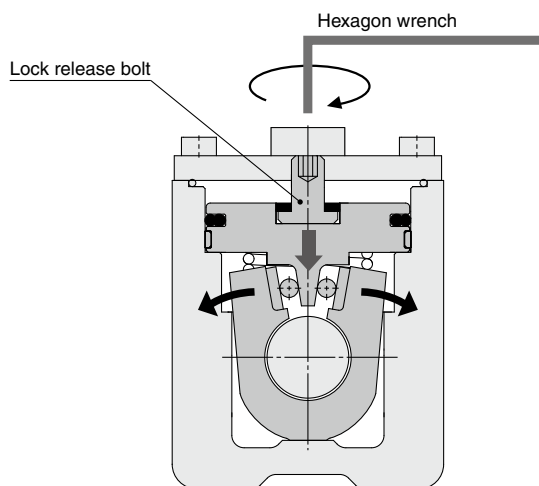
\* Check that there is no air leakage from the unlock port.



#### Locked (when air is exhausted)

When the air supplied to the unlock port is exhausted, the piston moves upward due to the spring force at the bottom of the piston and rigidity of the brake pad. Then, the brake pad is closed and holds the piston rod, locking its movement. This is the locked state.

### Manual Lock Release



#### Manual lock released

When the lock release bolt is screwed-in, the piston moves downward, the brake pad is opened by the tapered portion of the piston and the piston rod will be freed. This holds the lock in the released state. Refer to page 52 for how to return to the locked state.

Model  
Selection

Working  
Principle

CP96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

C96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

Lock Unit  
MWB-UT

Accessories

Auto Switch

Made to  
Order

Specific Product  
Precautions

# Cylinder with Lock

## Double Acting, Single Rod/Double Rod

# CP96N Series

ø32, ø40, ø50, ø63, ø80, ø100

RoHS

### How to Order

**CP96N** **B** **32** - **100** **C** **J** **W** - **□** **□** - **□**

**With auto switch** **CP96N D** **B** **32** - **100** **C** **J** **W** - **□** **□** - **M9BW** **S** - **□**

**With auto switch** (Built-in magnet)

**Mounting**

| Symbol   | Description   | Single rod | Double rod |
|----------|---------------|------------|------------|
| <b>B</b> | Basic         | ○          | ○          |
| <b>L</b> | Axial foot    | ○          | ○          |
| <b>F</b> | Rod flange    | ○          | ○          |
| <b>G</b> | Head flange   | ○          | ○          |
| <b>C</b> | Single clevis | ○          | —          |
| <b>D</b> | Double clevis | ○          | —          |

\* Mounting brackets are shipped together with the product but do not come assembled.  
\* The single clevis with ball joint should be ordered separately.

**Bore size**

| Symbol     | Bore size [mm] |
|------------|----------------|
| <b>32</b>  | 32 mm          |
| <b>40</b>  | 40 mm          |
| <b>50</b>  | 50 mm          |
| <b>63</b>  | 63 mm          |
| <b>80</b>  | 80 mm          |
| <b>100</b> | 100 mm         |

**Cylinder stroke [mm]**

Refer to page 10 for standard strokes.

**Air cushion on both ends + Bumper cushion**

**Rod boot**

| Symbol     | Description                          |
|------------|--------------------------------------|
| <b>Nil</b> | Without rod boot                     |
| <b>J</b>   | Nylon tarpaulin (One end)            |
| <b>JJ</b>  | Nylon tarpaulin (Both ends)          |
| <b>K</b>   | Heat-resistant tarpaulin (One end)   |
| <b>KK</b>  | Heat-resistant tarpaulin (Both ends) |

**Rod**

| Symbol     | Description |
|------------|-------------|
| <b>Nil</b> | Single rod  |
| <b>W</b>   | Double rod  |

**Pivot bracket**

| Symbol     | Description   |
|------------|---------------|
| <b>Nil</b> | No bracket    |
| <b>N</b>   | Pivot bracket |

\* Only for the D mounting type  
\* The double clevis pivot bracket and clevis pivot bracket with ball joint should be ordered separately.

**Rod end bracket**

| Symbol     | Description |
|------------|-------------|
| <b>Nil</b> | No bracket  |
| <b>W</b>   | Rod clevis  |

\* The floating joint and rod end should be ordered separately.

**Made to order**

Refer to page 10 for details.

**Number of auto switches**

| Symbol     | Number |
|------------|--------|
| <b>Nil</b> | 2      |
| <b>S</b>   | 1      |
| <b>3</b>   | 3      |
| <b>n</b>   | n      |

**Auto switch**

| Symbol     | Description         |
|------------|---------------------|
| <b>Nil</b> | Without auto switch |

\* For applicable auto switches, refer to the table below.

**Refer to the Ordering Example of Cylinder Assembly on page 10.**

### Applicable Auto Switches/Refer to the Web Catalog or Best Pneumatics Catalog for further information on auto switches.

| Type                    | Special function                          | Electrical entry | Indicator light | Wiring (Output)         | Load voltage |               | Auto switch model |                | Lead wire length [m] |       |       |       | Pre-wired connector | Applicable load |            |
|-------------------------|-------------------------------------------|------------------|-----------------|-------------------------|--------------|---------------|-------------------|----------------|----------------------|-------|-------|-------|---------------------|-----------------|------------|
|                         |                                           |                  |                 |                         | DC           | AC            | Perpendicular     | In-line        | 0.5 (Nil)            | 1 (M) | 3 (L) | 5 (Z) |                     |                 |            |
| Solid state auto switch | Diagnostic indication (2-color indicator) | Grommet          | Yes             | 3-wire (NPN)            | 5 V, 12 V    | —             | <b>M9NV</b>       | <b>M9N</b>     | ●                    | ●     | ●     | ○     | ○                   | IC circuit      | Relay, PLC |
|                         |                                           |                  |                 | 3-wire (PNP)            | 12 V         |               | <b>M9PV</b>       | <b>M9P</b>     | ●                    | ●     | ●     | ○     | ○                   | —               |            |
|                         |                                           |                  |                 | 2-wire                  | 5 V, 12 V    |               | <b>M9BV</b>       | <b>M9B</b>     | ●                    | ●     | ●     | ○     | ○                   | —               |            |
|                         |                                           |                  |                 | 3-wire (NPN)            | 5 V, 12 V    |               | <b>M9NWV</b>      | <b>M9NW</b>    | ●                    | ●     | ●     | ○     | ○                   | IC circuit      |            |
|                         |                                           |                  |                 | 3-wire (PNP)            | 12 V         |               | <b>M9PWV</b>      | <b>M9PW</b>    | ●                    | ●     | ●     | ○     | ○                   | —               |            |
|                         |                                           |                  |                 | 2-wire                  | 5 V, 12 V    |               | <b>M9BWV</b>      | <b>M9BW</b>    | ●                    | ●     | ●     | ○     | ○                   | —               |            |
|                         | Water-resistant (2-color indicator)       | Grommet          | Yes             | 3-wire (NPN)            | 5 V, 12 V    |               | <b>M9NAV</b> *1   | <b>M9NA</b> *1 | ○                    | ○     | ●     | ○     | ○                   | IC circuit      |            |
|                         |                                           |                  |                 | 3-wire (PNP)            | 12 V         |               | <b>M9PAV</b> *1   | <b>M9PA</b> *1 | ○                    | ○     | ●     | ○     | ○                   | —               |            |
|                         |                                           |                  |                 | 2-wire                  | 5 V, 12 V    |               | <b>M9BAV</b> *1   | <b>M9BA</b> *1 | ○                    | ○     | ●     | ○     | ○                   | —               |            |
|                         |                                           |                  |                 | 2-wire                  | 12 V         |               |                   |                | ○                    | ○     | ○     | ○     | ○                   | —               |            |
| Reed auto switch        | —                                         | Grommet          | Yes             | 3-wire (NPN equivalent) | 5 V          | —             | <b>A96V</b>       | <b>A96</b>     | ●                    | —     | ●     | —     | —                   | IC circuit      | —          |
|                         |                                           |                  | No              | 2-wire                  | 24 V         | 100 V         | <b>A93V</b> *2    | <b>A93</b>     | ●                    | ●     | ●     | ●     | —                   | —               | Relay, PLC |
|                         |                                           |                  |                 |                         |              | 100 V or less | <b>A90V</b>       | <b>A90</b>     | ●                    | —     | ●     | —     | —                   | IC circuit      |            |

\*1 Water-resistant type auto switches can be mounted on the above models, but SMC cannot guarantee water resistance.

\*2 The 1 m lead wire is only applicable to the D-A93.

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NV  
1 m ..... M (Example) M9NM  
3 m ..... L (Example) M9NL  
5 m ..... Z (Example) M9NZ

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

\* Since there are applicable auto switches other than those listed above, refer to page 23 for details.

\* The D-A9□/M9□/M9□/M9□ auto switches are shipped together with the product but do not come assembled. (Only the auto switch mounting brackets are assembled before shipment.)

\* The D-Y59A, Y69A, Y7P, Y7□W, Z7□, Z80 cannot be mounted.

Moreover, the D-M9□□ and A9□ auto switches cannot be mounted on square groove.

# Cylinder with Lock Double Acting, Single Rod/Double Rod **CP96N Series**



**Made to Order Common Specifications**  
(For details, refer to pages 46 to 48.)

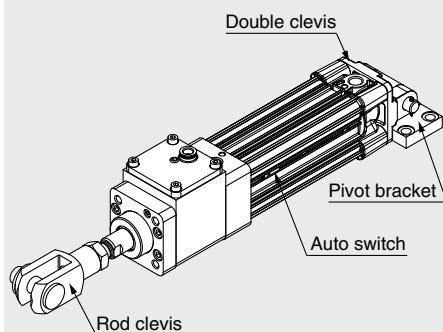
| Symbol | Specifications                            |
|--------|-------------------------------------------|
| -XA□   | Change of rod end shape (Single rod only) |
| -XC35  | With coil scraper                         |

For details of **cylinders with auto switches**  
⇒ page 23

- Auto Switch Proper Mounting Position (Detection at stroke end)
- Minimum Stroke for Auto Switch Mounting
- Operating Range

## Ordering Example of Cylinder Assembly

Cylinder model: CP96NDD50-100C-NW-M9BW



**Mounting D: Double clevis**  
**Pivot bracket N: Yes**  
**Rod end bracket W: Rod clevis**  
**Auto switch D-M9BW: 2 pcs.**

\* Pivot bracket, rod clevis, and auto switch are shipped together with the product but do not come assembled.

## Cylinder Specifications

| Bore size [mm]                 | 32                                                                                                                                                                                                                                                                            | 40   | 50 | 63   | 80 | 100  |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----|------|----|------|
| Action                         | Double acting                                                                                                                                                                                                                                                                 |      |    |      |    |      |
| Fluid                          | Air                                                                                                                                                                                                                                                                           |      |    |      |    |      |
| Proof pressure                 | 1.5 MPa                                                                                                                                                                                                                                                                       |      |    |      |    |      |
| Max. operating pressure        | 1.0 MPa                                                                                                                                                                                                                                                                       |      |    |      |    |      |
| Min. operating pressure        | 0.08 MPa                                                                                                                                                                                                                                                                      |      |    |      |    |      |
| Ambient and fluid temperatures | Without auto switch: -10°C to 70°C<br>With auto switch: -10°C to 60°C (No freezing)                                                                                                                                                                                           |      |    |      |    |      |
| Lubricant                      | Not required (Non-lube)                                                                                                                                                                                                                                                       |      |    |      |    |      |
| Piston speed                   | 50 to 1000 mm/s*1                                                                                                                                                                                                                                                             |      |    |      |    |      |
| Stroke length tolerance        | Up to 500 st: $\begin{smallmatrix} +2.0 \\ 0 \end{smallmatrix}$ , 501 to 1000 st: $\begin{smallmatrix} +2.4 \\ 0 \end{smallmatrix}$ , 1001 to 1500 st: $\begin{smallmatrix} +2.8 \\ 0 \end{smallmatrix}$ , 1501 to 2000 st: $\begin{smallmatrix} +3.2 \\ 0 \end{smallmatrix}$ |      |    |      |    |      |
| Cushion                        | Air cushion on both ends + Bumper cushion                                                                                                                                                                                                                                     |      |    |      |    |      |
| Port size                      | G1/8                                                                                                                                                                                                                                                                          | G1/4 |    | G3/8 |    | G1/2 |
| Mounting                       | Basic, Axial foot, Rod flange, Head flange<br>Single clevis, Double clevis                                                                                                                                                                                                    |      |    |      |    |      |

\*1 Load limits exist depending upon the piston speed when locked, mounting direction, and operating pressure.

## Lock Unit Specifications

| Bore size [mm]                                | 32              | 40  | 50   | 63   | 80   | 100  |
|-----------------------------------------------|-----------------|-----|------|------|------|------|
| <b>Locking action</b>                         | Exhaust locking |     |      |      |      |      |
| <b>Max. operating pressure</b>                | 1.0 MPa         |     |      |      |      |      |
| <b>Min. operating pressure</b>                | 0.3 MPa         |     |      |      |      |      |
| <b>Locking direction</b>                      | Both directions |     |      |      |      |      |
| <b>Holding force (Max. static load) [N]*1</b> | 630             | 980 | 1570 | 2450 | 3920 | 6080 |

\*1 The holding force (max. static load) shows the maximum capability and does not show the normal holding capability. Be sure to select a cylinder using the method described in Model Selection (page 6).

## Standard Strokes

\* When using with auto switches, refer to the Minimum Stroke for Auto Switch Mounting table on page 23.

| Bore size  | Standard stroke                                                   | Max. stroke |
|------------|-------------------------------------------------------------------|-------------|
| <b>32</b>  | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500                | 2000        |
| <b>40</b>  | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500                | 2000        |
| <b>50</b>  | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600           | 2000        |
| <b>63</b>  | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600           | 2000        |
| <b>80</b>  | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600, 700, 800 | 2000        |
| <b>100</b> | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600, 700, 800 | 2000        |

- \* The manufacturing of intermediate strokes is possible. (Spacers are not used.)
- \* Applicable strokes should be confirmed according to the usage. For details, refer to the Air Cylinders Model Selection in the **Web Catalog** or Best Pneumatics Catalog. In addition, products that exceed the standard stroke might not be able to fulfill the specifications due to deflection, etc.
- \* When using a rod boot, a stroke range of up to 1000 mm is available. Please consult with SMC when exceeding a 1000 mm stroke.

## Stopping Accuracy

| Bore size [mm]                | 32                                                                                                                                                                                                                                                                                                                                                  | 40 | 50 | 63 | 80 | 100 |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|----|-----|
| <b>Lock type</b>              | Exhaust locking                                                                                                                                                                                                                                                                                                                                     |    |    |    |    |     |
| <b>Stopping accuracy [mm]</b> | ±1.0                                                                                                                                                                                                                                                                                                                                                |    |    |    |    |     |
| <b>Conditions</b>             | <ul style="list-style-type: none"> <li>· Mounting orientation: Horizontal</li> <li>· Supply pressure: 0.5 MPa</li> <li>· Piston speed: 300 mm/s</li> <li>· Load condition: Upper limit of allowed value</li> </ul> Solenoid valve for locking is mounted on the unlock port.<br>Maximum value of stopping position dispersion from 100 measurements |    |    |    |    |     |



# CP96N Series

## Accessories

| Mounting |             | Basic | Axial foot | Rod flange | Head flange | Single clevis | Double clevis |
|----------|-------------|-------|------------|------------|-------------|---------------|---------------|
| Standard | Rod end nut | ●     | ●          | ●          | ●           | ●             | ●             |
|          | Clevis pin  | —     | —          | —          | —           | —             | ●             |
| Option   | Rod end     | ●     | ●          | ●          | ●           | ●             | ●             |
|          | Rod clevis  | ●     | ●          | ●          | ●           | ●             | ●             |
|          | Rod boot    | ●     | ●          | ●          | ●           | ●             | ●             |

- \* Do not use a rod end (or floating joint) together with a single clevis with a ball joint (or clevis pivot bracket with a ball joint).
- \* Refer to pages 19 to 22 for dimensions and part numbers of the accessories. (Excludes the rod end nut, clevis pin, and rod boot)

## Mounting Bracket/Rod End Bracket Part Nos.

| Bore size [mm] |                                              | 32          | 40          | 50          | 63          | 80           | 100          |
|----------------|----------------------------------------------|-------------|-------------|-------------|-------------|--------------|--------------|
| L              | Axial foot*1                                 | L5032       | L5040       | L5050       | L5063       | L5080        | L5100        |
| F, G           | Rod/Head flange                              | F5032       | F5040       | F5050       | F5063       | F5080        | F5100        |
| C              | Single clevis                                | C5032       | C5040       | C5050       | C5063       | C5080        | C5100        |
| D              | Double clevis                                | D5032       | D5040       | D5050       | D5063       | D5080        | D5100        |
| E              | Clevis pivot bracket                         | E5032       | E5040       | E5050       | E5063       | E5080        | E5100        |
| CS             | Single clevis with ball joint                | CS5032      | CS5040      | CS5050      | CS5063      | CS5080       | CS5100       |
| DS             | Double clevis pivot bracket for ES accessory | DS5032      | DS5040      | DS5050      | DS5063      | DS5080       | DS5100       |
| ES             | Clevis pivot bracket with ball joint         | ES5032      | ES5040      | ES5050      | ES5063      | ES5080       | ES5100       |
| GKM            | Rod clevis                                   | GKM10-20    | GKM12-24    | GKM16-32    | GKM16-32    | GKM20-40     | GKM20-40     |
| KJ             | Rod end                                      | KJ10D       | KJ12D       | KJ16D       | KJ16D       | KJ20D        | KJ20D        |
| JA             | Floating joint                               | JA30-10-125 | JA40-12-125 | JA50-16-150 | JA50-16-150 | JAH50-20-150 | JAH50-20-150 |

- \*1 Order two foot brackets per cylinder.
- \* Accessories for each mounting bracket are as follows.  
Axial foot, Rod/Head flange, Single clevis: Body mounting bolt  
Double clevis (D, DS): Body mounting bolt, Clevis pin, Clevis pin bracket
- \* The rod clevis (GKM) is compliant with ISO 8140.
- \* The rod end (KJ) is compliant with ISO 8139.

## Theoretical Output



[Unit: N]

| Bore size<br>[mm] | Rod size<br>[mm] | Operating<br>direction | Piston area<br>[mm <sup>2</sup> ] | Operating pressure [MPa] |      |      |      |      |      |      |      |      |
|-------------------|------------------|------------------------|-----------------------------------|--------------------------|------|------|------|------|------|------|------|------|
|                   |                  |                        |                                   | 0.2                      | 0.3  | 0.4  | 0.5  | 0.6  | 0.7  | 0.8  | 0.9  | 1.0  |
| 32                | 12               | OUT                    | 804                               | 161                      | 241  | 322  | 402  | 482  | 563  | 643  | 724  | 804  |
|                   |                  | IN                     | 691                               | 138                      | 207  | 276  | 346  | 415  | 484  | 553  | 622  | 691  |
| 40                | 16               | OUT                    | 1257                              | 251                      | 377  | 503  | 629  | 754  | 880  | 1006 | 1131 | 1257 |
|                   |                  | IN                     | 1056                              | 211                      | 317  | 422  | 528  | 634  | 739  | 845  | 950  | 1056 |
| 50                | 20               | OUT                    | 1963                              | 393                      | 589  | 785  | 982  | 1178 | 1374 | 1570 | 1767 | 1963 |
|                   |                  | IN                     | 1649                              | 330                      | 495  | 660  | 825  | 989  | 1154 | 1319 | 1484 | 1649 |
| 63                | 20               | OUT                    | 3117                              | 623                      | 935  | 1247 | 1559 | 1870 | 2182 | 2494 | 2805 | 3117 |
|                   |                  | IN                     | 2803                              | 561                      | 841  | 1121 | 1402 | 1682 | 1962 | 2242 | 2523 | 2803 |
| 80                | 25               | OUT                    | 5027                              | 1005                     | 1508 | 2011 | 2514 | 3016 | 3519 | 4022 | 4524 | 5027 |
|                   |                  | IN                     | 4536                              | 907                      | 1361 | 1814 | 2268 | 2722 | 3175 | 3629 | 4082 | 4536 |
| 100               | 30               | OUT                    | 7854                              | 1571                     | 2356 | 3142 | 3927 | 4712 | 5498 | 6283 | 7069 | 7854 |
|                   |                  | IN                     | 7147                              | 1429                     | 2144 | 2859 | 3574 | 4288 | 5003 | 5718 | 6432 | 7147 |

\* Theoretical output [N] = Pressure [MPa] x Piston area [mm<sup>2</sup>]

## Weight

### Single Rod (ø32 to ø100)

[kg]

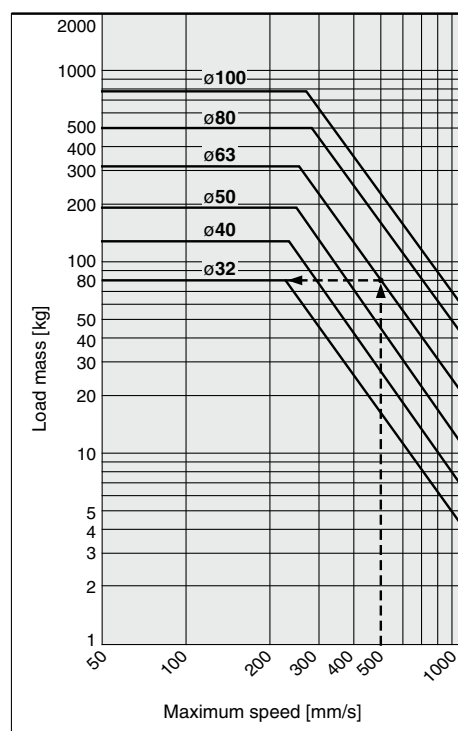
| Bore size [mm]                                                   |                       |                        | 32   | 40   | 50   | 63   | 80   | 100  |
|------------------------------------------------------------------|-----------------------|------------------------|------|------|------|------|------|------|
| Basic weight<br>(at 0 stroke)                                    | Basic                 | Lock unit              | 0.42 | 0.83 | 1.15 | 1.79 | 2.81 | 5.44 |
|                                                                  |                       | Cylinder (at 0 stroke) | 0.55 | 0.84 | 1.41 | 1.79 | 3.25 | 4.61 |
|                                                                  |                       | Total                  | 0.97 | 1.67 | 2.56 | 3.58 | 6.06 | 10.1 |
| Mounting bracket weight<br>(including bracket<br>mounting bolts) | Foot bracket (2 pcs.) |                        | 0.16 | 0.20 | 0.38 | 0.46 | 0.89 | 1.09 |
|                                                                  | Rod/Head flange       |                        | 0.20 | 0.23 | 0.47 | 0.58 | 1.30 | 1.81 |
|                                                                  | Single clevis bracket |                        | 0.16 | 0.23 | 0.37 | 0.60 | 1.07 | 1.73 |
|                                                                  | Double clevis bracket |                        | 0.20 | 0.32 | 0.45 | 0.71 | 1.28 | 2.11 |
| Additional weight per 50 mm of stroke                            |                       |                        | 0.14 | 0.18 | 0.30 | 0.32 | 0.49 | 0.54 |
| Accessories                                                      | Rod end               |                        | 0.07 | 0.11 | 0.22 | 0.40 |      |      |
|                                                                  | Rod clevis            |                        | 0.09 | 0.15 | 0.34 | 0.69 |      |      |

## Rod Boot Material

| Symbol | Material                 | Max. ambient temp. |
|--------|--------------------------|--------------------|
| J      | Nylon tarpaulin          | 70°C               |
| K      | Heat-resistant tarpaulin | 110°C*1            |

\*1 Max. ambient temperature for rod boot itself

## Allowable Kinetic Energy of the Cylinder\*1



Example) Load limit at rod end when the air cylinder ø63 is actuated at 500 mm/s.  
Extend upward from 500 mm/s on the horizontal axis of the graph to the intersection point with the line for a tube bore size of 63 mm, and then extend a tangent from this point to find the load of 80 kg.

\*1 The allowable kinetic energy of the cylinder is shown without the intermediate stop or emergency stop. Refer to page 6 or 7 for the kinetic energy with intermediate or emergency stop.

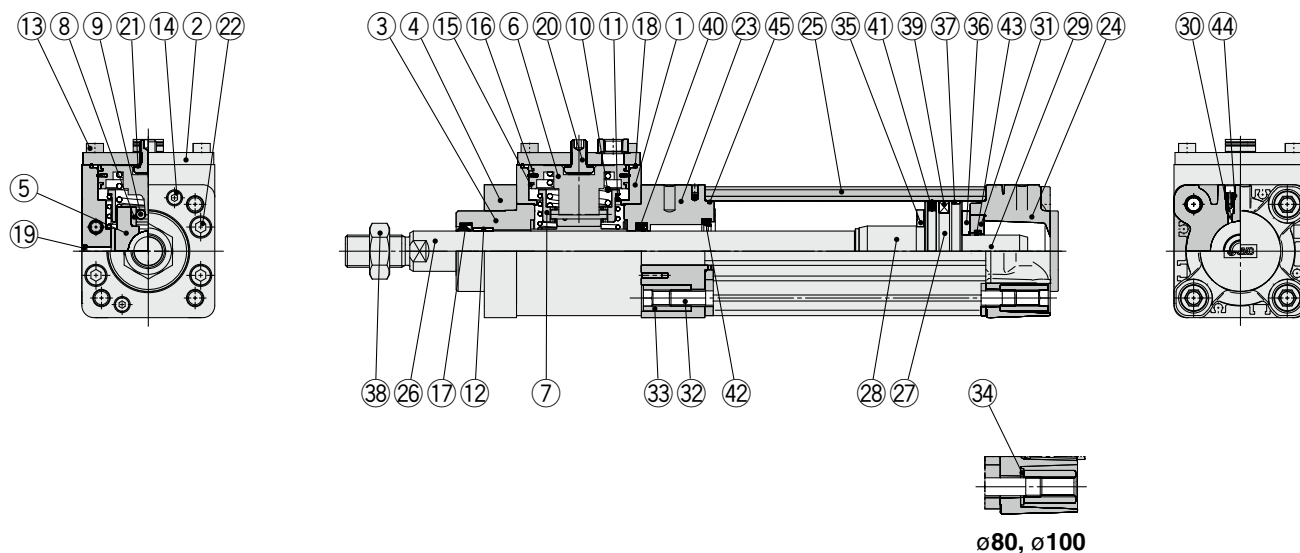
Calculation example)

**CP96NL32-100C** (Axial foot, ø32, 100 mm stroke)

- Basic weight...0.42 (Lock unit, ø32)
- Basic weight...0.55 (Cylinder, ø32)
- Additional weight...0.14/50 mm stroke
- Cylinder stroke...100 mm stroke
- Foot bracket...0.16

$$0.42 + 0.55 + (0.14/50) \times 100 + 0.16 = 1.41 \text{ kg}$$

## Construction (Single Rod)



### Component Parts

| No. | Description                   | Material              | Qty. | Note                |
|-----|-------------------------------|-----------------------|------|---------------------|
| 1   | Brake unit                    | Aluminum alloy        | 1    | Hard anodized       |
| 2   | Cap                           | Rolled steel          | 1    | Zinc chromated      |
| 3   | Collar                        | Aluminum alloy        | 1    | Chromated           |
| 4   | Retaining plate               | Aluminum alloy        | 1    | Anodized            |
| 5   | Brake pad                     | Cast iron             | 1    |                     |
| 6   | Piston A                      | Aluminum alloy        | 1    |                     |
| 7   | Roller holder                 | Carbon steel          | 1    |                     |
| 8   | Roller receiver               | Stainless steel       | 2    |                     |
| 9   | Needle roller                 | Carbon steel          | 2    |                     |
| 10  | Piston spring                 | Spring steel          | 1    | Zinc chromated      |
| 11  | Roller spring                 | Spring steel          | 1    | Zinc chromated      |
| 12  | Bushing                       | Bearing alloy         | 1    |                     |
| 13  | Hexagon socket head cap screw | Alloy steel           | 4    |                     |
| 14  | Hexagon socket head cap screw | Alloy steel           | 2    |                     |
| 15  | Wear ring A                   | Resin                 | 2    |                     |
| 16  | Piston seal A                 | NBR                   | 1    |                     |
| 17  | Rod seal A                    | NBR                   | 1    |                     |
| 18  | Gasket                        | NBR                   | 1    |                     |
| 19  | Element                       | Bronze                | 1    |                     |
| 20  | Release bolt                  | Alloy steel           | 1    |                     |
| 21  | Seal washer                   | NBR + Stainless steel | 1    |                     |
| 22  | Hexagon socket head cap screw | Alloy steel           | 4    |                     |
| 23  | Rod cover                     | Aluminum alloy        | 1    | Anodized            |
| 24  | Head cover                    | Aluminum die-cast     | 1    | Chromated           |
| 25  | Cylinder tube                 | Aluminum alloy        | 1    | Hard anodized       |
| 26  | Piston rod                    | Carbon steel          | 1    | Hard chrome plating |
| 27  | Piston B                      | Aluminum alloy        | 1    | ø32 to ø63          |
|     |                               | Aluminum die-cast     | 1    | ø80, ø100           |
| 28  | Cushion ring                  | Aluminum alloy        | 1    | Anodized            |
| 29  | Cushion ring B                | Aluminum alloy        | 1    | Anodized            |
| 30  | Cushion valve                 | Resin                 | 2    |                     |
| 31  | Cushion seal holder           | Aluminum alloy        | 1    | Anodized            |

### Component Parts

| No. | Description          | Material     | Qty. | Note           |
|-----|----------------------|--------------|------|----------------|
| 32  | Tie-rod              | Carbon steel | 4    | Zinc chromated |
| 33  | Tie-rod nut          | Rolled steel | 8    | Zinc chromated |
| 34  | Flat washer          | Steel        | 8    | ø80, ø100      |
| 35  | Bumper A             | Urethane     | 1    |                |
| 36  | Bumper B             | Urethane     | 1    |                |
| 37  | Wear ring B          | Resin        | 1    |                |
| 38  | Rod end nut          | Carbon steel | 1    | Zinc chromated |
| 39  | Magnet               | —            | (1)  |                |
| 40  | Rod seal B           | NBR          | 1    |                |
| 41  | Piston seal B        | NBR          | 1    |                |
| 42  | Cushion seal A       | Urethane     | 1    |                |
| 43  | Cushion seal B       | Urethane     | 1    |                |
| 44  | Cushion valve seal   | NBR          | 2    |                |
| 45  | Cylinder tube gasket | NBR          | 2    |                |

### Replacement Parts/Seal Kit

| Bore size [mm] | Kit no.    | Contents                                                                                                                   |
|----------------|------------|----------------------------------------------------------------------------------------------------------------------------|
| 32             | C96N32-PS  | A set of 17 Rod seal A, 40 Rod seal B, 41 Piston seal B, 42 Cushion seal A, 43 Cushion seal B, and 45 Cylinder tube gasket |
| 40             | C96N40-PS  |                                                                                                                            |
| 50             | C96N50-PS  |                                                                                                                            |
| 63             | C96N63-PS  |                                                                                                                            |
| 80             | C96N80-PS  |                                                                                                                            |
| 100            | C96N100-PS |                                                                                                                            |

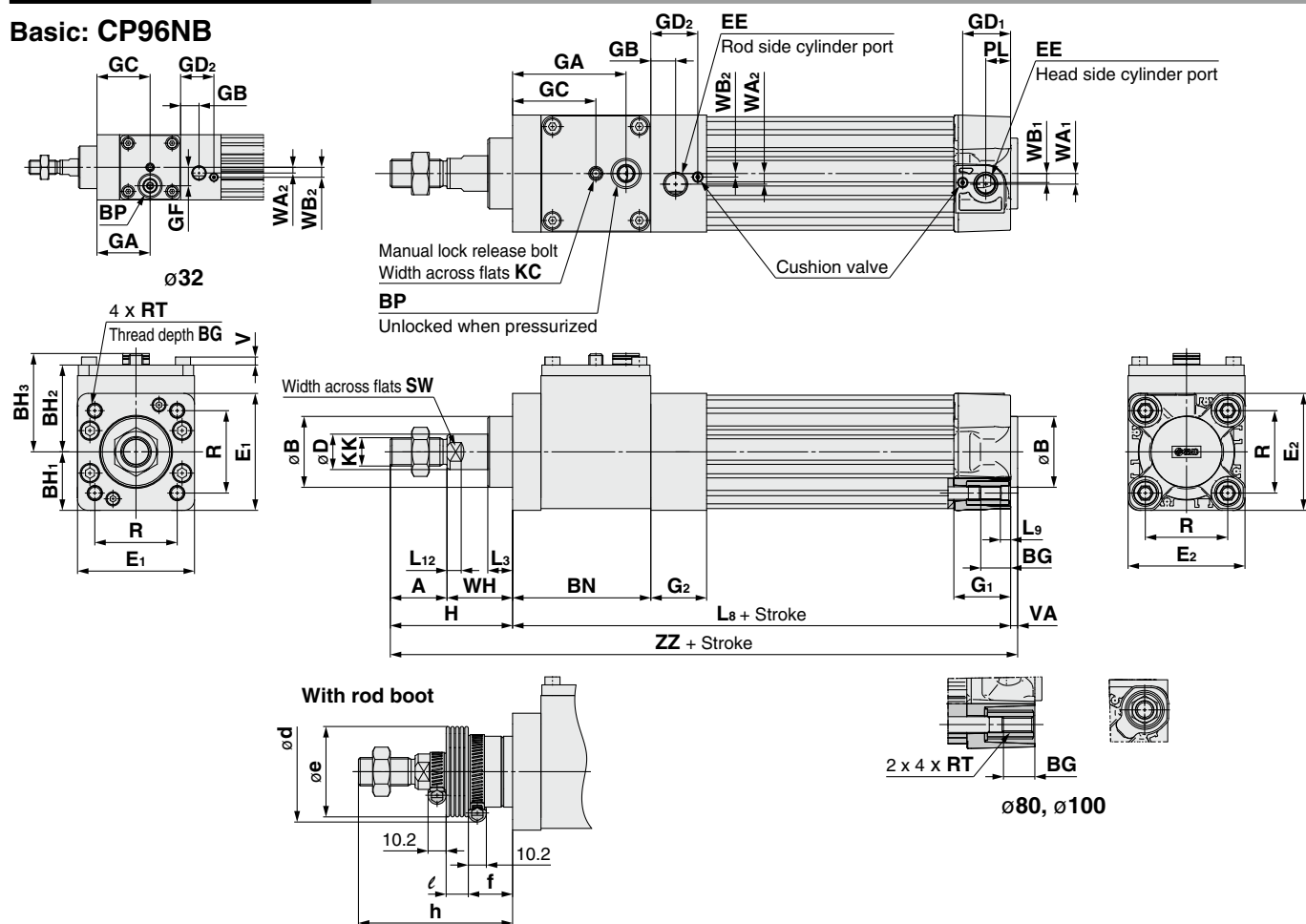
\* Never disassemble the lock unit. It should be replaced as a unit. Refer to page 52 for the part numbers for placing an order. The seal kit shown above contains the rod seal for the cylinder and lock unit. Order the seal kit suitable for the cylinder bore size.

\* The seal kit shown above includes a grease pack.  
(ø32, ø40, ø50: 10 g, ø63, ø80: 20 g, ø100: 30 g)  
Order with the following part number when only the grease pack is needed.  
**Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)**

# CP96N Series

## Dimensions (Single Rod)

### Basic: CP96NB



| Bore size | Stroke range | A  | øB <sub>d11</sub> | BG | BH <sub>1</sub> | BH <sub>2</sub> | BH <sub>3</sub> | BN  | BP   | øD | E <sub>1</sub> | E <sub>2</sub> | EE   | G <sub>1</sub> | G <sub>2</sub> | GA   | GB | GC   | GD <sub>1</sub> | GD <sub>2</sub> | GF |
|-----------|--------------|----|-------------------|----|-----------------|-----------------|-----------------|-----|------|----|----------------|----------------|------|----------------|----------------|------|----|------|-----------------|-----------------|----|
| 32        | Up to 2000   | 22 | 30                | 16 | 23              | 38.5            | 46.5            | 59  | G1/8 | 12 | 46             | 47             | G1/8 | 28.9           | 28.5           | 37.5 | 13 | 37.5 | 23.9            | 23.5            | 13 |
| 40        | Up to 2000   | 24 | 35                | 16 | 28.5            | 42.5            | 48.5            | 73  | G1/8 | 16 | 57             | 54             | G1/4 | 32.6           | 29             | 59.5 | 14 | 44.5 | 27.6            | 24              | —  |
| 50        | Up to 2000   | 32 | 40                | 16 | 33              | 49              | 55.5            | 78  | G1/8 | 20 | 66             | 66             | G1/4 | 32             | 31.5           | 64   | 14 | 47   | 27              | 26.5            | —  |
| 63        | Up to 2000   | 32 | 45                | 16 | 39              | 52.5            | 59.5            | 90  | G1/4 | 20 | 78             | 77             | G3/8 | 38.6           | 31.5           | 73   | 16 | 53   | 31.6            | 26.5            | —  |
| 80        | Up to 2000   | 40 | 45                | 17 | 49              | 64.5            | 71.5            | 113 | G1/4 | 25 | 98             | 99             | G3/8 | 38.4           | 38             | 92   | 16 | 65   | 32              | 31.6            | —  |
| 100       | Up to 2000   | 40 | 55                | 17 | 58              | 73.5            | 80.5            | 131 | G1/4 | 30 | 116            | 118            | G1/2 | 42.9           | 38             | 109  | 18 | 74   | 36.5            | 31.6            | —  |

| Bore size | Stroke range | H  | KC | KK         | L <sub>3</sub> | L <sub>8</sub> | L <sub>9</sub> | L <sub>12</sub> | PL | R    | RT        | SW | V   | VA | WA <sub>1</sub> | WA <sub>2</sub> | WB <sub>1</sub> | WB <sub>2</sub> | WH | ZZ    |
|-----------|--------------|----|----|------------|----------------|----------------|----------------|-----------------|----|------|-----------|----|-----|----|-----------------|-----------------|-----------------|-----------------|----|-------|
| 32        | Up to 2000   | 48 | 3  | M10 x 1.25 | 13             | 152            | 4              | 6               | 13 | 32.5 | M6 x 1    | 10 | 3.5 | 4  | 4               | 4               | 7               | 7               | 26 | 204   |
| 40        | Up to 2000   | 54 | 3  | M12 x 1.25 | 13             | 171            | 4              | 6.5             | 14 | 38   | M6 x 1    | 13 | 4.5 | 4  | 5               | 7               | 8.9             | 1.8             | 30 | 229   |
| 50        | Up to 2000   | 69 | 4  | M16 x 1.5  | 14             | 181            | 5              | 8               | 14 | 46.5 | M8 x 1.25 | 17 | 4.5 | 4  | 6               | 6               | 5.1             | 2               | 37 | 254   |
| 63        | Up to 2000   | 69 | 4  | M16 x 1.5  | 14             | 200.5          | 5              | 8               | 16 | 56.5 | M8 x 1.25 | 17 | 5.5 | 4  | 9               | 9               | 6.3             | 2               | 37 | 273.5 |
| 80        | Up to 2000   | 86 | 5  | M20 x 1.5  | 20             | 238            | —              | 10              | 16 | 72   | M10 x 1.5 | 22 | 7.5 | 4  | 11.5            | 11.5            | 6               | 6               | 46 | 328   |
| 100       | Up to 2000   | 91 | 5  | M20 x 1.5  | 20             | 261.5          | —              | 10              | 18 | 89   | M10 x 1.5 | 26 | 9.5 | 4  | 17              | 17              | 10              | 3               | 51 | 356.5 |

### With Rod Boot

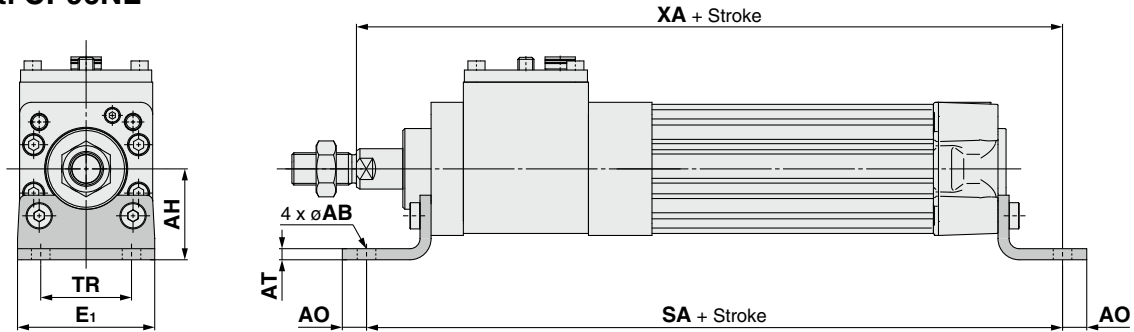
| Bore size | d  | e  | f  | h       |           |            |            |            |            |            |            |            |            |            |             |
|-----------|----|----|----|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
|           |    |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 501 to 600 | 601 to 700 | 701 to 800 | 801 to 900 | 901 to 1000 |
| 32        | 54 | 36 | 23 | 75      | 88        | 100        | 113        | 138        | 163        | 188        | 213        | 238        | 263        | 288        | 313         |
| 40        | 56 | 41 | 23 | 75      | 88        | 100        | 113        | 138        | 163        | 188        | 213        | 238        | 263        | 288        | 313         |
| 50        | 64 | 51 | 25 | 87      | 100       | 112        | 125        | 150        | 175        | 200        | 225        | 250        | 275        | 300        | 325         |
| 63        | 64 | 51 | 25 | 87      | 100       | 112        | 125        | 150        | 175        | 200        | 225        | 250        | 275        | 300        | 325         |
| 80        | 68 | 56 | 29 | 103     | 116       | 128        | 141        | 166        | 191        | 216        | 241        | 266        | 291        | 316        | 341         |
| 100       | 76 | 61 | 29 | 103     | 116       | 128        | 141        | 166        | 191        | 216        | 241        | 266        | 291        | 316        | 341         |

| Bore size | ℓ       |           |            |            |            |            |            |            |            |            |            |             |
|-----------|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
|           | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 501 to 600 | 601 to 700 | 701 to 800 | 801 to 900 | 901 to 1000 |
| 32        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         |
| 40        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         |
| 50        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         |
| 63        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         |
| 80        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         |
| 100       | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         |

## Dimensions: With Mounting Bracket

\* Refer to Basic (B) for other dimensions.

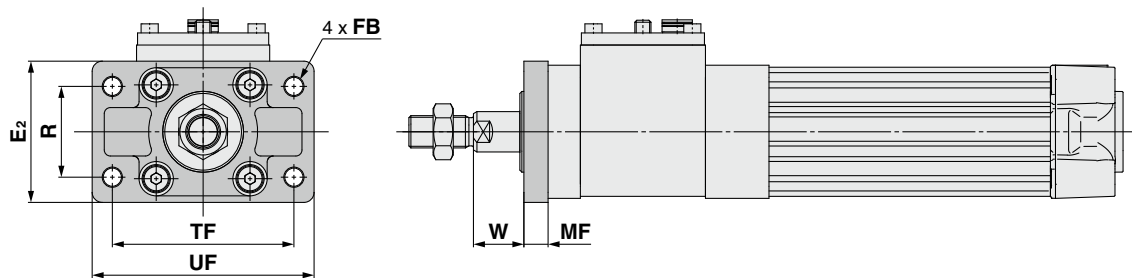
### Axial foot: CP96NL



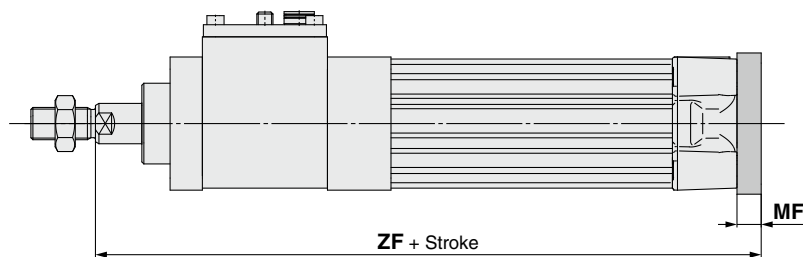
| Bore size | AB   | AH | AO | AT  | E <sub>1</sub> | SA    | TR | XA    |
|-----------|------|----|----|-----|----------------|-------|----|-------|
| 32        | 7    | 32 | 10 | 4.5 | 48             | 200   | 32 | 202   |
| 40        | 10   | 36 | 11 | 4.5 | 55             | 227   | 36 | 229   |
| 50        | 10   | 45 | 12 | 5.5 | 68             | 245   | 45 | 250   |
| 63        | 10   | 50 | 12 | 5.5 | 80             | 264.5 | 50 | 269.5 |
| 80        | 12   | 63 | 14 | 6.5 | 100            | 320   | 63 | 325   |
| 100       | 14.5 | 71 | 16 | 6.5 | 120            | 343.5 | 75 | 353.5 |

### Flange

#### Rod side: CP96NF



#### Head side: CP96NG



| Bore size | E <sub>2</sub> | FB | MF | R  | TF  | UF  | W  | ZF    |
|-----------|----------------|----|----|----|-----|-----|----|-------|
| 32        | 50             | 7  | 10 | 32 | 64  | 79  | 16 | 188   |
| 40        | 55             | 9  | 10 | 36 | 72  | 90  | 20 | 211   |
| 50        | 70             | 9  | 12 | 45 | 90  | 110 | 25 | 230   |
| 63        | 80             | 9  | 12 | 50 | 100 | 120 | 25 | 249.5 |
| 80        | 100            | 12 | 16 | 63 | 126 | 153 | 30 | 300   |
| 100       | 120            | 14 | 16 | 75 | 150 | 178 | 35 | 328.5 |

Model  
Selection

Working  
Principle

CP96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

C96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

Lock Unit  
MWB-UT

Accessories

Auto Switch

Made to  
Order

Specific Product  
Precautions



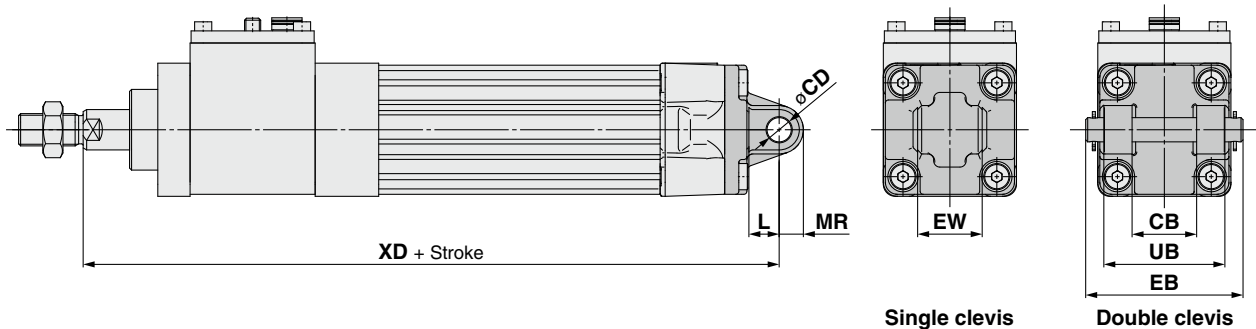
# CP96N Series

## Dimensions: With Mounting Bracket

\* Refer to Basic (B) for other dimensions.

Single clevis: CP96NC

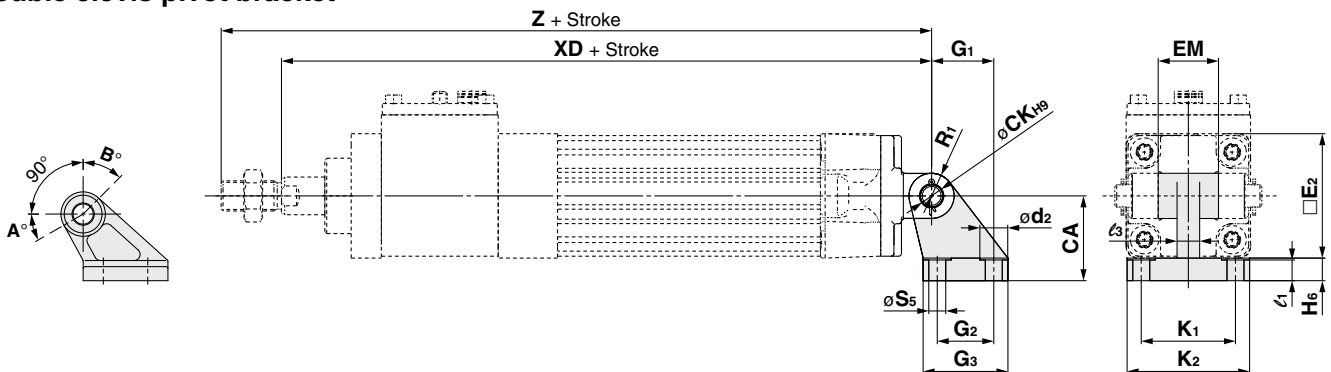
Double clevis: CP96ND



| Bore size | CB <sub>H14</sub> | CD <sub>H9</sub> | EB  | EW                                 | L  | MR  | UB <sub>H14</sub> | XD    |
|-----------|-------------------|------------------|-----|------------------------------------|----|-----|-------------------|-------|
| 32        | 26                | 10               | 65  | 26 <sup>-0.2</sup> <sub>-0.6</sub> | 12 | 9.5 | 45                | 200   |
| 40        | 28                | 12               | 75  | 28 <sup>-0.2</sup> <sub>-0.6</sub> | 15 | 12  | 52                | 226   |
| 50        | 32                | 12               | 80  | 32 <sup>-0.2</sup> <sub>-0.6</sub> | 15 | 12  | 60                | 245   |
| 63        | 40                | 16               | 90  | 40 <sup>-0.2</sup> <sub>-0.6</sub> | 20 | 16  | 70                | 269.5 |
| 80        | 50                | 16               | 110 | 50 <sup>-0.2</sup> <sub>-0.6</sub> | 20 | 16  | 90                | 320   |
| 100       | 60                | 20               | 140 | 60 <sup>-0.2</sup> <sub>-0.6</sub> | 25 | 20  | 110               | 353.5 |

## Pivot Bracket: Double Clevis Pivot Bracket

Double clevis pivot bracket

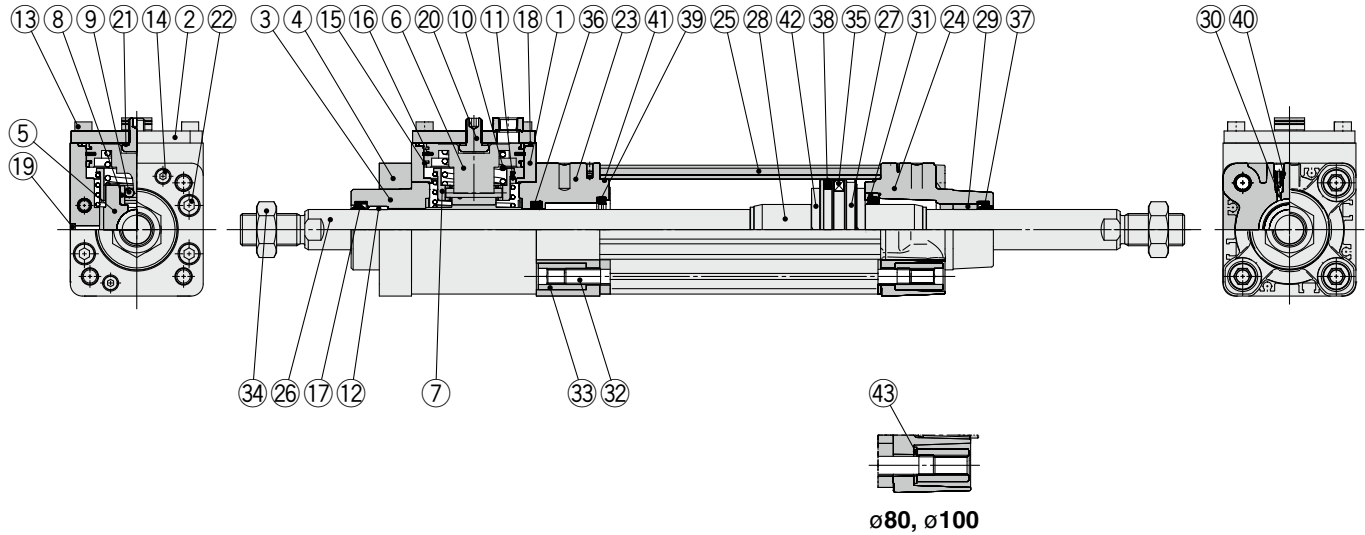


| Bore size | Part no. | CA | øCK | ød2 | □E2 | EM                                 | G1 | G2 | G3 (Max.) | H6 | K1 | K2 (Max.) | ℓ1   | ℓ3 (Max.) | R1 | øS5 | XD    | Z     |
|-----------|----------|----|-----|-----|-----|------------------------------------|----|----|-----------|----|----|-----------|------|-----------|----|-----|-------|-------|
| 32        | E5032    | 32 | 10  | 11  | 47  | 26 <sup>-0.2</sup> <sub>-0.6</sub> | 21 | 18 | 31        | 8  | 38 | 51        | 7    | 10        | 10 | 6.6 | 200   | 222   |
| 40        | E5040    | 36 | 12  | 11  | 54  | 28 <sup>-0.2</sup> <sub>-0.6</sub> | 24 | 22 | 35        | 10 | 41 | 54        | 9    | 10        | 11 | 6.6 | 226   | 250   |
| 50        | E5050    | 45 | 12  | 15  | 66  | 32 <sup>-0.2</sup> <sub>-0.6</sub> | 33 | 30 | 45        | 12 | 50 | 65        | 11   | 12        | 12 | 9   | 245   | 277   |
| 63        | E5063    | 50 | 16  | 15  | 77  | 40 <sup>-0.2</sup> <sub>-0.6</sub> | 37 | 35 | 50        | 12 | 52 | 67        | 11   | 14        | 15 | 9   | 269.5 | 301.5 |
| 80        | E5080    | 63 | 16  | 18  | 99  | 50 <sup>-0.2</sup> <sub>-0.6</sub> | 47 | 40 | 60        | 14 | 66 | 86        | 12.5 | 18        | 15 | 11  | 320   | 360   |
| 100       | E5100    | 71 | 20  | 18  | 118 | 60 <sup>-0.2</sup> <sub>-0.6</sub> | 55 | 50 | 70        | 15 | 76 | 96        | 13.5 | 20        | 19 | 11  | 353.5 | 393.5 |

## Rotating Angle

| Bore size [mm] | A°  | B°  | A° + B° + 90° |
|----------------|-----|-----|---------------|
| 32, 40         | 25° | 45° | 160°          |
| 50, 63         | 40° | 60° | 190°          |
| 80, 100        | 30° | 55° | 175°          |

## Construction (Double Rod)



### Component Parts

| No. | Description                   | Material              | Qty. | Note                |
|-----|-------------------------------|-----------------------|------|---------------------|
| 1   | Brake unit                    | Aluminum alloy        | 1    | Hard anodized       |
| 2   | Cap                           | Rolled steel          | 1    | Zinc chromated      |
| 3   | Collar                        | Aluminum alloy        | 1    | Chromated           |
| 4   | Retaining plate               | Aluminum alloy        | 1    | Anodized            |
| 5   | Brake pad                     | Cast iron             | 1    |                     |
| 6   | Piston A                      | Aluminum alloy        | 1    |                     |
| 7   | Roller holder                 | Carbon steel          | 1    |                     |
| 8   | Roller receiver               | Stainless steel       | 2    |                     |
| 9   | Needle roller                 | Carbon steel          | 2    |                     |
| 10  | Piston spring                 | Spring steel          | 1    | Zinc chromated      |
| 11  | Roller spring                 | Spring steel          | 1    | Zinc chromated      |
| 12  | Bushing A                     | Bearing alloy         | 1    |                     |
| 13  | Hexagon socket head cap screw | Alloy steel           | 4    |                     |
| 14  | Hexagon socket head cap screw | Alloy steel           | 2    |                     |
| 15  | Wear ring                     | Resin                 | 2    |                     |
| 16  | Piston seal A                 | NBR                   | 1    |                     |
| 17  | Rod seal A                    | NBR                   | 1    |                     |
| 18  | Gasket                        | NBR                   | 1    |                     |
| 19  | Element                       | Bronze                | 1    |                     |
| 20  | Release bolt                  | Alloy steel           | 1    |                     |
| 21  | Seal washer                   | NBR + Stainless steel | 1    |                     |
| 22  | Hexagon socket head cap screw | Alloy steel           | 4    |                     |
| 23  | Rod cover A                   | Aluminum alloy        | 1    | Anodized            |
| 24  | Rod cover B                   | Aluminum die-cast     | 1    | Zinc chromated      |
| 25  | Cylinder tube                 | Aluminum alloy        | 1    | Hard anodized       |
| 26  | Piston rod                    | Carbon steel          | 1    | Hard chrome plating |
| 27  | Piston B                      | Aluminum alloy        | 1    |                     |
| 28  | Cushion ring                  | Aluminum alloy        | 2    | Anodized            |
| 29  | Bushing B                     | Bearing alloy         | 1    |                     |
| 30  | Cushion valve                 | Resin                 | 2    |                     |

### Component Parts

| No. | Description          | Material       | Qty. | Note           |
|-----|----------------------|----------------|------|----------------|
| 31  | Cushion seal holder  | Aluminum alloy | 1    | Anodized       |
| 32  | Tie-rod              | Carbon steel   | 4    | Zinc chromated |
| 33  | Tie-rod nut          | Rolled steel   | 8    | Zinc chromated |
| 34  | Rod end nut          | Carbon steel   | 2    | Zinc chromated |
| 35  | Magnet               | —              | (1)  |                |
| 36  | Rod seal B           | NBR            | 1    |                |
| 37  | Rod seal C           | NBR            | 1    |                |
| 38  | Piston seal B        | NBR            | 1    |                |
| 39  | Cushion seal         | Urethane       | 2    |                |
| 40  | Cushion valve seal   | NBR            | 2    |                |
| 41  | Cylinder tube gasket | NBR            | 2    |                |
| 42  | Bumper               | Urethane       | 2    |                |
| 43  | Flat washer          | Steel          | 8    | ø80, ø100      |

### Replacement Parts/Seal Kit

| Bore size [mm] | Kit no.     | Contents                                                                                                                            |
|----------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 32             | C96N32W-PS  | A set of 17 Rod seal A,<br>36 Rod seal B,<br>37 Rod seal C,<br>38 Piston seal B,<br>39 Cushion seal, and<br>41 Cylinder tube gasket |
| 40             | C96N40W-PS  |                                                                                                                                     |
| 50             | C96N50W-PS  |                                                                                                                                     |
| 63             | C96N63W-PS  |                                                                                                                                     |
| 80             | C96N80W-PS  |                                                                                                                                     |
| 100            | C96N100W-PS |                                                                                                                                     |

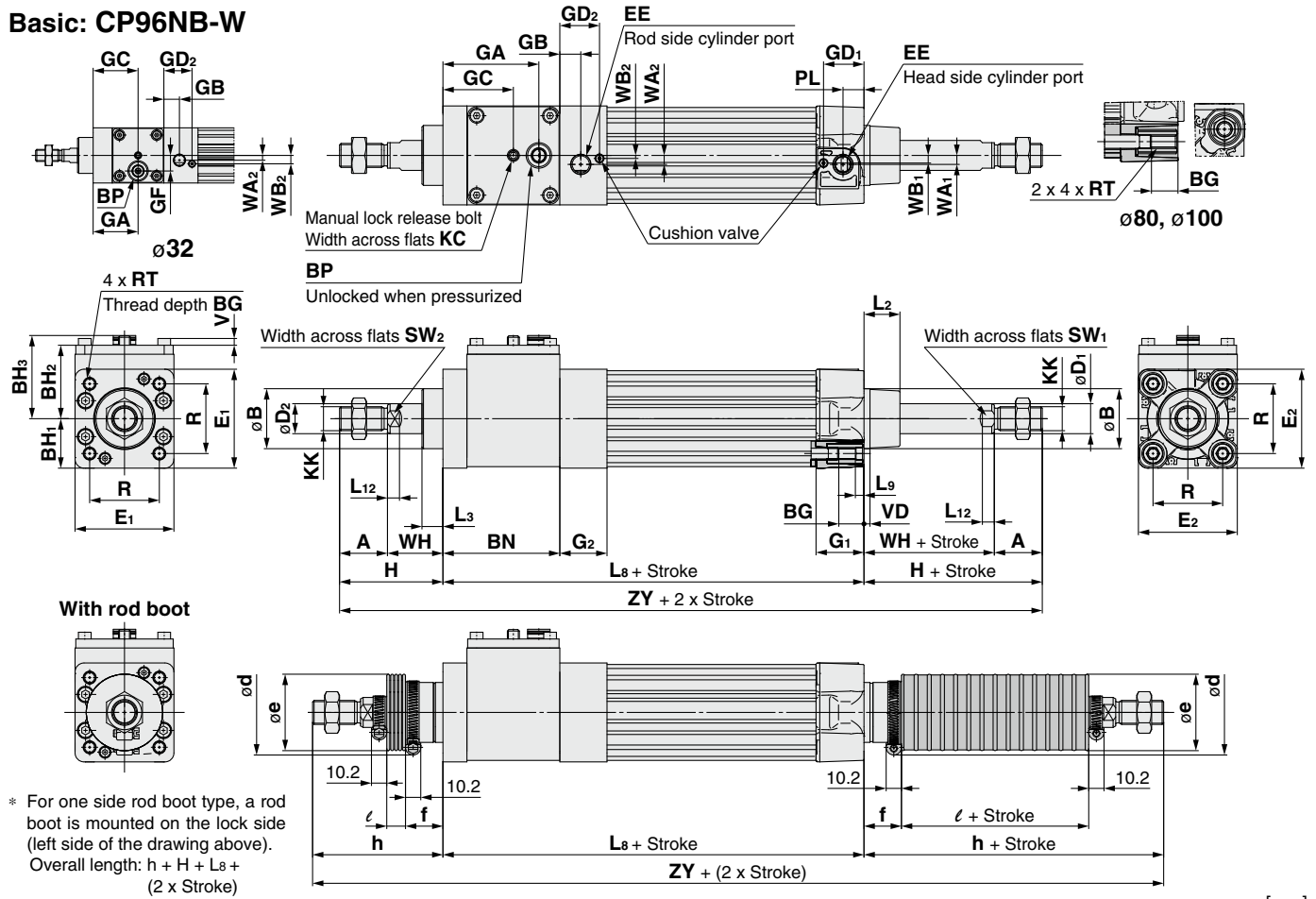
\* Never disassemble the lock unit. It should be replaced as a unit. Refer to page 52 for the part numbers for placing an order. The seal kit shown above contains the rod seal for the cylinder and lock unit. Order the seal kit suitable for the cylinder bore size.

\* The seal kit shown above includes a grease pack.  
(ø32, ø40, ø50: 10 g, ø63, ø80: 20 g, ø100: 30 g)  
Order with the following part number when only the grease pack is needed.  
**Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)**

# CP96N Series

## Dimensions (Double Rod)

### Basic: CP96NB-W



\* For one side rod boot type, a rod boot is mounted on the lock side (left side of the drawing above).  
Overall length:  $h + H + L_8 + (2 \times \text{Stroke})$

| Bore size | Stroke range | A  | øB <sub>d11</sub> | BG | BH <sub>1</sub> | BH <sub>2</sub> | BH <sub>3</sub> | BN  | BP   | øD <sub>1</sub> | øD <sub>2</sub> | E <sub>1</sub> | E <sub>2</sub> | EE   | G <sub>1</sub> | G <sub>2</sub> | GA   | GB | GC   | GD <sub>1</sub> | GD <sub>2</sub> | GF | H  |
|-----------|--------------|----|-------------------|----|-----------------|-----------------|-----------------|-----|------|-----------------|-----------------|----------------|----------------|------|----------------|----------------|------|----|------|-----------------|-----------------|----|----|
| 32        | Up to 1000   | 22 | 30                | 16 | 23              | 38.5            | 46.5            | 59  | G1/8 | 12              | 12              | 46             | 47             | G1/8 | 28.9           | 28.5           | 37.5 | 13 | 37.5 | 23.9            | 23.5            | 13 | 48 |
| 40        | Up to 1000   | 24 | 35                | 16 | 28.5            | 42.5            | 48.5            | 73  | G1/8 | 16              | 16              | 57             | 54             | G1/4 | 32.6           | 29             | 59.5 | 14 | 44.5 | 27.6            | 24              | —  | 54 |
| 50        | Up to 1000   | 32 | 40                | 16 | 33              | 49              | 55.5            | 78  | G1/8 | 20              | 20              | 66             | 66             | G1/4 | 32             | 31.5           | 64   | 14 | 47   | 27              | 26.5            | —  | 69 |
| 63        | Up to 1000   | 32 | 45                | 16 | 39              | 52.5            | 59.5            | 90  | G1/4 | 20              | 20              | 78             | 77             | G3/8 | 38.6           | 31.5           | 73   | 16 | 53   | 31.6            | 26.5            | —  | 69 |
| 80        | Up to 1000   | 40 | 45                | 17 | 49              | 64.5            | 71.5            | 113 | G1/4 | 25              | 25              | 98             | 99             | G3/8 | 38.4           | 38             | 92   | 16 | 65   | 32              | 31.6            | —  | 86 |
| 100       | Up to 1000   | 40 | 55                | 17 | 58              | 73.5            | 80.5            | 131 | G1/4 | 25              | 30              | 116            | 118            | G1/2 | 42.9           | 38             | 109  | 18 | 74   | 36.5            | 31.6            | —  | 91 |

| Bore size | Stroke range | KC | KK         | L <sub>2</sub> | L <sub>3</sub> | L <sub>8</sub> | L <sub>9</sub> | L <sub>12</sub> | PL | R    | RT        | SW <sub>1</sub> | SW <sub>2</sub> | V   | VD | WA <sub>1</sub> | WA <sub>2</sub> | WB <sub>1</sub> | WB <sub>2</sub> | WH | ZY    |
|-----------|--------------|----|------------|----------------|----------------|----------------|----------------|-----------------|----|------|-----------|-----------------|-----------------|-----|----|-----------------|-----------------|-----------------|-----------------|----|-------|
| 32        | Up to 1000   | 3  | M10 x 1.25 | 15             | 13             | 152            | 4              | 6               | 13 | 32.5 | M6 x 1    | 10              | 10              | 3.5 | 4  | 4               | 4               | 7               | 7               | 26 | 248   |
| 40        | Up to 1000   | 3  | M12 x 1.25 | 17             | 13             | 171            | 4              | 6.5             | 14 | 38   | M6 x 1    | 13              | 13              | 4.5 | 4  | 5               | 7               | 8.9             | 1.8             | 30 | 279   |
| 50        | Up to 1000   | 4  | M16 x 1.5  | 24             | 14             | 181            | 5              | 8               | 14 | 46.5 | M8 x 1.25 | 17              | 17              | 4.5 | 4  | 6               | 6               | 5.1             | 2               | 37 | 319   |
| 63        | Up to 1000   | 4  | M16 x 1.5  | 24             | 14             | 200.5          | 5              | 8               | 16 | 56.5 | M8 x 1.25 | 17              | 17              | 5.5 | 4  | 9               | 9               | 6.3             | 2               | 37 | 338.5 |
| 80        | Up to 1000   | 5  | M20 x 1.5  | 30             | 20             | 238            | —              | 10              | 16 | 72   | M10 x 1.5 | 22              | 22              | 7.5 | 4  | 11.5            | 11.5            | 6               | 6               | 46 | 410   |
| 100       | Up to 1000   | 5  | M20 x 1.5  | 32             | 20             | 261.5          | —              | 10              | 18 | 89   | M10 x 1.5 | 22              | 26              | 9.5 | 4  | 17              | 17              | 10              | 3               | 51 | 443.5 |

### With Rod Boot

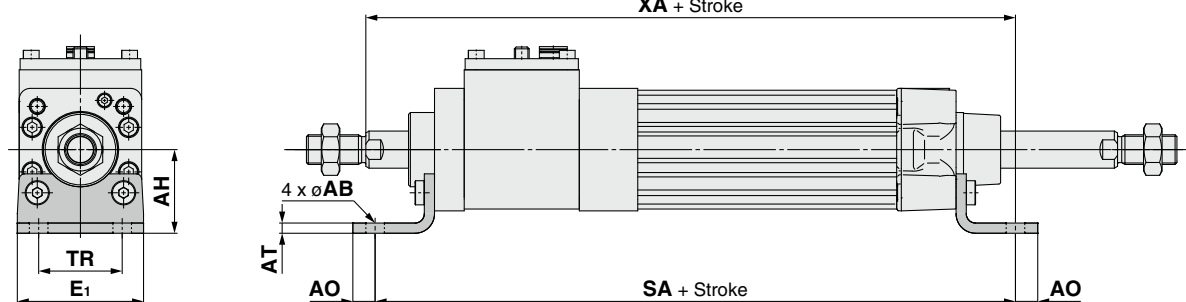
| Bore size |                                | d  | e  | f  | h       |           |            |            |            |            |            |            |            |            |            |             |  |  |  |  |
|-----------|--------------------------------|----|----|----|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|--|--|--|--|
|           |                                |    |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 501 to 600 | 601 to 700 | 701 to 800 | 801 to 900 | 901 to 1000 |  |  |  |  |
| 32        |                                | 54 | 36 | 23 | 75      | 88        | 100        | 113        | 138        | 163        | 188        | 213        | 238        | 263        | 288        | 313         |  |  |  |  |
| 40        | Lock unit side                 | 56 | 41 | 23 | 75      | 88        | 100        | 113        | 138        | 163        | 188        | 213        | 238        | 263        | 288        | 313         |  |  |  |  |
|           | Opposite side of the lock unit | 54 | 36 | 23 | 75      | 88        | 100        | 113        | 138        | 163        | 188        | 213        | 238        | 263        | 288        | 313         |  |  |  |  |
| 50        |                                | 64 | 51 | 25 | 87      | 100       | 112        | 125        | 150        | 175        | 200        | 225        | 250        | 275        | 300        | 325         |  |  |  |  |
| 63        |                                | 64 | 51 | 25 | 87      | 100       | 112        | 125        | 150        | 175        | 200        | 225        | 250        | 275        | 300        | 325         |  |  |  |  |
| 80        |                                | 68 | 56 | 29 | 103     | 116       | 128        | 141        | 166        | 191        | 216        | 241        | 266        | 291        | 316        | 341         |  |  |  |  |
| 100       | Lock unit side                 | 76 | 61 | 29 | 103     | 116       | 128        | 141        | 166        | 191        | 216        | 241        | 266        | 291        | 316        | 341         |  |  |  |  |
|           | Opposite side of the lock unit | 68 | 56 | 29 | 103     | 116       | 128        | 141        | 166        | 191        | 216        | 241        | 266        | 291        | 316        | 341         |  |  |  |  |

|           |         |           |            |            |            |            |            |            |            |            |            |             |         |           |            |            |            |            |            |            |            |            |            |             | [mm] |
|-----------|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|------|
| Bore size | L       |           |            |            |            |            |            |            |            |            |            |             | ZY      |           |            |            |            |            |            |            |            |            |            |             |      |
|           | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 501 to 600 | 601 to 700 | 701 to 800 | 801 to 900 | 901 to 1000 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 501 to 600 | 601 to 700 | 701 to 800 | 801 to 900 | 901 to 1000 |      |
| 32        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 302     | 328       | 352        | 378        | 428        | 478        | 528        | 578        | 628        | 678        | 728        | 778         |      |
| 40        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 321     | 347       | 371        | 397        | 447        | 497        | 547        | 597        | 647        | 697        | 747        | 797         |      |
| 50        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 355     | 381       | 405        | 431        | 481        | 531        | 581        | 631        | 681        | 731        | 781        | 831         |      |
| 63        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 374.5   | 400.5     | 424.5      | 450.5      | 500.5      | 550.5      | 600.5      | 650.5      | 700.5      | 750.5      | 800.5      | 850.5       |      |
| 80        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 444     | 470       | 494        | 520        | 570        | 620        | 670        | 720        | 770        | 820        | 870        | 920         |      |
| 100       | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 467.5   | 493.5     | 517.5      | 543.5      | 593.5      | 643.5      | 693.5      | 743.5      | 793.5      | 843.5      | 893.5      | 943.5       |      |

## Dimensions: With Mounting Bracket

\* Refer to Basic (B) for other dimensions.

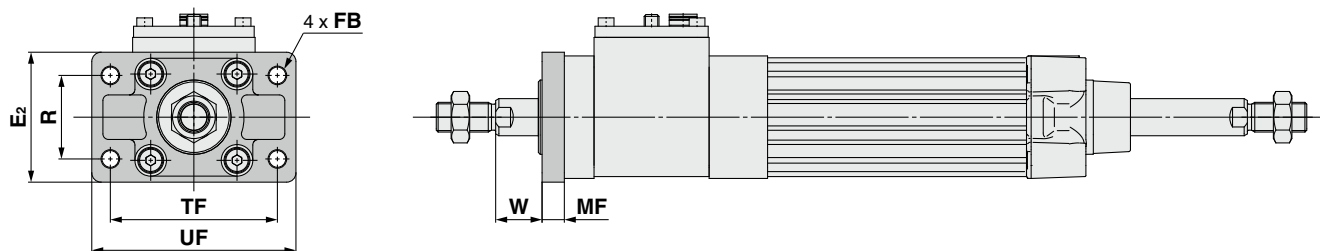
### Axial foot: CP96NL-W



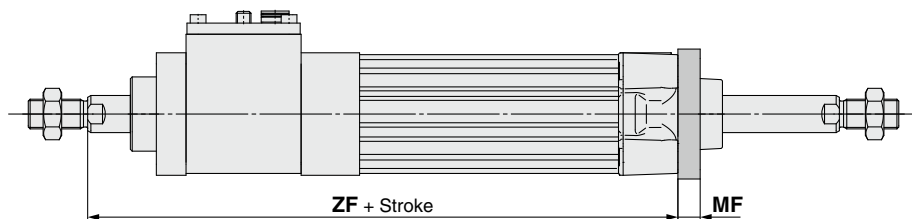
| Bore size | AB   | AH | AO | AT  | E <sub>1</sub> | SA    | TR | XA    |
|-----------|------|----|----|-----|----------------|-------|----|-------|
| 32        | 7    | 32 | 10 | 4.5 | 48             | 200   | 32 | 202   |
| 40        | 10   | 36 | 11 | 4.5 | 55             | 227   | 36 | 229   |
| 50        | 10   | 45 | 12 | 5.5 | 68             | 245   | 45 | 250   |
| 63        | 10   | 50 | 12 | 5.5 | 80             | 264.5 | 50 | 269.5 |
| 80        | 12   | 63 | 14 | 6.5 | 100            | 320   | 63 | 325   |
| 100       | 14.5 | 71 | 16 | 6.5 | 120            | 343.5 | 75 | 353.5 |

### Flange

#### Rod side: CP96NF-W



#### Head side: CP96NG-W



| Bore size | E <sub>2</sub> | FB | MF | R  | TF  | UF  | W  | ZF    |
|-----------|----------------|----|----|----|-----|-----|----|-------|
| 32        | 50             | 7  | 10 | 32 | 64  | 79  | 16 | 188   |
| 40        | 55             | 9  | 10 | 36 | 72  | 90  | 20 | 211   |
| 50        | 70             | 9  | 12 | 45 | 90  | 110 | 25 | 230   |
| 63        | 80             | 9  | 12 | 50 | 100 | 120 | 25 | 249.5 |
| 80        | 100            | 12 | 16 | 63 | 126 | 153 | 30 | 300   |
| 100       | 120            | 14 | 16 | 75 | 150 | 178 | 35 | 328.5 |

Model  
Selection

Working  
Principle

CP96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

C96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

Lock Unit  
MWB-UT

Accessories

Auto Switch

Made to  
Order

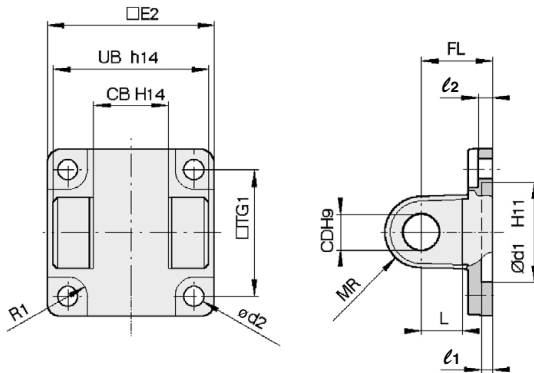
Specific Product  
Precautions





## Dimensions: Mounting Brackets, Pivot Brackets for Cylinder Mounting

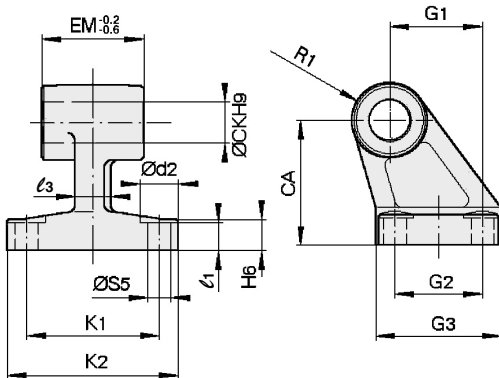
### Double clevis (D)



| Bore size | Part no. | CB | ØCD | Ød1 | Ød2 | E2  | FL | L  | l1 | l2  | MR  | R1  | TG1  | UB  |
|-----------|----------|----|-----|-----|-----|-----|----|----|----|-----|-----|-----|------|-----|
| 32        | D5032    | 26 | 10  | 30  | 6.6 | 48  | 22 | 12 | 5  | 5.5 | 9.5 | 6.5 | 32.5 | 45  |
| 40        | D5040    | 28 | 12  | 35  | 6.6 | 56  | 25 | 15 | 5  | 5.5 | 12  | 6.5 | 38   | 52  |
| 50        | D5050    | 32 | 12  | 40  | 9   | 64  | 27 | 15 | 5  | 6.5 | 12  | 8.5 | 46.5 | 60  |
| 63        | D5063    | 40 | 16  | 45  | 9   | 75  | 32 | 20 | 5  | 6.5 | 16  | 8.5 | 56.5 | 70  |
| 80        | D5080    | 50 | 16  | 45  | 11  | 95  | 36 | 20 | 5  | 10  | 16  | 11  | 72   | 90  |
| 100       | D5100    | 60 | 20  | 55  | 11  | 115 | 41 | 25 | 5  | 10  | 20  | 12  | 89   | 110 |

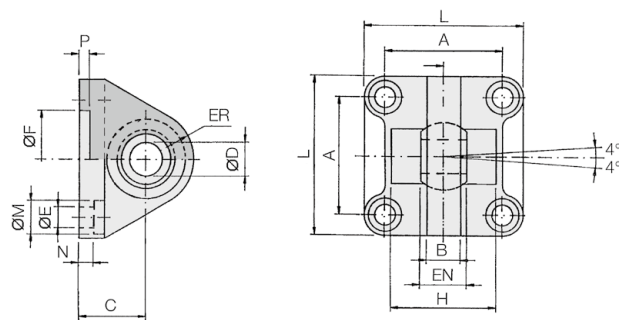
\* Supplied with 4 mounting screws, clevis pin, and clevis pin bracket

### Clevis pivot bracket (E)



| Bore size | Part no. | CA | ØCK | Ød2 | EM                                 | G1 | G2 | G3 (Max.) | H6 | K1 | K2 (Max.) | l1   | l3 (Max.) | R1 | ØS5 |
|-----------|----------|----|-----|-----|------------------------------------|----|----|-----------|----|----|-----------|------|-----------|----|-----|
| 32        | E5032    | 32 | 10  | 11  | 26 <sup>-0.2</sup> <sub>-0.6</sub> | 21 | 18 | 31        | 8  | 38 | 51        | 7    | 10        | 10 | 6.6 |
| 40        | E5040    | 36 | 12  | 11  | 28 <sup>-0.2</sup> <sub>-0.6</sub> | 24 | 22 | 35        | 10 | 41 | 54        | 9    | 10        | 11 | 6.6 |
| 50        | E5050    | 45 | 12  | 15  | 32 <sup>-0.2</sup> <sub>-0.6</sub> | 33 | 30 | 45        | 12 | 50 | 65        | 11   | 12        | 12 | 9   |
| 63        | E5063    | 50 | 16  | 15  | 40 <sup>-0.2</sup> <sub>-0.6</sub> | 37 | 35 | 50        | 12 | 52 | 67        | 11   | 14        | 15 | 9   |
| 80        | E5080    | 63 | 16  | 18  | 50 <sup>-0.2</sup> <sub>-0.6</sub> | 47 | 40 | 60        | 14 | 66 | 86        | 12.5 | 18        | 15 | 11  |
| 100       | E5100    | 71 | 20  | 18  | 60 <sup>-0.2</sup> <sub>-0.6</sub> | 55 | 50 | 70        | 15 | 76 | 96        | 13.5 | 20        | 19 | 11  |

### Single clevis with ball joint (CS)



| Bore size | Part no. | A    | B (Max.) | C  | ØDH7 | ØE  | EN <sup>0</sup> <sub>-0.1</sub> | ER (Max.) | ØFH11 | H ±0.5 | L   | ØM   | N   | P |
|-----------|----------|------|----------|----|------|-----|---------------------------------|-----------|-------|--------|-----|------|-----|---|
| 32        | CS5032   | 32.5 | 10.5     | 22 | 10   | 6.6 | 14                              | 15        | 30    | —      | 45  | 10.5 | 5.5 | 5 |
| 40        | CS5040   | 38   | 12       | 25 | 12   | 6.6 | 16                              | 18        | 35    | —      | 55  | 11   | 5.5 | 5 |
| 50        | CS5050   | 46.5 | 15       | 27 | 16   | 9   | 21                              | 20        | 40    | 51     | 65  | 15   | 6.5 | 5 |
| 63        | CS5063   | 56.5 | 15       | 32 | 16   | 9   | 21                              | 23        | 45    | —      | 75  | 15   | 6.5 | 5 |
| 80        | CS5080   | 72   | 18       | 36 | 20   | 11  | 25                              | 27        | 45    | 70     | 95  | 18   | 10  | 5 |
| 100       | CS5100   | 89   | 18       | 41 | 20   | 11  | 25                              | 30        | 55    | —      | 115 | 18   | 10  | 5 |

\* Supplied with 4 mounting screws

Model Selection

Working Principle

CP96N

Double Acting, Single Rod

Double Acting, Double Rod

C96N

Double Acting, Single Rod

Double Acting, Double Rod

Lock Unit MWB-UT

Accessories

Auto Switch

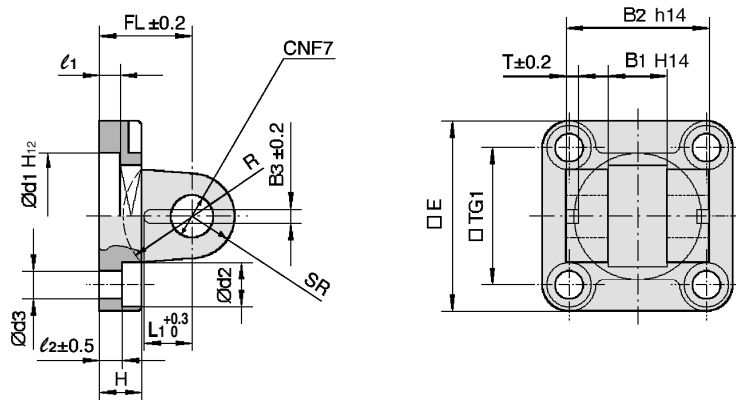
Made to Order

Specific Product Precautions

# CP96N/C96N Series

## Dimensions: Pivot Brackets for Cylinder Mounting

### Double clevis pivot bracket (DS)/for ES accessory

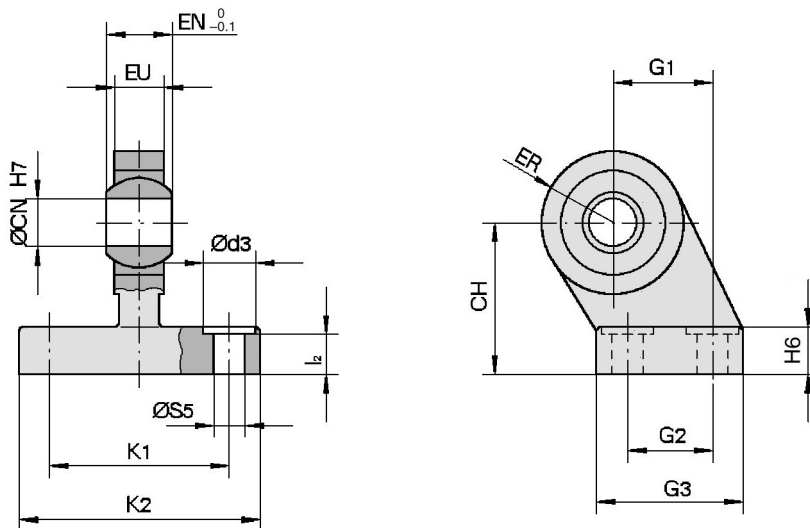


[mm]

| Bore size | Part no. | B <sub>1</sub> | B <sub>2</sub> | B <sub>3</sub> | øCN | ød <sub>1</sub> | ød <sub>2</sub> | ød <sub>3</sub> | E   | FL | H<br>(Max.) | L <sub>1</sub> | l <sub>1</sub><br>(Min.) | l <sub>2</sub> | R  | SR<br>(Max.) | T | TG <sub>1</sub> |
|-----------|----------|----------------|----------------|----------------|-----|-----------------|-----------------|-----------------|-----|----|-------------|----------------|--------------------------|----------------|----|--------------|---|-----------------|
| 32        | DS5032   | 14             | 34             | 3.3            | 10  | 30              | 10.5            | 6.6             | 45  | 22 | 10          | 11.5           | 5                        | 5.5            | 17 | 11           | 3 | 32.5            |
| 40        | DS5040   | 16             | 40             | 4.3            | 12  | 35              | 11              | 6.6             | 55  | 25 | 10          | 12             | 5                        | 5.5            | 20 | 13           | 4 | 38              |
| 50        | DS5050   | 21             | 45             | 4.3            | 16  | 40              | 15              | 9               | 65  | 27 | 12          | 14             | 5                        | 6.5            | 22 | 18           | 4 | 46.5            |
| 63        | DS5063   | 21             | 51             | 4.3            | 16  | 45              | 15              | 9               | 75  | 32 | 12          | 14             | 5                        | 6.5            | 25 | 18           | 4 | 56.5            |
| 80        | DS5080   | 25             | 65             | 4.3            | 20  | 45              | 18              | 11              | 95  | 36 | 16          | 16             | 5                        | 10             | 30 | 22           | 4 | 72              |
| 100       | DS5100   | 25             | 75             | 6.3            | 20  | 55              | 18              | 11              | 115 | 41 | 16          | 16             | 5                        | 10             | 32 | 22           | 4 | 89              |

\* Supplied with 4 mounting screws, clevis pin, and clevis pin bracket

### Clevis pivot bracket with ball joint (ES)

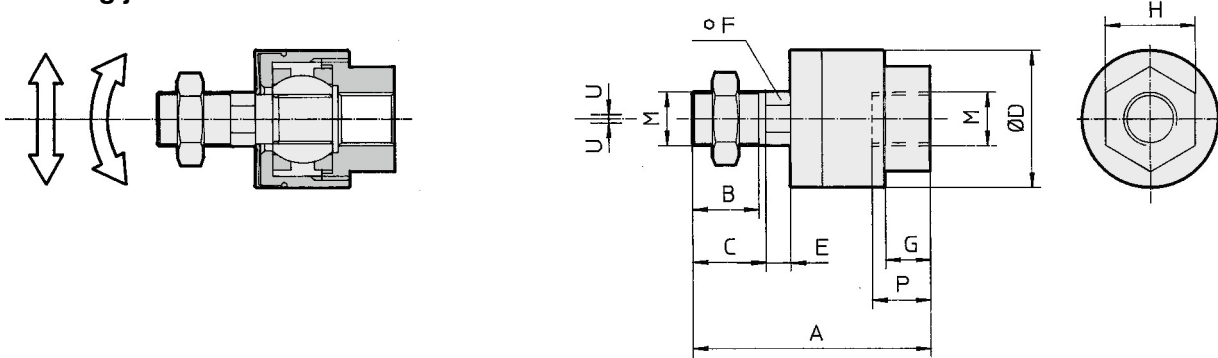


[mm]

| Bore size | Part no. | CH | øCN | ød <sub>3</sub> | EN | ER<br>(Max.) | EU   | G <sub>1</sub> | G <sub>2</sub> | G <sub>3</sub><br>(Max.) | H <sub>6</sub> | K <sub>1</sub> | K <sub>2</sub><br>(Max.) | l <sub>2</sub> | øS <sub>5</sub> |
|-----------|----------|----|-----|-----------------|----|--------------|------|----------------|----------------|--------------------------|----------------|----------------|--------------------------|----------------|-----------------|
| 32        | ES5032   | 32 | 10  | 11              | 14 | 15           | 10.5 | 21             | 18             | 31                       | 10             | 38             | 51                       | 8.5            | 6.6             |
| 40        | ES5040   | 36 | 12  | 11              | 16 | 18           | 12   | 24             | 22             | 35                       | 10             | 41             | 54                       | 8.5            | 6.6             |
| 50        | ES5050   | 45 | 16  | 15              | 21 | 20           | 15   | 33             | 30             | 45                       | 12             | 50             | 65                       | 10.5           | 9               |
| 63        | ES5063   | 50 | 16  | 15              | 21 | 23           | 15   | 37             | 35             | 50                       | 12             | 52             | 67                       | 10.5           | 9               |
| 80        | ES5080   | 63 | 20  | 18              | 25 | 27           | 18   | 47             | 40             | 60                       | 14             | 66             | 86                       | 11.5           | 11              |
| 100       | ES5100   | 71 | 20  | 18              | 25 | 30           | 18   | 55             | 50             | 70                       | 15             | 76             | 96                       | 12.5           | 11              |

## Dimensions: Piston Rod Accessories

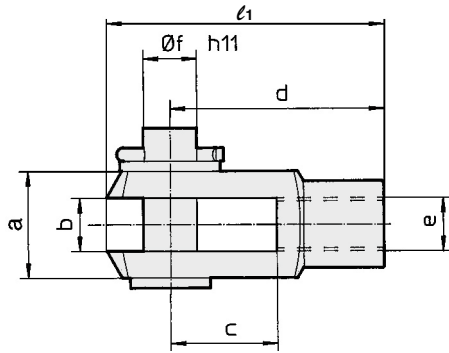
### Floating joint: JA



| Bore size | Part no.     | A    | B    | C  | ØD   | E    | F  | G    | H  | M          | P  | U    | Load [kN] | Weight [g] | Rotating angle |
|-----------|--------------|------|------|----|------|------|----|------|----|------------|----|------|-----------|------------|----------------|
| 32        | JA30-10-125  | 49.5 | 19.5 | —  | 24   | 5    | 8  | 8    | 17 | M10 x 1.25 | 9  | 0.5  | 2.5       | 70         | ±0.5°          |
| 40        | JA40-12-125  | 60   | 20   | —  | 31   | 6    | 11 | 11   | 22 | M12 x 1.25 | 13 | 0.75 | 4.4       | 160        |                |
| 50, 63    | JA50-16-150  | 71.5 | 22   | —  | 41   | 7.5  | 14 | 13.5 | 27 | M16 x 1.5  | 15 | 1    | 11        | 300        |                |
| 80, 100   | JAH50-20-150 | 101  | 28   | 31 | 59.5 | 11.5 | 24 | 16   | 32 | M20 x 1.5  | 18 | 2    | 18        | 1080       |                |

\* Black color

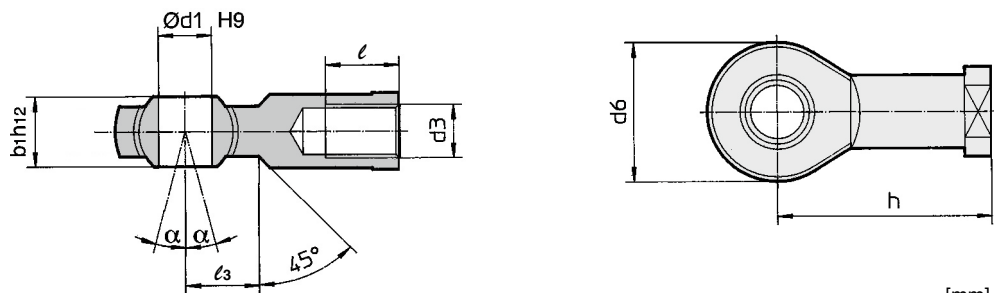
### Rod clevis: GKM (ISO 8140)



| Bore size | Part no. | a<br>(Max.) | b                                   | c<br>(Min.) | d  | e          | Øf H9<br>(Hole) | Øf h11<br>(Shaft) | ℓ <sub>1</sub> |
|-----------|----------|-------------|-------------------------------------|-------------|----|------------|-----------------|-------------------|----------------|
| 32        | GKM10-20 | 20          | 10 <sup>+0.5</sup> <sub>+0.15</sub> | 20          | 40 | M10 x 1.25 | 10              | 10                | 52             |
| 40        | GKM12-24 | 24          | 12 <sup>+0.5</sup> <sub>+0.15</sub> | 24          | 48 | M12 x 1.25 | 12              | 12                | 62             |
| 50, 63    | GKM16-32 | 32          | 16 <sup>+0.5</sup> <sub>+0.15</sub> | 32          | 64 | M16 x 1.5  | 16              | 16                | 83             |
| 80, 100   | GKM20-40 | 40          | 20 <sup>+0.5</sup> <sub>+0.15</sub> | 40          | 80 | M20 x 1.5  | 20              | 20                | 105            |

\* Supplied with clevis pin and clevis pin bracket

### Rod end: KJ (ISO 8139)

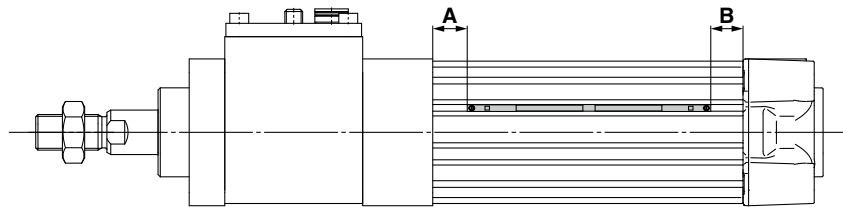


| Bore size | Part no. | b <sub>1</sub> h <sub>12</sub> | Ød <sub>1</sub> H <sub>9</sub> | d <sub>3</sub> | d <sub>6</sub><br>(Max.) | h  | ℓ<br>(Min.) | ℓ <sub>3</sub> | α  |
|-----------|----------|--------------------------------|--------------------------------|----------------|--------------------------|----|-------------|----------------|----|
| 32        | KJ10D    | 14                             | 10                             | M10 x 1.25     | 28                       | 43 | 20          | 15             | 4° |
| 40        | KJ12D    | 16                             | 12                             | M12 x 1.25     | 32                       | 50 | 22          | 17             | 4° |
| 50, 63    | KJ16D    | 21                             | 16                             | M16 x 1.5      | 42                       | 64 | 28          | 23             | 4° |
| 80, 100   | KJ20D    | 25                             | 20                             | M20 x 1.5      | 50                       | 77 | 33          | 27             | 4° |

# CP96N Series

## Auto Switch Mounting

### Auto Switch Proper Mounting Position (Detection at stroke end)



Auto Switch Proper Mounting Position [mm]

| Auto switch model<br>Bore size | D-M9□(V)<br>D-M9□W(V)<br>D-M9□A(V) |      | D-A9□(V) |      |
|--------------------------------|------------------------------------|------|----------|------|
|                                | A                                  | B    | A        | B    |
| 32                             | 13.5                               | 10.5 | 9.5      | 6.5  |
| 40                             | 10.5                               | 14   | 6.5      | 10   |
| 50                             | 13                                 | 14.5 | 9        | 10.5 |
| 63                             | 13                                 | 15.5 | 9        | 11.5 |
| 80                             | 18.5                               | 18   | 14.5     | 14   |
| 100                            | 18.5                               | 19   | 14.5     | 15   |

- \* Adjust the auto switch after confirming the operating conditions in the actual setting.
- \* The D-M9□V/M9□WV/M9□AV/A9□V are mountable on ø32 to ø63.

### Minimum Stroke for Auto Switch Mounting

| Auto switch model       |                           |                 |                 |    |    |    |     | [mm] |
|-------------------------|---------------------------|-----------------|-----------------|----|----|----|-----|------|
| Number of auto switches |                           | 32              | 40              | 50 | 63 | 80 | 100 |      |
| D-M9□<br>D-M9□W         | 2 (Same surface)          | 50              |                 |    |    |    |     |      |
|                         | 1, 2 (Different surfaces) | 10              |                 |    |    |    |     |      |
|                         | n                         | 10 + 40 (n – 2) |                 |    |    |    |     |      |
| D-M9□V<br>D-M9□WV       | 2 (Same surface)          | 40              |                 |    |    |    |     |      |
|                         | 1, 2 (Different surfaces) | 10              |                 |    |    |    |     |      |
|                         | n                         | 10 + 30 (n – 2) |                 |    |    |    |     |      |
| D-M9□A                  | 2 (Same surface)          | 55              | 50              |    |    |    |     |      |
|                         | 1, 2 (Different surfaces) | 15              | 10              |    |    |    |     |      |
|                         | n                         | 15 + 40 (n – 2) | 10 + 40 (n – 2) |    |    |    |     |      |
| D-M9□AV                 | 2 (Same surface)          | 40              |                 |    |    |    |     |      |
|                         | 1, 2 (Different surfaces) | 10              |                 |    |    |    |     |      |
|                         | n                         | 10 + 30 (n – 2) |                 |    |    |    |     |      |
| D-A9□                   | 2 (Same surface)          | 50              |                 |    |    |    |     |      |
|                         | 1, 2 (Different surfaces) | 10              |                 |    |    |    |     |      |
|                         | n                         | 10 + 40 (n – 2) |                 |    |    |    |     |      |
| D-A9□V                  | 2 (Same surface)          | 40              |                 |    |    |    |     |      |
|                         | 1, 2 (Different surfaces) | 10              |                 |    |    |    |     |      |
|                         | n                         | 10 + 30 (n – 2) |                 |    |    |    |     |      |

\* n = 3, 4, 5...

\* The D-M9□V/M9□WV/M9□AV/A9□V are mountable on ø32 to ø63.

### Operating Range

| Auto switch model                  | Bore size [mm] |    |     |     |     |      |
|------------------------------------|----------------|----|-----|-----|-----|------|
|                                    | 32             | 40 | 50  | 63  | 80  | 100  |
| D-M9□(V)<br>D-M9□W(V)<br>D-M9□A(V) | 4              | 4  | 5   | 6   | 5.5 | 6    |
| D-A9□(V)                           | 7              | 8  | 8.5 | 9.5 | 9.5 | 10.5 |

\* Values which include hysteresis are for reference purposes only. They are not a guarantee (assuming approximately ±30% dispersion) and may change substantially depending on the ambient environment.

\* The D-M9□V/M9□WV/M9□AV/A9□V are mountable on ø32 to ø63.

**Other than the applicable auto switches listed in “How to Order,” the following auto switches are also mountable.**

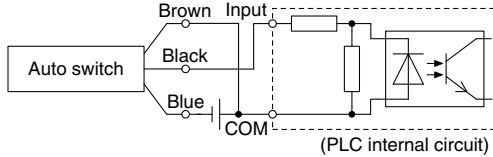
- \* Normally closed (NC = b contact) solid state auto switches (D-M9□E) are also available. For details, refer to the **Web Catalog** or Best Pneumatics Catalog.
- \* With pre-wired connector is also available for solid state switches. For details, refer to the **Web Catalog** or Best Pneumatics Catalog.

# Prior to Use

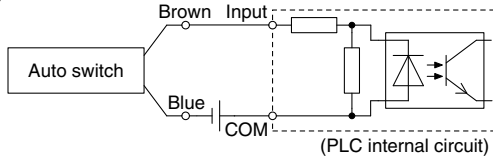
## Auto Switch Connections and Examples

### Sink Input Specifications

#### 3-wire, NPN

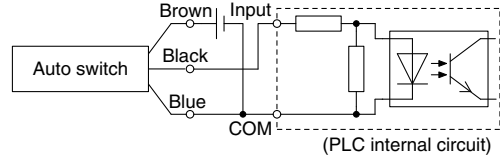


#### 2-wire

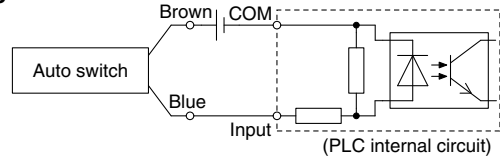


### Source Input Specifications

#### 3-wire, PNP



#### 2-wire



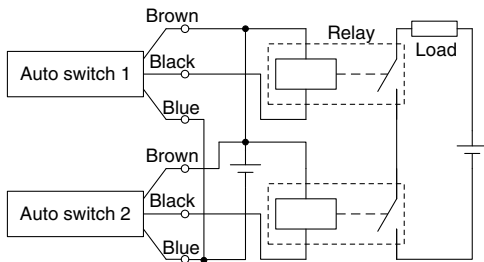
Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

### Examples of AND (Series) and OR (Parallel) Connections

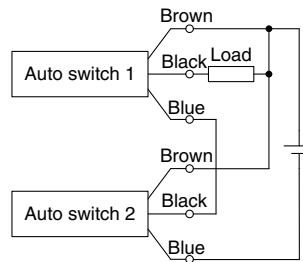
\* When using solid state auto switches, ensure the application is set up so the signals for the first 50 ms are invalid.

#### 3-wire AND connection for NPN output

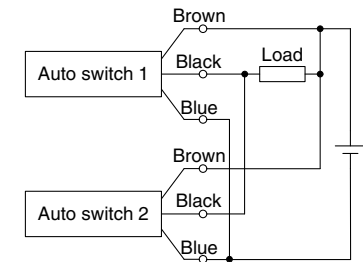
(Using relays)



(Performed with auto switches only)

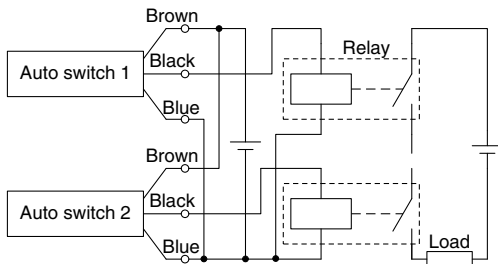


#### 3-wire OR connection for NPN output

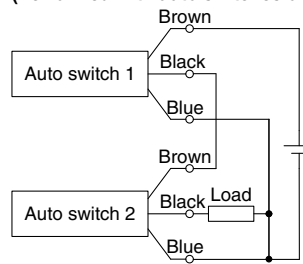


#### 3-wire AND connection for PNP output

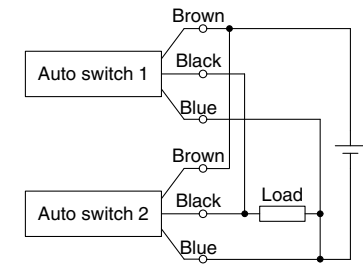
(Using relays)



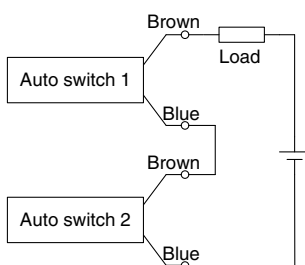
(Performed with auto switches only)



#### 3-wire OR connection for PNP output



#### 2-wire AND connection

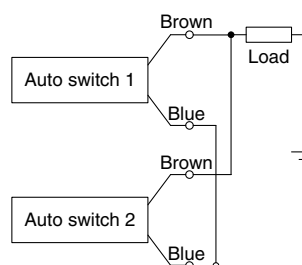


When two auto switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state. The indicator lights will light up when both of the auto switches are in the ON state. Auto switches with a load voltage less than 20 V cannot be used.

$$\begin{aligned} \text{Load voltage at ON} &= \text{Power supply voltage} - \text{Residual voltage} \times 2 \text{ pcs.} \\ &= 24 \text{ V} - 4 \text{ V} \times 2 \text{ pcs.} \\ &= 16 \text{ V} \end{aligned}$$

Example: Power supply is 24 VDC  
Internal voltage drop in auto switch is 4 V.

#### 2-wire OR connection



(Solid state)  
When two auto switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

(Reed)  
Because there is no current leakage, the load voltage will not increase when turned OFF. However, depending on the number of auto switches in the ON state, the indicator lights may sometimes grow dim or not light up, due to the dispersion and reduction of the current flowing to the auto switches.

$$\begin{aligned} \text{Load voltage at OFF} &= \text{Leakage current} \times 2 \text{ pcs.} \times \text{Load impedance} \\ &= 1 \text{ mA} \times 2 \text{ pcs.} \times 3 \text{ k}\Omega \\ &= 6 \text{ V} \end{aligned}$$

Example: Load impedance is 3 k $\Omega$ .  
Leakage current from auto switch is 1 mA.



# Cylinder with Lock

## Double Acting, Single Rod/Double Rod

# C96N Series

ø32, ø40, ø50, ø63, ø80, ø100

RoHS

### How to Order

**C96N** **B** **32** - **100** **C** **J** **W** - [ ] - [ ] - [ ]

**With auto switch** **C96N D** **B** **32** - **100** **C** **J** **W** - [ ] - [ ] - **M9BW** **S** - [ ]

**With auto switch** (Built-in magnet)

**Mounting**

| Symbol | Description     | Single rod | Double rod |
|--------|-----------------|------------|------------|
| B      | Basic           | ○          | ○          |
| L      | Axial foot      | ○          | ○          |
| F      | Rod flange      | ○          | ○          |
| G      | Head flange     | ○          | ○          |
| C      | Single clevis   | ○          | —          |
| D      | Double clevis   | ○          | —          |
| T      | Center trunnion | ○          | ○          |

\* Mounting brackets other than center trunnion type are shipped together with the product but do not come assembled.  
\* The single clevis with ball joint should be ordered separately.

**Bore size**

| Symbol | Bore size [mm] |
|--------|----------------|
| 32     | 32 mm          |
| 40     | 40 mm          |
| 50     | 50 mm          |
| 63     | 63 mm          |
| 80     | 80 mm          |
| 100    | 100 mm         |

**Cylinder stroke** [mm]  
Refer to page 26 for standard strokes.

**Air cushion on both ends + Bumper cushion**

**Rod boot**

| Symbol | Description                          |
|--------|--------------------------------------|
| Nil    | Without rod boot                     |
| J      | Nylon tarpaulin (One end)            |
| JJ     | Nylon tarpaulin (Both ends)          |
| K      | Heat-resistant tarpaulin (One end)   |
| KK     | Heat-resistant tarpaulin (Both ends) |

**Rod**

| Symbol | Description |
|--------|-------------|
| Nil    | Single rod  |
| W      | Double rod  |

**Pivot bracket**

| Symbol | Description   |
|--------|---------------|
| Nil    | No bracket    |
| N      | Pivot bracket |

\* Only for D and T mounting types  
\* The double clevis pivot bracket and clevis pivot bracket with ball joint should be ordered separately.

**Rod end bracket**

| Symbol | Description |
|--------|-------------|
| Nil    | No bracket  |
| W      | Rod clevis  |

\* The floating joint and rod end should be ordered separately.

**Made to order**  
Refer to page 26 for details.

**Number of auto switches**

| Symbol | Number |
|--------|--------|
| Nil    | 2      |
| S      | 1      |
| 3      | 3      |
| n      | n      |

**Auto switch**

| Symbol | Description         |
|--------|---------------------|
| Nil    | Without auto switch |

\* For applicable auto switches, refer to the table below.

**Refer to the Ordering Example of Cylinder Assembly on page 26.**

### Applicable Auto Switches/Refer to the Web Catalog or Best Pneumatics Catalog for further information on auto switches.

| Type                    | Special function                                                                                                                                                                           | Electrical entry | Indicator light | Wiring (Output)                       | Load voltage |                                                             |        | Auto switch model |               |               | Lead wire length [m] |       |       |            | Pre-wired connector | Applicable load |            |            |            |            |            |   |   |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------|---------------------------------------|--------------|-------------------------------------------------------------|--------|-------------------|---------------|---------------|----------------------|-------|-------|------------|---------------------|-----------------|------------|------------|------------|------------|------------|---|---|
|                         |                                                                                                                                                                                            |                  |                 |                                       | DC           |                                                             | AC     | Tie-rod mounting  |               | Band mounting | 0.5 (Nil)            | 1 (M) | 3 (L) | 5 (Z)      |                     |                 |            |            |            |            |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 |                                       |              |                                                             |        | Perpendicular     | In-line       |               |                      |       |       |            |                     |                 |            |            |            |            |            |   |   |
| Solid state auto switch | —                                                                                                                                                                                          | Grommet          | Yes             | 3-wire (NPN)                          | 24 V         | 5 V, 12 V                                                   | —      | M9NV              | M9N           | —             | ●                    | ●     | ●     | ○          | ○                   | IC circuit      | Relay, PLC |            |            |            |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 | 3-wire (PNP)                          |              |                                                             |        | M9PV              | M9P           | —             | ●                    | ●     | ●     | ○          | ○                   |                 |            |            |            |            |            |   |   |
|                         |                                                                                                                                                                                            | 2-wire           |                 | 12 V                                  |              |                                                             |        | M9BV              | M9B           | —             | ●                    | ●     | ●     | ○          | ○                   |                 |            |            |            |            |            |   |   |
|                         |                                                                                                                                                                                            | 3-wire (NPN)     |                 | 5 V, 12 V                             |              |                                                             |        | —                 | —             | G39           | —                    | —     | —     | —          | —                   |                 |            |            |            |            |            |   |   |
|                         | Diagnostic indication (2-color indicator)<br><br>Water-resistant (2-color indicator)<br><br>With diagnostic output (2-color indicator)<br><br>Magnetic field-resistant (2-color indicator) | Terminal conduit |                 | 2-wire                                | 12 V         | —                                                           | —      | K39               | —             | —             | —                    | —     | —     | —          | —                   | —               |            | —          |            |            |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 | 3-wire (NPN)                          | 5 V, 12 V    | M9NWV                                                       | M9NW   | —                 | ●             | ●             | ●                    | ○     | ○     | IC circuit |                     |                 |            |            |            |            |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 | 3-wire (PNP)                          | 12 V         | M9PWV                                                       | M9PW   | —                 | ●             | ●             | ●                    | ○     | ○     |            | —                   |                 |            |            |            |            |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 | 2-wire                                | 5 V, 12 V    | M9BWW                                                       | M9BW   | —                 | ●             | ●             | ●                    | ○     | ○     | IC circuit |                     |                 |            |            |            |            |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 | 3-wire (NPN)                          | 5 V, 12 V    | M9NAV*1                                                     | M9NA*1 | —                 | ○             | ○             | ●                    | ○     | ○     |            | —                   |                 |            |            |            |            |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 | 3-wire (PNP)                          | 12 V         | M9PAV*1                                                     | M9PA*1 | —                 | ○             | ○             | ●                    | ○     | ○     | IC circuit |                     |                 |            |            |            |            |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 | 2-wire                                | 5 V, 12 V    | M9BAV*1                                                     | M9BA*1 | —                 | ○             | ○             | ●                    | ○     | ○     |            | —                   |                 |            |            |            |            |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 | 4-wire (NPN)                          | 5 V, 12 V    | —                                                           | F59F   | —                 | ●             | —             | ●                    | ○     | ○     | IC circuit |                     |                 |            |            |            |            |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 | 2-wire (Non-polar)                    | —            | —                                                           | P3DWA  | —                 | ●             | —             | ●                    | ●     | ○     |            | —                   |                 |            |            |            |            |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 | —                                     | —            | —                                                           | P4DW   | —                 | —             | —             | ●                    | ●     | ○     | ○          |                     | —               |            |            |            |            |            |   |   |
| Reed auto switch        | —                                                                                                                                                                                          | Grommet          | Yes             | 3-wire (NPN equivalent)<br><br>2-wire | 24 V         | 5 V<br><br>12 V<br><br>12 V<br><br>12 V<br><br>100 V, 200 V | —      | —                 | A96V          | A96           | —                    | ●     | —     | ●          | —                   |                 | —          | IC circuit | Relay, PLC |            |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 |                                       |              |                                                             |        |                   | 100 V         | A93V*2        | A93                  | —     | ●     | ●          | ●                   | ●               | —          |            |            | IC circuit |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 |                                       |              |                                                             |        |                   | 100 V or less | A90V          | A90                  | —     | ●     | —          | ●                   | —               | —          |            |            |            | —          |   |   |
|                         |                                                                                                                                                                                            |                  |                 |                                       |              |                                                             |        |                   | 100 V, 200 V  | —             | A54                  | —     | ●     | —          | ●                   | ●               | —          |            |            |            |            | — |   |
|                         |                                                                                                                                                                                            |                  |                 |                                       |              |                                                             |        |                   | 200 V or less | —             | A64                  | —     | ●     | —          | ●                   | —               | —          |            |            |            |            |   | — |
|                         |                                                                                                                                                                                            | Terminal conduit |                 |                                       |              |                                                             |        |                   | —             | —             | A33                  | —     | —     | —          | —                   | —               | —          | —          |            | PLC        |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 |                                       |              |                                                             |        |                   | —             | —             | A34                  | —     | —     | —          | —                   | —               | —          |            |            |            | Relay, PLC |   |   |
|                         |                                                                                                                                                                                            |                  |                 |                                       |              |                                                             |        |                   | 100 V, 200 V  | —             | A44                  | —     | —     | —          | —                   | —               | —          |            |            |            |            | — |   |
|                         |                                                                                                                                                                                            |                  |                 |                                       |              |                                                             |        |                   | —             | —             | —                    | —     | —     | —          | —                   | —               | —          |            |            |            |            |   |   |
|                         |                                                                                                                                                                                            |                  |                 |                                       |              |                                                             |        |                   | —             | —             | —                    | A59W  | —     | ●          | —                   | ●               | —          |            |            |            |            |   | — |

\*1 Water-resistant type auto switches can be mounted on the above models, but SMC cannot guarantee water resistance.

A water-resistant type cylinder is recommended for use in an environment which requires water resistance.

\*2 The 1 m lead wire is only applicable to the D-A93.

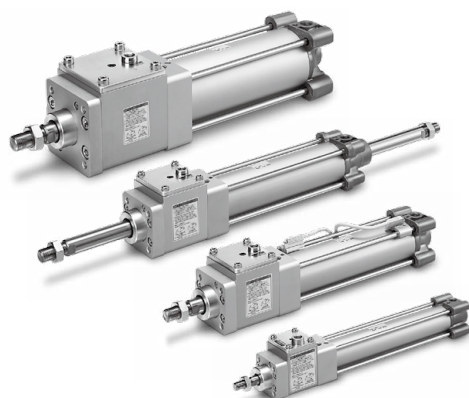
\* Lead wire length symbols: 0.5 m.....Nil (Example) M9NW 3 m.....L (Example) M9NWL  
1 m.....M (Example) M9NWM 5 m.....Z (Example) M9NWZ

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

\* Since there are applicable auto switches other than those listed above, refer to page 42 for details.

\* The D-A9□/M9□/P3DWA□ auto switches are shipped together with the product but do not come assembled. (Only the auto switch mounting brackets are assembled for the D-A9□/M9□ before shipment.)

# Cylinder with Lock Double Acting, Single Rod/Double Rod **C96N Series**



## Made to Order Common Specifications (For details, refer to pages 46 to 48.)

| Symbol | Specifications                            |
|--------|-------------------------------------------|
| -XA□   | Change of rod end shape (Single rod only) |
| -XC35  | With coil scraper                         |

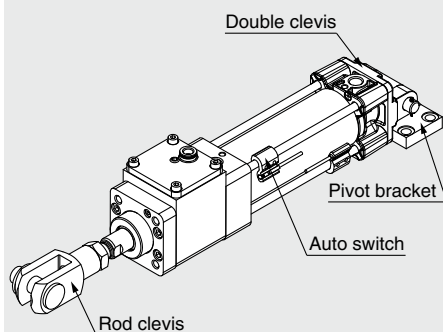
For details of **cylinders with auto switches**

⇒ pages 36 to 42

- Auto Switch Proper Mounting Position (Detection at stroke end) and Mounting Height
- Minimum Stroke for Auto Switch Mounting
- Auto Switch Mounting Brackets/Part Nos.
- Operating Range

## Ordering Example of Cylinder Assembly

Cylinder model: C96NDD50-100C-NW-M9BW



**Mounting D: Double clevis**  
**Pivot bracket N: Yes**  
**Rod end bracket W: Rod clevis**  
**Auto switch D-M9BW: 2 pcs.**

\* Pivot bracket, rod clevis, and auto switch are shipped together with the product but do not come assembled.

## Cylinder Specifications

| Bore size [mm]                 | 32                                                                                                                                                                                                                                                                            | 40   | 50   | 63   | 80 | 100 |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|----|-----|
| Action                         | Double acting                                                                                                                                                                                                                                                                 |      |      |      |    |     |
| Fluid                          | Air                                                                                                                                                                                                                                                                           |      |      |      |    |     |
| Proof pressure                 | 1.5 MPa                                                                                                                                                                                                                                                                       |      |      |      |    |     |
| Max. operating pressure        | 1.0 MPa                                                                                                                                                                                                                                                                       |      |      |      |    |     |
| Min. operating pressure        | 0.08 MPa                                                                                                                                                                                                                                                                      |      |      |      |    |     |
| Ambient and fluid temperatures | Without auto switch: -10°C to 70°C<br>With auto switch: -10°C to 60°C (No freezing)                                                                                                                                                                                           |      |      |      |    |     |
| Lubricant                      | Not required (Non-lube)                                                                                                                                                                                                                                                       |      |      |      |    |     |
| Piston speed                   | 50 to 1000 mm/s*1                                                                                                                                                                                                                                                             |      |      |      |    |     |
| Stroke length tolerance        | Up to 500 st: $\begin{smallmatrix} +2.0 \\ 0 \end{smallmatrix}$ , 501 to 1000 st: $\begin{smallmatrix} +2.4 \\ 0 \end{smallmatrix}$ , 1001 to 1500 st: $\begin{smallmatrix} +2.8 \\ 0 \end{smallmatrix}$ , 1501 to 1900 st: $\begin{smallmatrix} +3.2 \\ 0 \end{smallmatrix}$ |      |      |      |    |     |
| Cushion                        | Air cushion on both ends + Bumper cushion                                                                                                                                                                                                                                     |      |      |      |    |     |
| Port size                      | G1/8                                                                                                                                                                                                                                                                          | G1/4 | G3/8 | G1/2 |    |     |
| Mounting                       | Basic, Axial foot, Rod flange, Head flange<br>Single clevis, Double clevis, Center trunnion                                                                                                                                                                                   |      |      |      |    |     |

\*1 Load limits exist depending upon the piston speed when locked, mounting direction, and operating pressure.

## Lock Unit Specifications

| Bore size [mm]                                | 32              | 40  | 50   | 63   | 80   | 100  |
|-----------------------------------------------|-----------------|-----|------|------|------|------|
| <b>Locking action</b>                         | Exhaust locking |     |      |      |      |      |
| <b>Max. operating pressure</b>                | 1.0 MPa         |     |      |      |      |      |
| <b>Min. operating pressure</b>                | 0.3 MPa         |     |      |      |      |      |
| <b>Locking direction</b>                      | Both directions |     |      |      |      |      |
| <b>Holding force (Max. static load) [N]*1</b> | 630             | 980 | 1570 | 2450 | 3920 | 6080 |

\*1 The holding force (max. static load) shows the maximum capability and does not show the normal holding capability. Be sure to select a cylinder using the method described in Model Selection (page 6).

## Standard Strokes

\* When using with auto switches, refer to the Minimum Stroke for Auto Switch Mounting table on pages 38 to 40.

| Bore size  | Standard stroke                                                   | Max. stroke [mm] |
|------------|-------------------------------------------------------------------|------------------|
| <b>32</b>  | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500                | 1000             |
| <b>40</b>  | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500                | 1900             |
| <b>50</b>  | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600           | 1900             |
| <b>63</b>  | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600           | 1900             |
| <b>80</b>  | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600, 700, 800 | 1900             |
| <b>100</b> | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600, 700, 800 | 1900             |

- \* The manufacturing of intermediate strokes is possible. (Spacers are not used.)
- \* Applicable strokes should be confirmed according to the usage. For details, refer to the Air Cylinders Model Selection in the **Web Catalog** or Best Pneumatics Catalog. In addition, products that exceed the standard stroke might not be able to fulfill the specifications due to deflection, etc.
- \* When using a rod boot, a stroke range of up to 1000 mm is available. Please consult with SMC when exceeding a 1000 mm stroke.

## Stopping Accuracy

| Bore size [mm]                | 32                                                                                                                                                                                                                                                                                                                                                  | 40 | 50 | 63 | 80 | 100 |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|----|-----|
| <b>Lock type</b>              | Exhaust locking                                                                                                                                                                                                                                                                                                                                     |    |    |    |    |     |
| <b>Stopping accuracy [mm]</b> | ±1.0                                                                                                                                                                                                                                                                                                                                                |    |    |    |    |     |
| <b>Conditions</b>             | <ul style="list-style-type: none"> <li>· Mounting orientation: Horizontal</li> <li>· Supply pressure: 0.5 MPa</li> <li>· Piston speed: 300 mm/s</li> <li>· Load condition: Upper limit of allowed value</li> </ul> Solenoid valve for locking is mounted on the unlock port.<br>Maximum value of stopping position dispersion from 100 measurements |    |    |    |    |     |

# C96N Series

## Accessories

| Mounting |             | Basic | Axial foot | Rod flange | Head flange | Single clevis | Double clevis | Center trunnion |
|----------|-------------|-------|------------|------------|-------------|---------------|---------------|-----------------|
| Standard | Rod end nut | ●     | ●          | ●          | ●           | ●             | ●             | ●               |
|          | Clevis pin  | —     | —          | —          | —           | —             | ●             | —               |
| Option   | Rod end     | ●     | ●          | ●          | ●           | ●             | ●             | ●               |
|          | Rod clevis  | ●     | ●          | ●          | ●           | ●             | ●             | ●               |
|          | Rod boot    | ●     | ●          | ●          | ●           | ●             | ●             | ●               |

- \* Do not use a rod end (or floating joint) together with a single clevis with a ball joint (or clevis pivot bracket with a ball joint).
- \* Refer to pages 19 to 22 for dimensions and part numbers of the accessories. (Excludes the rod end nut, clevis pin, and rod boot)

## Mounting Bracket/Rod End Bracket Part Nos.

| Bore size [mm] |                                              | 32          | 40          | 50          | 63          | 80           | 100          |
|----------------|----------------------------------------------|-------------|-------------|-------------|-------------|--------------|--------------|
| L              | Axial foot*1                                 | L5032       | L5040       | L5050       | L5063       | L5080        | L5100        |
| F, G           | Rod/Head flange                              | F5032       | F5040       | F5050       | F5063       | F5080        | F5100        |
| C              | Single clevis                                | C5032       | C5040       | C5050       | C5063       | C5080        | C5100        |
| D              | Double clevis                                | D5032       | D5040       | D5050       | D5063       | D5080        | D5100        |
| E              | Clevis pivot bracket                         | E5032       | E5040       | E5050       | E5063       | E5080        | E5100        |
| CS             | Single clevis with ball joint                | CS5032      | CS5040      | CS5050      | CS5063      | CS5080       | CS5100       |
| DS             | Double clevis pivot bracket for ES accessory | DS5032      | DS5040      | DS5050      | DS5063      | DS5080       | DS5100       |
| ES             | Clevis pivot bracket with ball joint         | ES5032      | ES5040      | ES5050      | ES5063      | ES5080       | ES5100       |
| GKM            | Rod clevis                                   | GKM10-20    | GKM12-24    | GKM16-32    | GKM16-32    | GKM20-40     | GKM20-40     |
| KJ             | Rod end                                      | KJ10D       | KJ12D       | KJ16D       | KJ16D       | KJ20D        | KJ20D        |
| JA             | Floating joint                               | JA30-10-125 | JA40-12-125 | JA50-16-150 | JA50-16-150 | JAH50-20-150 | JAH50-20-150 |

- \*1 Order two foot brackets per cylinder.
- \* Accessories for each mounting bracket are as follows.  
Axial foot, Rod/Head flange, Single clevis: Body mounting bolt  
Double clevis (D, DS): Body mounting bolt, Clevis pin, Clevis pin bracket
- \* The rod clevis (GKM) is compliant with ISO 8140.
- \* The rod end (KJ) is compliant with ISO 8139.

## Theoretical Output



(Unit: N)

| Bore size<br>[mm] | Rod size<br>[mm] | Operating<br>direction | Piston area<br>[mm <sup>2</sup> ] | Operating pressure [MPa] |      |      |      |      |      |      |      |      |
|-------------------|------------------|------------------------|-----------------------------------|--------------------------|------|------|------|------|------|------|------|------|
|                   |                  |                        |                                   | 0.2                      | 0.3  | 0.4  | 0.5  | 0.6  | 0.7  | 0.8  | 0.9  | 1.0  |
| 32                | 12               | OUT                    | 804                               | 161                      | 241  | 322  | 402  | 482  | 563  | 643  | 724  | 804  |
|                   |                  | IN                     | 691                               | 138                      | 207  | 276  | 346  | 415  | 484  | 553  | 622  | 691  |
| 40                | 16               | OUT                    | 1257                              | 251                      | 377  | 503  | 629  | 754  | 880  | 1006 | 1131 | 1257 |
|                   |                  | IN                     | 1056                              | 211                      | 317  | 422  | 528  | 634  | 739  | 845  | 950  | 1056 |
| 50                | 20               | OUT                    | 1963                              | 393                      | 589  | 785  | 982  | 1178 | 1374 | 1570 | 1767 | 1963 |
|                   |                  | IN                     | 1649                              | 330                      | 495  | 660  | 825  | 989  | 1154 | 1319 | 1484 | 1649 |
| 63                | 20               | OUT                    | 3117                              | 623                      | 935  | 1247 | 1559 | 1870 | 2182 | 2494 | 2805 | 3117 |
|                   |                  | IN                     | 2803                              | 561                      | 841  | 1121 | 1402 | 1682 | 1962 | 2242 | 2523 | 2803 |
| 80                | 25               | OUT                    | 5027                              | 1005                     | 1508 | 2011 | 2514 | 3016 | 3519 | 4022 | 4524 | 5027 |
|                   |                  | IN                     | 4536                              | 907                      | 1361 | 1814 | 2268 | 2722 | 3175 | 3629 | 4082 | 4536 |
| 100               | 30               | OUT                    | 7854                              | 1571                     | 2356 | 3142 | 3927 | 4712 | 5498 | 6283 | 7069 | 7854 |
|                   |                  | IN                     | 7147                              | 1429                     | 2144 | 2859 | 3574 | 4288 | 5003 | 5718 | 6432 | 7147 |

\* Theoretical output [N] = Pressure [MPa] x Piston area [mm<sup>2</sup>]

## Weight

### Single Rod (ø32 to ø100)

[kg]

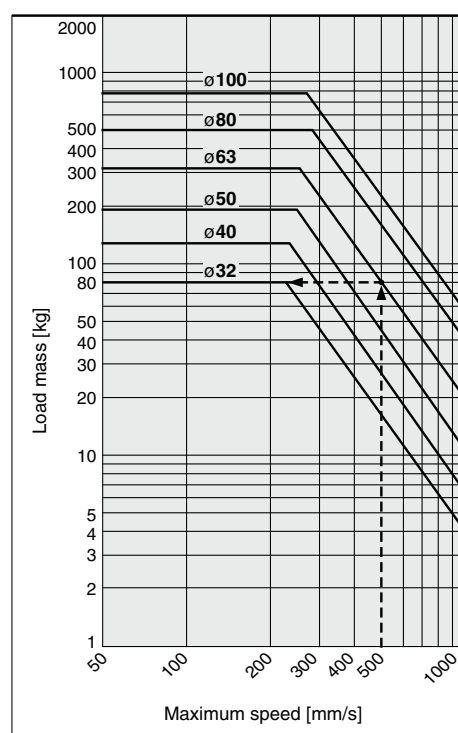
| Bore size [mm]                                                   |                       | 32                     | 40   | 50   | 63   | 80   | 100  |      |
|------------------------------------------------------------------|-----------------------|------------------------|------|------|------|------|------|------|
| Basic weight<br>(at 0 stroke)                                    | Basic                 | Lock unit              | 0.42 | 0.83 | 1.15 | 1.79 | 2.81 | 5.44 |
|                                                                  |                       | Cylinder (at 0 stroke) | 0.53 | 0.82 | 1.37 | 1.74 | 3.16 | 4.50 |
|                                                                  |                       | Total                  | 0.95 | 1.65 | 2.52 | 3.53 | 5.97 | 9.94 |
| Mounting bracket weight<br>(including bracket<br>mounting bolts) | Foot bracket (2 pcs.) |                        | 0.16 | 0.20 | 0.38 | 0.46 | 0.89 | 1.09 |
|                                                                  | Rod/Head flange       |                        | 0.20 | 0.23 | 0.47 | 0.58 | 1.30 | 1.81 |
|                                                                  | Single clevis bracket |                        | 0.16 | 0.23 | 0.37 | 0.60 | 1.07 | 1.73 |
|                                                                  | Double clevis bracket |                        | 0.20 | 0.32 | 0.45 | 0.71 | 1.28 | 2.11 |
|                                                                  | Trunnion bracket      |                        | 0.17 | 0.29 | 0.38 | 0.64 | 1.12 | 1.85 |
| Additional weight per 50 mm of stroke                            |                       |                        | 0.11 | 0.16 | 0.24 | 0.26 | 0.40 | 0.44 |
| Accessories                                                      | Rod end               |                        | 0.07 | 0.11 | 0.22 | 0.40 |      |      |
|                                                                  | Rod clevis            |                        | 0.09 | 0.15 | 0.34 | 0.69 |      |      |

## Rod Boot Material

| Symbol | Material                 | Max. ambient temp. |
|--------|--------------------------|--------------------|
| J      | Nylon tarpaulin          | 70°C               |
| K      | Heat-resistant tarpaulin | 110°C*1            |

\*1 Max. ambient temperature for rod boot itself

## Allowable Kinetic Energy of the Cylinder\*1



Example) Load limit at rod end when the air cylinder ø63 is actuated at 500 mm/s.  
Extend upward from 500 mm/s on the horizontal axis of the graph to the intersection point with the line for a tube bore size of 63 mm, and then extend leftward from this point to find the load of 80 kg.

\*1 The allowable kinetic energy of the cylinder is shown without the intermediate stop or emergency stop. Refer to page 6 or 7 for the kinetic energy with intermediate or emergency stop.

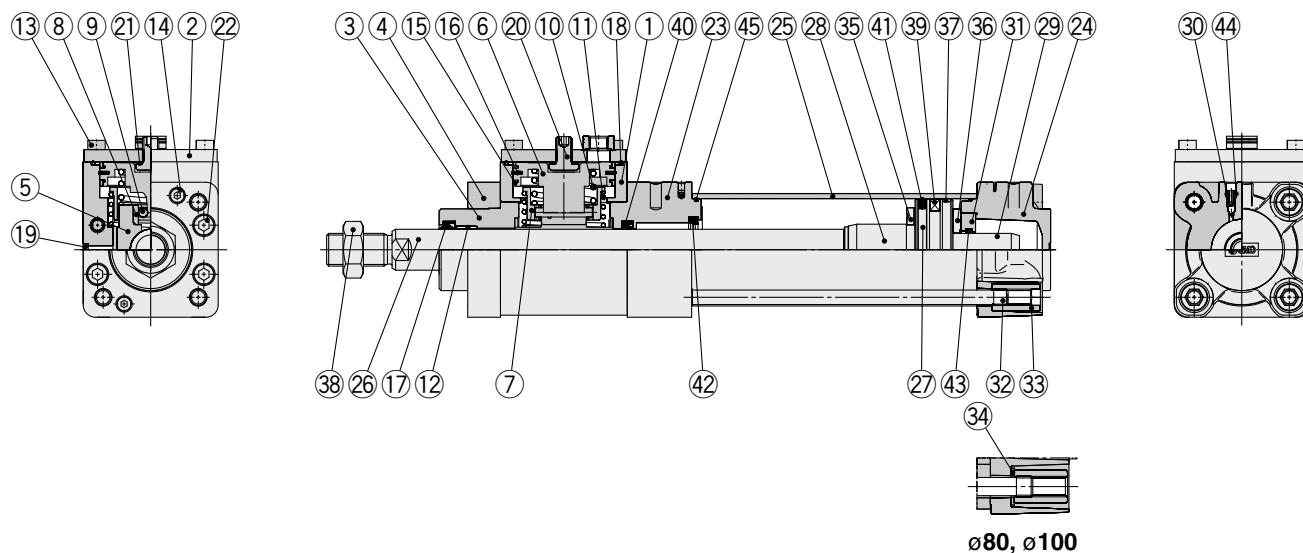
Calculation example)

**C96NL32-100C** (Axial foot, ø32, 100 mm stroke)

- Basic weight...0.42 (Lock unit, ø32)
- Basic weight...0.53 (Cylinder, ø32)
- Additional weight...0.11/50 mm stroke
- Cylinder stroke...100 mm stroke
- Foot bracket...0.16

$$0.42 + 0.53 + (0.11/50) \times 100 + 0.16 = 1.33 \text{ kg}$$

## Construction (Single Rod)



### Component Parts

| No. | Description                   | Material              | Qty. | Note                |
|-----|-------------------------------|-----------------------|------|---------------------|
| 1   | Brake unit                    | Aluminum alloy        | 1    | Hard anodized       |
| 2   | Cap                           | Rolled steel          | 1    | Zinc chromated      |
| 3   | Collar                        | Aluminum alloy        | 1    | Zinc chromated      |
| 4   | Retaining plate               | Aluminum alloy        | 1    | Anodized            |
| 5   | Brake pad                     | Cast iron             | 1    |                     |
| 6   | Piston A                      | Aluminum alloy        | 1    |                     |
| 7   | Roller holder                 | Carbon steel          | 1    |                     |
| 8   | Roller receiver               | Stainless steel       | 2    |                     |
| 9   | Needle roller                 | Carbon steel          | 2    |                     |
| 10  | Piston spring                 | Spring steel          | 1    | Zinc chromated      |
| 11  | Roller spring                 | Spring steel          | 1    | Zinc chromated      |
| 12  | Bushing                       | Bearing alloy         | 1    |                     |
| 13  | Hexagon socket head cap screw | Alloy steel           | 4    |                     |
| 14  | Hexagon socket head cap screw | Alloy steel           | 2    |                     |
| 15  | Wear ring A                   | Resin                 | 2    |                     |
| 16  | Piston seal A                 | NBR                   | 1    |                     |
| 17  | Rod seal A                    | NBR                   | 1    |                     |
| 18  | Gasket                        | NBR                   | 1    |                     |
| 19  | Element                       | Bronze                | 1    |                     |
| 20  | Release bolt                  | Alloy steel           | 1    |                     |
| 21  | Seal washer                   | NBR + Stainless steel | 1    |                     |
| 22  | Hexagon socket head cap screw | Alloy steel           | 4    |                     |
| 23  | Rod cover                     | Aluminum alloy        | 1    | Anodized            |
| 24  | Head cover                    | Aluminum die-cast     | 1    | Zinc chromated      |
| 25  | Cylinder tube                 | Aluminum alloy        | 1    | Hard anodized       |
| 26  | Piston rod                    | Carbon steel          | 1    | Hard chrome plating |
| 27  | Piston B                      | Aluminum alloy        | 1    | ø32 to ø63          |
|     |                               | Aluminum die-cast     | 1    | ø80, ø100           |
| 28  | Cushion ring                  | Aluminum alloy        | 1    | Anodized            |
| 29  | Cushion ring B                | Aluminum alloy        | 1    | Anodized            |
| 30  | Cushion valve                 | Resin                 | 2    |                     |
| 31  | Cushion seal holder           | Aluminum alloy        | 1    | Anodized            |

### Component Parts

| No. | Description          | Material     | Qty. | Note           |
|-----|----------------------|--------------|------|----------------|
| 32  | Tie-rod              | Carbon steel | 4    | Zinc chromated |
| 33  | Tie-rod nut          | Rolled steel | 8    | Zinc chromated |
| 34  | Flat washer          | Steel        | 8    | ø80, ø100      |
| 35  | Bumper A             | Urethane     | 1    |                |
| 36  | Bumper B             | Urethane     | 1    |                |
| 37  | Wear ring B          | Resin        | 1    |                |
| 38  | Rod end nut          | Carbon steel | 1    | Zinc chromated |
| 39  | Magnet               | —            | (1)  |                |
| 40  | Rod seal B           | NBR          | 1    |                |
| 41  | Piston seal B        | NBR          | 1    |                |
| 42  | Cushion seal A       | Urethane     | 1    |                |
| 43  | Cushion seal B       | Urethane     | 1    |                |
| 44  | Cushion valve seal   | NBR          | 2    |                |
| 45  | Cylinder tube gasket | NBR          | 2    |                |

### Replacement Parts/Seal Kit

| Bore size [mm] | Kit no.    | Contents                                                                                                                   |
|----------------|------------|----------------------------------------------------------------------------------------------------------------------------|
| 32             | C96N32-PS  | A set of 17 Rod seal A, 40 Rod seal B, 41 Piston seal B, 42 Cushion seal A, 43 Cushion seal B, and 45 Cylinder tube gasket |
| 40             | C96N40-PS  |                                                                                                                            |
| 50             | C96N50-PS  |                                                                                                                            |
| 63             | C96N63-PS  |                                                                                                                            |
| 80             | C96N80-PS  |                                                                                                                            |
| 100            | C96N100-PS |                                                                                                                            |

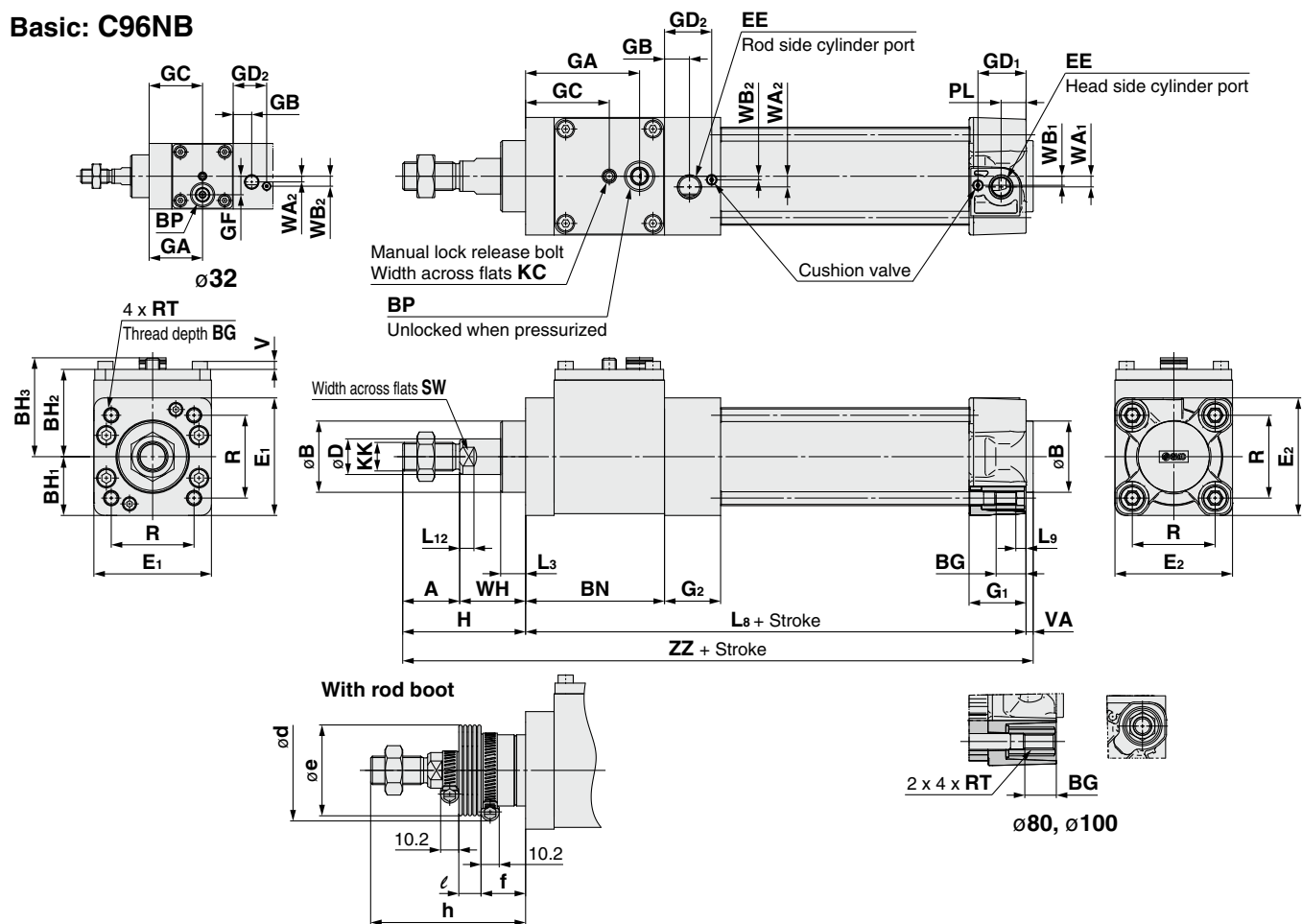
\* Never disassemble the lock unit. It should be replaced as a unit. Refer to page 52 for the part numbers for placing an order. The seal kit shown above contains the rod seal for the cylinder and lock unit. Order the seal kit suitable for the cylinder bore size.

\* The seal kit shown above includes a grease pack.  
(ø32, ø40, ø50: 10 g, ø63, ø80: 20 g, ø100: 30 g)  
Order with the following part number when only the grease pack is needed.  
**Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)**

# C96N Series

## Dimensions (Single Rod)

### Basic: C96NB



| Bore size | Stroke range | A  | øB <sub>d11</sub> | BG | BH <sub>1</sub> | BH <sub>2</sub> | BH <sub>3</sub> | BN  | BP   | øD | E <sub>1</sub> | E <sub>2</sub> | EE   | G <sub>1</sub> | G <sub>2</sub> | GA   | GB | GC   | GD <sub>1</sub> | GD <sub>2</sub> | GF | H  |
|-----------|--------------|----|-------------------|----|-----------------|-----------------|-----------------|-----|------|----|----------------|----------------|------|----------------|----------------|------|----|------|-----------------|-----------------|----|----|
| 32        | Up to 1000   | 22 | 30                | 16 | 23              | 38.5            | 46.5            | 59  | G1/8 | 12 | 46             | 47             | G1/8 | 28.9           | 28.5           | 37.5 | 13 | 37.5 | 23.9            | 23.5            | 13 | 48 |
| 40        | Up to 1900   | 24 | 35                | 16 | 28.5            | 42.5            | 48.5            | 73  | G1/8 | 16 | 57             | 54             | G1/4 | 32.6           | 29             | 59.5 | 14 | 44.5 | 27.6            | 24              | —  | 54 |
| 50        | Up to 1900   | 32 | 40                | 16 | 33              | 49              | 55.5            | 78  | G1/8 | 20 | 66             | 66             | G1/4 | 32             | 31.5           | 64   | 14 | 47   | 27              | 26.5            | —  | 69 |
| 63        | Up to 1900   | 32 | 45                | 16 | 39              | 52.5            | 59.5            | 90  | G1/4 | 20 | 78             | 77             | G3/8 | 38.6           | 31.5           | 73   | 16 | 53   | 31.6            | 26.5            | —  | 69 |
| 80        | Up to 1900   | 40 | 45                | 17 | 49              | 64.5            | 71.5            | 113 | G1/4 | 25 | 98             | 99             | G3/8 | 38.4           | 38             | 92   | 16 | 65   | 32              | 31.6            | —  | 86 |
| 100       | Up to 1900   | 40 | 55                | 17 | 58              | 73.5            | 80.5            | 131 | G1/4 | 30 | 116            | 118            | G1/2 | 42.9           | 38             | 109  | 18 | 74   | 36.5            | 31.6            | —  | 91 |

| Bore size | Stroke range | KC | KK         | L <sub>3</sub> | L <sub>8</sub> | L <sub>9</sub> | L <sub>12</sub> | PL | R    | RT        | SW | V   | VA | WA <sub>1</sub> | WA <sub>2</sub> | WB <sub>1</sub> | WB <sub>2</sub> | WH | ZZ    |
|-----------|--------------|----|------------|----------------|----------------|----------------|-----------------|----|------|-----------|----|-----|----|-----------------|-----------------|-----------------|-----------------|----|-------|
| 32        | Up to 1000   | 3  | M10 x 1.25 | 13             | 152            | 4              | 6               | 13 | 32.5 | M6 x 1    | 10 | 3.5 | 4  | 4               | 4               | 7               | 7               | 26 | 204   |
| 40        | Up to 1900   | 3  | M12 x 1.25 | 13             | 171            | 4              | 6.5             | 14 | 38   | M6 x 1    | 13 | 4.5 | 4  | 5               | 7               | 8.9             | 1.8             | 30 | 229   |
| 50        | Up to 1900   | 4  | M16 x 1.5  | 14             | 181            | 5              | 8               | 14 | 46.5 | M8 x 1.25 | 17 | 4.5 | 4  | 6               | 6               | 5.1             | 2               | 37 | 254   |
| 63        | Up to 1900   | 4  | M16 x 1.5  | 14             | 200.5          | 5              | 8               | 16 | 56.5 | M8 x 1.25 | 17 | 5.5 | 4  | 9               | 9               | 6.3             | 2               | 37 | 273.5 |
| 80        | Up to 1900   | 5  | M20 x 1.5  | 20             | 238            | —              | 10              | 16 | 72   | M10 x 1.5 | 22 | 7.5 | 4  | 11.5            | 11.5            | 6               | 6               | 46 | 328   |
| 100       | Up to 1900   | 5  | M20 x 1.5  | 20             | 261.5          | —              | 10              | 18 | 89   | M10 x 1.5 | 26 | 9.5 | 4  | 17              | 17              | 10              | 3               | 51 | 356.5 |

### With Rod Boot

| Bore size | d  | e  | f  | h       |           |            |            |            |            |            |            |            |            |            |             |
|-----------|----|----|----|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
|           |    |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 501 to 600 | 601 to 700 | 701 to 800 | 801 to 900 | 901 to 1000 |
| 32        | 54 | 36 | 23 | 75      | 88        | 100        | 113        | 138        | 163        | 188        | 213        | 238        | 263        | 288        | 313         |
| 40        | 56 | 41 | 23 | 75      | 88        | 100        | 113        | 138        | 163        | 188        | 213        | 238        | 263        | 288        | 313         |
| 50        | 64 | 51 | 25 | 87      | 100       | 112        | 125        | 150        | 175        | 200        | 225        | 250        | 275        | 300        | 325         |
| 63        | 64 | 51 | 25 | 87      | 100       | 112        | 125        | 150        | 175        | 200        | 225        | 250        | 275        | 300        | 325         |
| 80        | 68 | 56 | 29 | 103     | 116       | 128        | 141        | 166        | 191        | 216        | 241        | 266        | 291        | 316        | 341         |
| 100       | 76 | 61 | 29 | 103     | 116       | 128        | 141        | 166        | 191        | 216        | 241        | 266        | 291        | 316        | 341         |

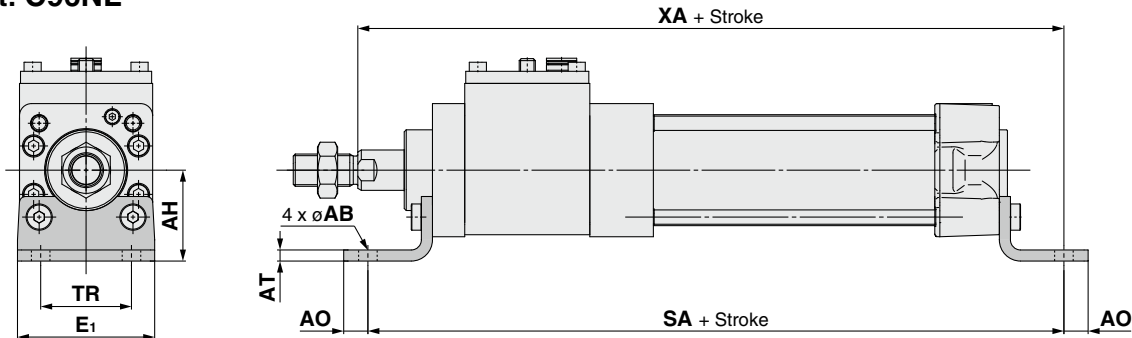
| Bore size | ℓ       |           |            |            |            |            |            |            |            |            |            |             |
|-----------|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
|           | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 501 to 600 | 601 to 700 | 701 to 800 | 801 to 900 | 901 to 1000 |
| 32        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         |
| 40        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         |
| 50        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         |
| 63        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         |
| 80        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         |
| 100       | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         |



Dimensions: With Mounting Bracket

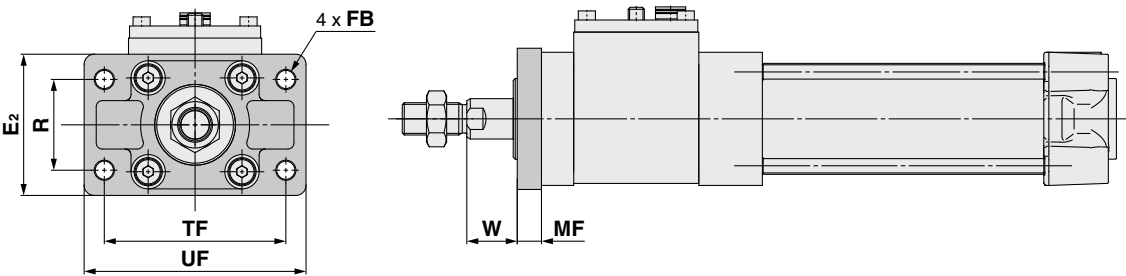
\* Refer to Basic (B) for other dimensions.

Axial foot: C96NL

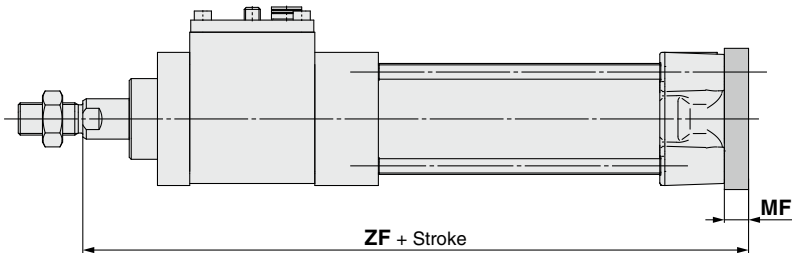


| Bore size | AB   | AH | AO | AT  | E <sub>1</sub> | SA    | TR | XA    |
|-----------|------|----|----|-----|----------------|-------|----|-------|
| 32        | 7    | 32 | 10 | 4.5 | 48             | 200   | 32 | 202   |
| 40        | 10   | 36 | 11 | 4.5 | 55             | 227   | 36 | 229   |
| 50        | 10   | 45 | 12 | 5.5 | 68             | 245   | 45 | 250   |
| 63        | 10   | 50 | 12 | 5.5 | 80             | 264.5 | 50 | 269.5 |
| 80        | 12   | 63 | 14 | 6.5 | 100            | 320   | 63 | 325   |
| 100       | 14.5 | 71 | 16 | 6.5 | 120            | 343.5 | 75 | 353.5 |

Flange  
Rod side: C96NF



Head side: C96NG



| Bore size | E <sub>2</sub> | FB | MF | R  | TF  | UF  | W  | ZF    |
|-----------|----------------|----|----|----|-----|-----|----|-------|
| 32        | 50             | 7  | 10 | 32 | 64  | 79  | 16 | 188   |
| 40        | 55             | 9  | 10 | 36 | 72  | 90  | 20 | 211   |
| 50        | 70             | 9  | 12 | 45 | 90  | 110 | 25 | 230   |
| 63        | 80             | 9  | 12 | 50 | 100 | 120 | 25 | 249.5 |
| 80        | 100            | 12 | 16 | 63 | 126 | 153 | 30 | 300   |
| 100       | 120            | 14 | 16 | 75 | 150 | 178 | 35 | 328.5 |

Model  
Selection

Working  
Principle

CP96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

C96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

Lock Unit  
MWB-UT

Accessories

Auto Switch

Made to  
Order

Specific Product  
Precautions



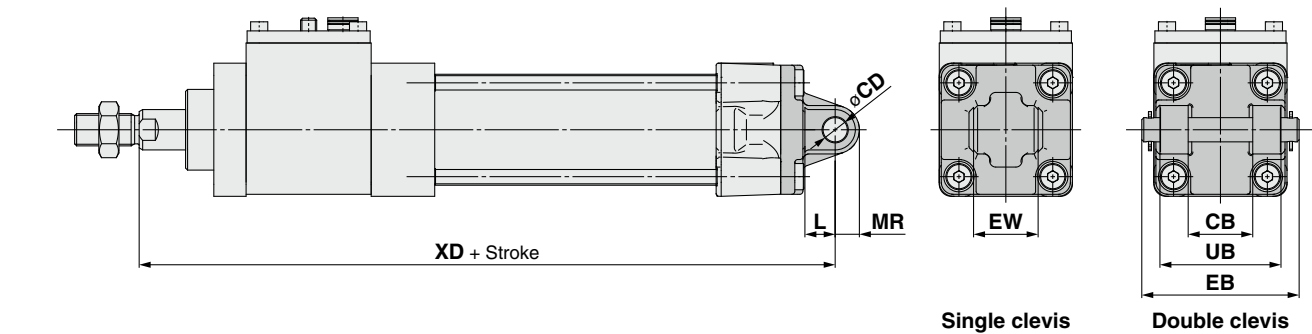
# C96N Series

## Dimensions: With Mounting Bracket

\* Refer to Basic (B) for other dimensions.

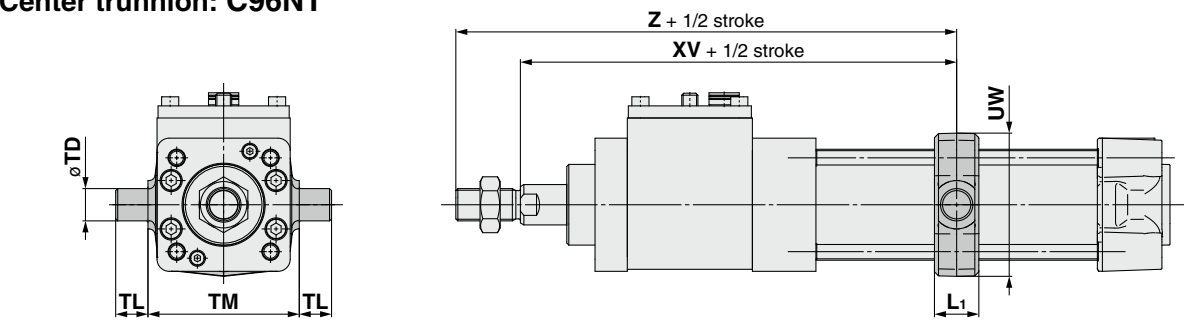
Single clevis: C96NC

Double clevis: C96ND



| Bore size | CB <sub>H14</sub> | CD <sub>H9</sub> | EB  | EW                                 | L  | MR  | UB <sub>H14</sub> | XD    |
|-----------|-------------------|------------------|-----|------------------------------------|----|-----|-------------------|-------|
| 32        | 26                | 10               | 65  | 26 <sup>-0.2</sup> <sub>-0.6</sub> | 12 | 9.5 | 45                | 200   |
| 40        | 28                | 12               | 75  | 28 <sup>-0.2</sup> <sub>-0.6</sub> | 15 | 12  | 52                | 226   |
| 50        | 32                | 12               | 80  | 32 <sup>-0.2</sup> <sub>-0.6</sub> | 15 | 12  | 60                | 245   |
| 63        | 40                | 16               | 90  | 40 <sup>-0.2</sup> <sub>-0.6</sub> | 20 | 16  | 70                | 269.5 |
| 80        | 50                | 16               | 110 | 50 <sup>-0.2</sup> <sub>-0.6</sub> | 20 | 16  | 90                | 320   |
| 100       | 60                | 20               | 140 | 60 <sup>-0.2</sup> <sub>-0.6</sub> | 25 | 20  | 110               | 353.5 |

Center trunnion: C96NT



| Bore size | L <sub>1</sub> | TD <sub>e8</sub> | TL | TM  | UW  | XV  | Z   |
|-----------|----------------|------------------|----|-----|-----|-----|-----|
| 32        | 17             | 12               | 12 | 50  | 49  | 131 | 153 |
| 40        | 22             | 16               | 16 | 63  | 58  | 150 | 174 |
| 50        | 22             | 16               | 16 | 75  | 71  | 166 | 198 |
| 63        | 28             | 20               | 20 | 90  | 87  | 179 | 211 |
| 80        | 34             | 20               | 20 | 110 | 110 | 221 | 261 |
| 100       | 40             | 25               | 25 | 132 | 136 | 245 | 285 |

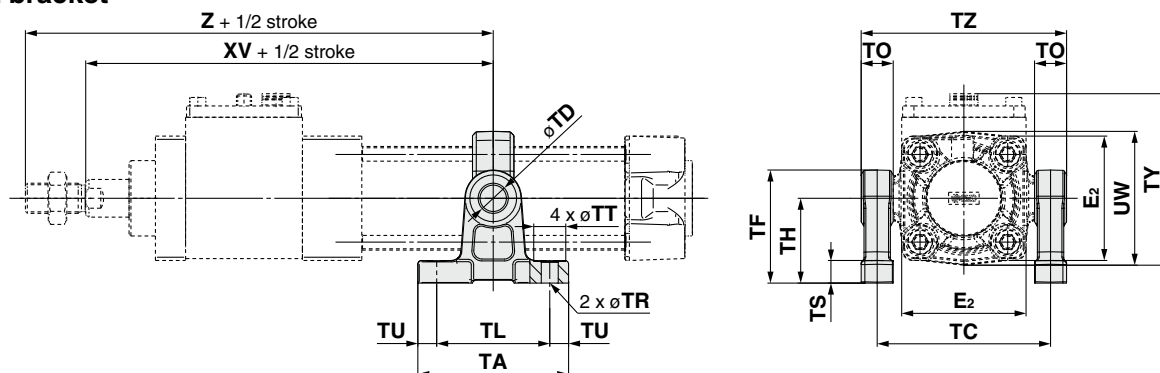
## Pivot Bracket: Trunnion and Double Clevis Pivot Bracket

### Part Nos.

| Bore size [mm]              | 32     | 40     | 50     | 63     | 80     | 100    |
|-----------------------------|--------|--------|--------|--------|--------|--------|
| Trunnion pivot bracket*1    | MB-S03 | MB-S04 | MB-S04 | MB-S06 | MB-S06 | MB-S10 |
| Double clevis pivot bracket | E5032  | E5040  | E5050  | E5063  | E5080  | E5100  |

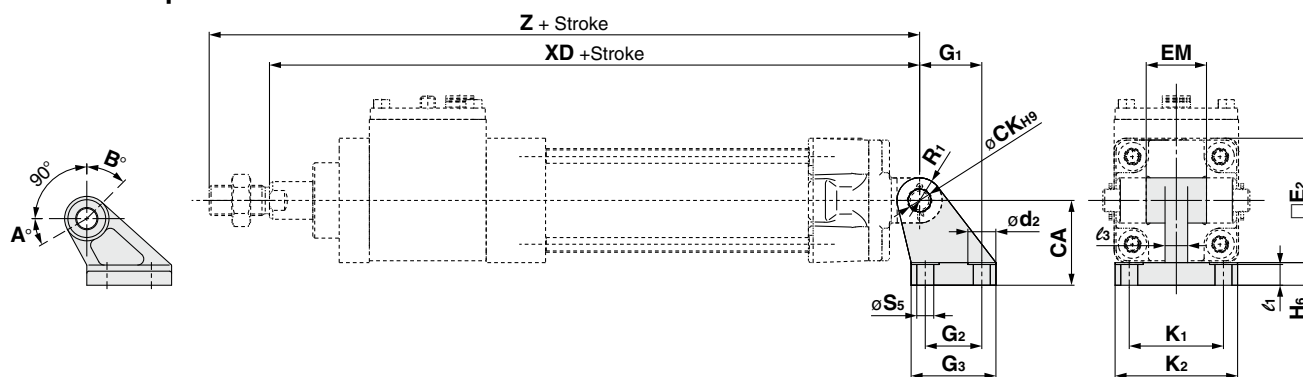
\*1 Order 2 trunnion pivot brackets per cylinder.

### Trunnion pivot bracket



| Bore size | Part no. | E <sub>2</sub> | TA  | TC  | TD                                | TF  | TH | TL | TO | TR   | TS | TT | TU  | TX  | TY    | TZ  | UW  | XV  | Z   |
|-----------|----------|----------------|-----|-----|-----------------------------------|-----|----|----|----|------|----|----|-----|-----|-------|-----|-----|-----|-----|
| 32        | MB-S03   | 47             | 62  | 62  | 12 <sup>+0.070</sup> <sub>0</sub> | 47  | 35 | 45 | 12 | 7    | 10 | 13 | 8.5 | 50  | 71    | 74  | 49  | 131 | 153 |
| 40        | MB-S04   | 54             | 80  | 80  | 16 <sup>+0.070</sup> <sub>0</sub> | 60  | 45 | 60 | 17 | 9    | 12 | 17 | 10  | 63  | 77.5  | 97  | 58  | 150 | 174 |
| 50        |          | 66             | 80  | 92  | 16 <sup>+0.070</sup> <sub>0</sub> | 60  | 45 | 60 | 17 | 9    | 12 | 17 | 10  | 75  | 91    | 109 | 71  | 166 | 198 |
| 63        | MB-S06   | 77             | 100 | 110 | 20 <sup>+0.084</sup> <sub>0</sub> | 80  | 60 | 70 | 20 | 11   | 14 | 22 | 15  | 90  | 103   | 130 | 87  | 179 | 211 |
| 80        |          | 99             | 100 | 130 | 20 <sup>+0.084</sup> <sub>0</sub> | 80  | 60 | 70 | 20 | 11   | 14 | 22 | 15  | 110 | 126.5 | 150 | 110 | 221 | 261 |
| 100       | MB-S10   | 118            | 120 | 158 | 25 <sup>+0.084</sup> <sub>0</sub> | 100 | 75 | 90 | 26 | 13.5 | 17 | 24 | 15  | 132 | 148.5 | 184 | 136 | 245 | 285 |

### Double clevis pivot bracket



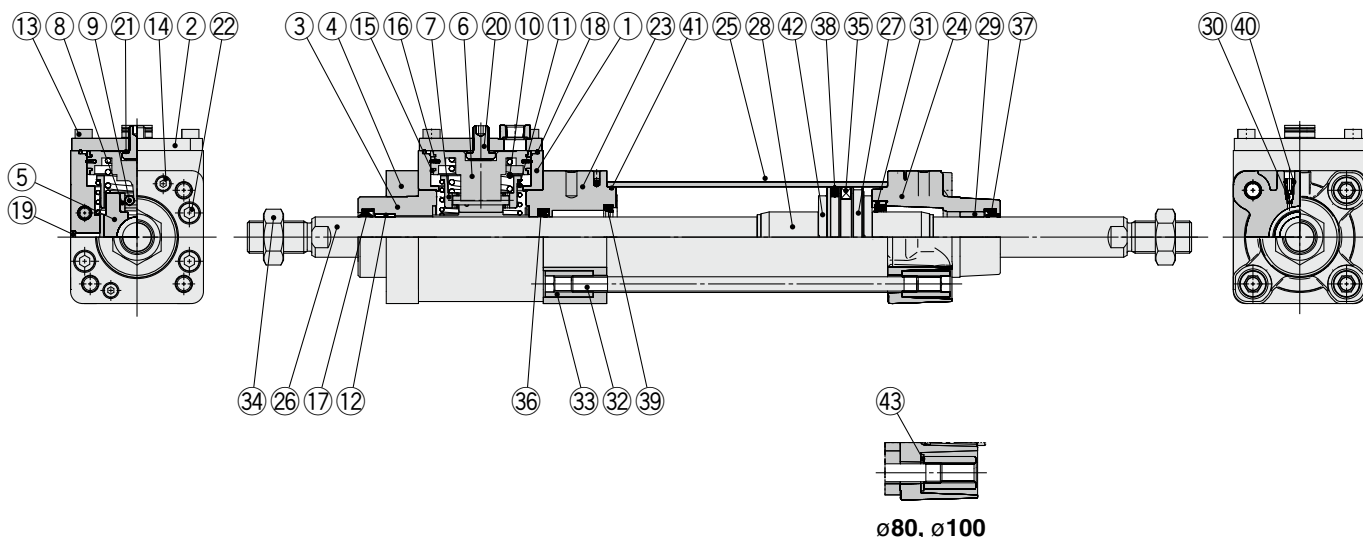
| Bore size | Part no. | CA | øCK | ød <sub>2</sub> | E <sub>2</sub> | EM                                 | G <sub>1</sub> | G <sub>2</sub> | G <sub>3</sub> (Max.) | H <sub>6</sub> | K <sub>1</sub> | K <sub>2</sub> (Max.) | ℓ <sub>1</sub> | ℓ <sub>3</sub> (Max.) | R <sub>1</sub> | øS <sub>5</sub> | XD    | Z     |
|-----------|----------|----|-----|-----------------|----------------|------------------------------------|----------------|----------------|-----------------------|----------------|----------------|-----------------------|----------------|-----------------------|----------------|-----------------|-------|-------|
| 32        | E5032    | 32 | 10  | 11              | 47             | 26 <sup>-0.2</sup> <sub>-0.6</sub> | 21             | 18             | 31                    | 8              | 38             | 51                    | 7              | 10                    | 10             | 6.6             | 200   | 222   |
| 40        | E5040    | 36 | 12  | 11              | 54             | 28 <sup>-0.2</sup> <sub>-0.6</sub> | 24             | 22             | 35                    | 10             | 41             | 54                    | 9              | 10                    | 11             | 6.6             | 226   | 250   |
| 50        | E5050    | 45 | 12  | 15              | 66             | 32 <sup>-0.2</sup> <sub>-0.6</sub> | 33             | 30             | 45                    | 12             | 50             | 65                    | 11             | 12                    | 12             | 9               | 245   | 277   |
| 63        | E5063    | 50 | 16  | 15              | 77             | 40 <sup>-0.2</sup> <sub>-0.6</sub> | 37             | 35             | 50                    | 12             | 52             | 67                    | 11             | 14                    | 15             | 9               | 269.5 | 301.5 |
| 80        | E5080    | 63 | 16  | 18              | 99             | 50 <sup>-0.2</sup> <sub>-0.6</sub> | 47             | 40             | 60                    | 14             | 66             | 86                    | 12.5           | 18                    | 15             | 11              | 320   | 360   |
| 100       | E5100    | 71 | 20  | 18              | 118            | 60 <sup>-0.2</sup> <sub>-0.6</sub> | 55             | 50             | 70                    | 15             | 76             | 96                    | 13.5           | 20                    | 19             | 11              | 353.5 | 393.5 |

### Rotating Angle

| Bore size [mm] | A°  | B°  | A° + B° + 90° |
|----------------|-----|-----|---------------|
| 32, 40         | 25° | 45° | 160°          |
| 50, 63         | 40° | 60° | 190°          |
| 80, 100        | 30° | 55° | 175°          |

# C96N Series

## Construction (Double Rod)



### Component Parts

| No. | Description                   | Material              | Qty. | Note                |
|-----|-------------------------------|-----------------------|------|---------------------|
| 1   | Brake unit                    | Aluminum alloy        | 1    | Hard anodized       |
| 2   | Cap                           | Rolled steel          | 1    | Zinc chromated      |
| 3   | Collar                        | Aluminum alloy        | 1    | Chromated           |
| 4   | Retaining plate               | Aluminum alloy        | 1    | Anodized            |
| 5   | Brake pad                     | Cast iron             | 1    |                     |
| 6   | Piston A                      | Aluminum alloy        | 1    |                     |
| 7   | Roller holder                 | Carbon steel          | 1    |                     |
| 8   | Roller receiver               | Stainless steel       | 2    |                     |
| 9   | Needle roller                 | Carbon steel          | 2    |                     |
| 10  | Piston spring                 | Spring steel          | 1    | Zinc chromated      |
| 11  | Roller spring                 | Spring steel          | 1    | Zinc chromated      |
| 12  | Bushing A                     | Bearing alloy         | 1    |                     |
| 13  | Hexagon socket head cap screw | Alloy steel           | 4    |                     |
| 14  | Hexagon socket head cap screw | Alloy steel           | 2    |                     |
| 15  | Wear ring                     | Resin                 | 2    |                     |
| 16  | Piston seal A                 | NBR                   | 1    |                     |
| 17  | Rod seal A                    | NBR                   | 1    |                     |
| 18  | Gasket                        | NBR                   | 1    |                     |
| 19  | Element                       | Bronze                | 1    |                     |
| 20  | Release bolt                  | Alloy steel           | 1    |                     |
| 21  | Seal washer                   | NBR + Stainless steel | 1    |                     |
| 22  | Hexagon socket head cap screw | Alloy steel           | 4    |                     |
| 23  | Rod cover A                   | Aluminum alloy        | 1    | Anodized            |
| 24  | Rod cover B                   | Aluminum die-cast     | 1    | Zinc chromated      |
| 25  | Cylinder tube                 | Aluminum alloy        | 1    | Hard anodized       |
| 26  | Piston rod                    | Carbon steel          | 1    | Hard chrome plating |
| 27  | Piston B                      | Aluminum alloy        | 1    |                     |
| 28  | Cushion ring                  | Aluminum alloy        | 2    | Anodized            |
| 29  | Bushing B                     | Bearing alloy         | 1    |                     |
| 30  | Cushion valve                 | Resin                 | 2    |                     |

### Component Parts

| No. | Description          | Material       | Qty. | Note           |
|-----|----------------------|----------------|------|----------------|
| 31  | Cushion seal holder  | Aluminum alloy | 1    | Anodized       |
| 32  | Tie-rod              | Carbon steel   | 4    | Zinc chromated |
| 33  | Tie-rod nut          | Rolled steel   | 8    | Zinc chromated |
| 34  | Rod end nut          | Carbon steel   | 2    | Zinc chromated |
| 35  | Magnet               | —              | (1)  |                |
| 36  | Rod seal B           | NBR            | 1    |                |
| 37  | Rod seal C           | NBR            | 1    |                |
| 38  | Piston seal B        | NBR            | 1    |                |
| 39  | Cushion seal         | Urethane       | 2    |                |
| 40  | Cushion valve seal   | NBR            | 2    |                |
| 41  | Cylinder tube gasket | NBR            | 2    |                |
| 42  | Bumper               | Urethane       | 2    |                |
| 43  | Flat washer          | Steel          | 8    | ø80, ø100      |

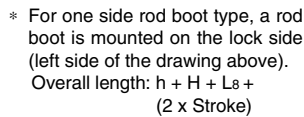
### Replacement Parts/Seal Kit

| Bore size [mm] | Kit no.     | Contents                                                                                                                            |
|----------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 32             | C96N32W-PS  | A set of 17 Rod seal A,<br>36 Rod seal B,<br>37 Rod seal C,<br>38 Piston seal B,<br>39 Cushion seal, and<br>41 Cylinder tube gasket |
| 40             | C96N40W-PS  |                                                                                                                                     |
| 50             | C96N50W-PS  |                                                                                                                                     |
| 63             | C96N63W-PS  |                                                                                                                                     |
| 80             | C96N80W-PS  |                                                                                                                                     |
| 100            | C96N100W-PS |                                                                                                                                     |

\* Never disassemble the lock unit. It should be replaced as a unit. Refer to page 52 for the part numbers for placing an order. The seal kit shown above contains the rod seal for the cylinder and lock unit. Order the seal kit suitable for the cylinder bore size.

\* The seal kit shown above includes a grease pack.  
(ø32, ø40, ø50: 10 g, ø63, ø80: 20 g, ø100: 30 g)  
Order with the following part number when only the grease pack is needed.  
**Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)**

## Basic: C96NB-W



|           |              |    |            |                |                |                |                |                 |    |      |           |                 |                 |     |    |                 |                 |                 |                 |    | [mm]  |
|-----------|--------------|----|------------|----------------|----------------|----------------|----------------|-----------------|----|------|-----------|-----------------|-----------------|-----|----|-----------------|-----------------|-----------------|-----------------|----|-------|
| Bore size | Stroke range | KC | KK         | L <sub>2</sub> | L <sub>3</sub> | L <sub>8</sub> | L <sub>9</sub> | L <sub>12</sub> | PL | R    | RT        | SW <sub>1</sub> | SW <sub>2</sub> | V   | VD | WA <sub>1</sub> | WA <sub>2</sub> | WB <sub>1</sub> | WB <sub>2</sub> | WH | ZY    |
| 32        | Up to 1000   | 3  | M10 x 1.25 | 15             | 13             | 152            | 4              | 13              | 13 | 32.5 | M6 x 1    | 10              | 10              | 3.5 | 4  | 4               | 4               | 7               | 7               | 26 | 248   |
| 40        | Up to 1000   | 3  | M12 x 1.25 | 17             | 13             | 171            | 4              | 13              | 14 | 38   | M6 x 1    | 13              | 13              | 4.5 | 4  | 5               | 7               | 8.9             | 1.8             | 30 | 279   |
| 50        | Up to 1000   | 4  | M16 x 1.5  | 24             | 14             | 181            | 5              | 14              | 14 | 46.5 | M8 x 1.25 | 17              | 17              | 4.5 | 4  | 6               | 6               | 5.1             | 2               | 37 | 319   |
| 63        | Up to 1000   | 4  | M16 x 1.5  | 24             | 14             | 200.5          | 5              | 14              | 16 | 56.5 | M8 x 1.25 | 17              | 17              | 5.5 | 4  | 9               | 9               | 6.3             | 2               | 37 | 338.5 |
| 80        | Up to 1000   | 5  | M20 x 1.5  | 30             | 20             | 238            | —              | 20              | 16 | 72   | M10 x 1.5 | 22              | 22              | 7.5 | 4  | 11.5            | 11.5            | 6               | 6               | 46 | 410   |
| 100       | Up to 1000   | 5  | M20 x 1.5  | 32             | 20             | 261.5          | —              | 20              | 18 | 89   | M10 x 1.5 | 22              | 26              | 9.5 | 4  | 17              | 17              | 10              | 3               | 51 | 443.5 |

## [mm]

| Bore size  |  | <i>ℓ</i> |           |            |            |            |            |            |            |            |            |            |             | ZY      |           |            |            |            |            |            |            |            |            |            |             | [mm] |
|------------|--|----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|------|
|            |  | 1 to 50  | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 501 to 600 | 601 to 700 | 701 to 800 | 801 to 900 | 901 to 1000 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 501 to 600 | 601 to 700 | 701 to 800 | 801 to 900 | 901 to 1000 |      |
| <b>32</b>  |  | 12.5     | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 302     | 328       | 352        | 378        | 428        | 478        | 528        | 578        | 628        | 678        | 728        | 778         |      |
| <b>40</b>  |  | 12.5     | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 321     | 347       | 371        | 397        | 447        | 497        | 547        | 597        | 647        | 697        | 747        | 797         |      |
| <b>50</b>  |  | 12.5     | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 355     | 381       | 405        | 431        | 481        | 531        | 581        | 631        | 681        | 731        | 781        | 831         |      |
| <b>63</b>  |  | 12.5     | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 374.5   | 400.5     | 424.5      | 450.5      | 500.5      | 550.5      | 600.5      | 650.5      | 700.5      | 750.5      | 800.5      | 850.5       |      |
| <b>80</b>  |  | 12.5     | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 444     | 470       | 494        | 520        | 570.5      | 620        | 670        | 720        | 770        | 820        | 870        | 920         |      |
| <b>100</b> |  | 12.5     | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 467.5   | 493.5     | 517.5      | 543.5      | 593.5      | 643.5      | 693.5      | 743.5      | 793.5      | 843.5      | 893.5      | 943.5       |      |

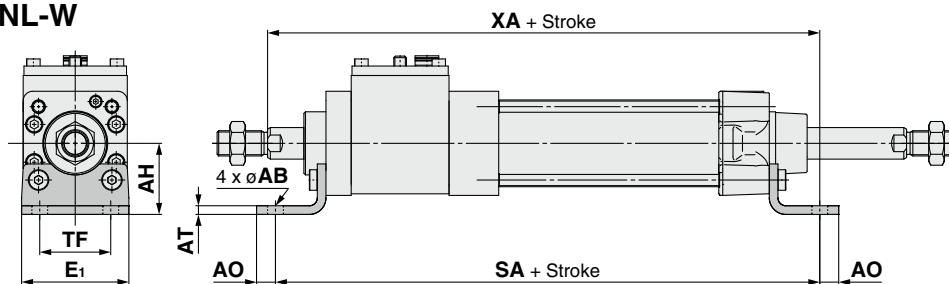
### Specific Product Precautions

# C96N Series

## Dimensions: With Mounting Bracket

\* Refer to Basic (B) for other dimensions.

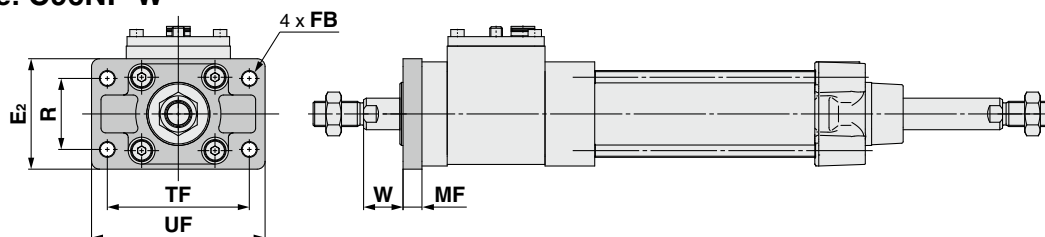
### Axial foot: C96NL-W



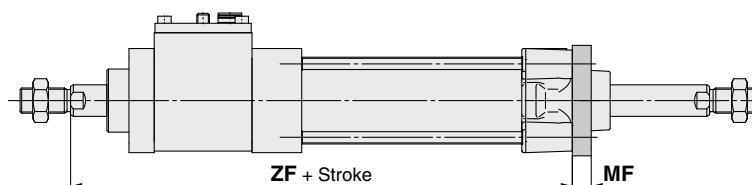
| Bore size | AB   | AH | AO | AT  | E <sub>1</sub> | SA    | TR | XA    |
|-----------|------|----|----|-----|----------------|-------|----|-------|
| 32        | 7    | 32 | 10 | 4.5 | 48             | 200   | 32 | 202   |
| 40        | 10   | 36 | 11 | 4.5 | 55             | 227   | 36 | 229   |
| 50        | 10   | 45 | 12 | 5.5 | 68             | 245   | 45 | 250   |
| 63        | 10   | 50 | 12 | 5.5 | 80             | 264.5 | 50 | 269.5 |
| 80        | 12   | 63 | 14 | 6.5 | 100            | 320   | 63 | 325   |
| 100       | 14.5 | 71 | 16 | 6.5 | 120            | 343.5 | 75 | 353.5 |

### Flange

#### Rod side: C96NF-W

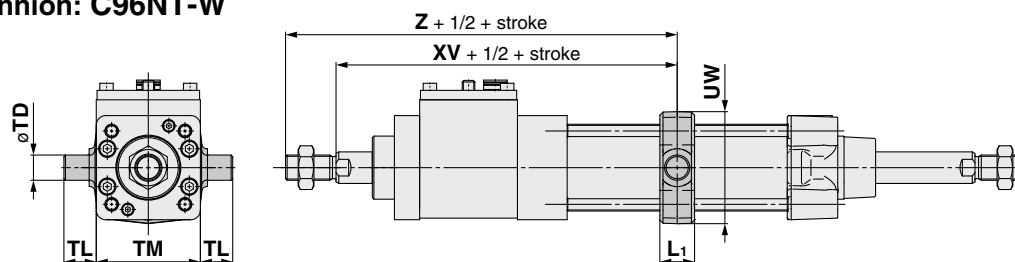


#### Head side: C96NG-W



| Bore size | E <sub>2</sub> | FB | MF | R  | TF  | UF  | W  | ZF    |
|-----------|----------------|----|----|----|-----|-----|----|-------|
| 32        | 50             | 7  | 10 | 32 | 64  | 79  | 16 | 188   |
| 40        | 55             | 9  | 10 | 36 | 72  | 90  | 20 | 211   |
| 50        | 70             | 9  | 12 | 45 | 90  | 110 | 25 | 230   |
| 63        | 80             | 9  | 12 | 50 | 100 | 120 | 25 | 249.5 |
| 80        | 100            | 12 | 16 | 63 | 126 | 153 | 30 | 300   |
| 100       | 120            | 14 | 16 | 75 | 150 | 178 | 35 | 328.5 |

### Center trunnion: C96NT-W



| Bore size | L  | TD <sub>∅8</sub> | TL | TM  | UW  | XV  | Z   |
|-----------|----|------------------|----|-----|-----|-----|-----|
| 32        | 17 | 12               | 12 | 50  | 49  | 131 | 153 |
| 40        | 22 | 16               | 16 | 63  | 58  | 150 | 174 |
| 50        | 22 | 16               | 16 | 75  | 71  | 166 | 198 |
| 63        | 28 | 20               | 20 | 90  | 87  | 179 | 211 |
| 80        | 34 | 20               | 20 | 110 | 110 | 221 | 261 |
| 100       | 40 | 25               | 25 | 132 | 136 | 245 | 285 |



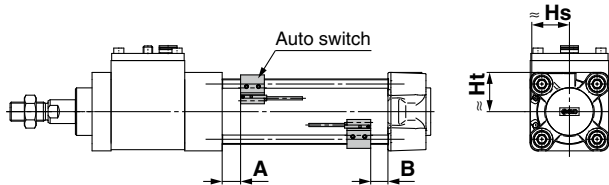
# C96N Series

## Auto Switch Mounting

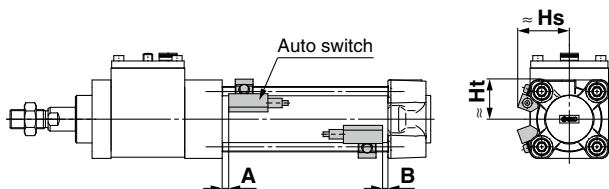
### Auto Switch Proper Mounting Position (Detection at stroke end) and Mounting Height

#### <Tie-rod mounting>

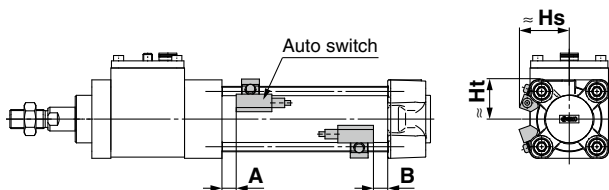
D-M9□/M9□V      D-Y59□/Y69□/Y7P/Y7PV  
 D-M9□W/M9□WV      D-Y7□W/Y7□WV/Y7BA  
 D-M9□A/M9□AV      D-Z7□/Z80  
 D-A9□/A9□V



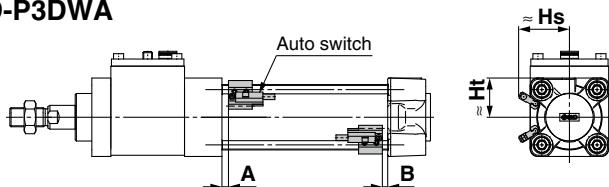
D-A5□/A6□  
 D-A59W



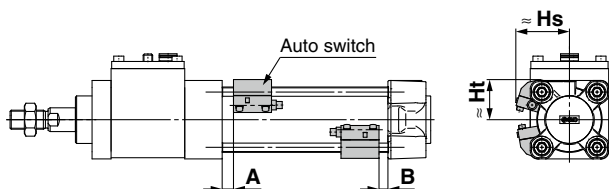
D-F5□/J5□  
 D-F5□W/J59W/F5BA  
 D-F59F/F5NT



D-P3DWA

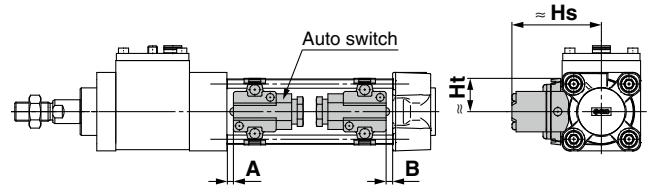


D-P4DW

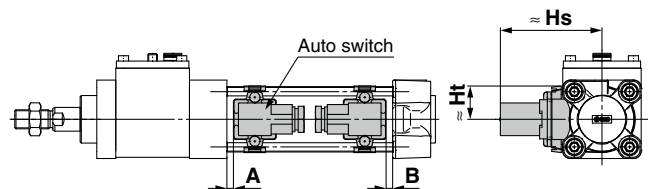


#### <Band mounting>

D-G39/K39/A3□



D-A44



Model  
Selection

Working  
Principle

CP96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

C96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

Lock Unit  
MWB-UT

Accessories

Auto Switch

Made to  
Order

Specific Product  
Precautions

# C96N Series

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

### Auto Switch Proper Mounting Position

[mm]

| Auto switch model<br>Bore size | D-M9□<br>D-M9□V<br>D-M9□W<br>D-M9□WV<br>D-M9□A<br>D-M9□AV |      | D-A9□<br>D-A9□V |      | D-F5□<br>D-J59<br>D-F59F |      | D-F5NTL |      | D-A5□<br>D-A6□ |     | D-A59W |     | D-G39<br>D-K39<br>D-A3□<br>D-A44 |     | D-Y59□<br>D-Y69□<br>D-Y7P<br>D-Y7PV<br>D-Y7H<br>D-Y7□W<br>D-Y7□WV<br>D-Y7BA<br>D-Z7□<br>D-Z80 |      | D-P3DWA |      | D-P4DW |     |
|--------------------------------|-----------------------------------------------------------|------|-----------------|------|--------------------------|------|---------|------|----------------|-----|--------|-----|----------------------------------|-----|-----------------------------------------------------------------------------------------------|------|---------|------|--------|-----|
|                                | A                                                         | B    | A               | B    | A                        | B    | A       | B    | A              | B   | A      | B   | A                                | B   | A                                                                                             | B    | A       | B    | A      | B   |
| 32                             | 13.5                                                      | 10.5 | 9.5             | 6.5  | 10                       | 7    | 15      | 12   | 3.5            | 0.5 | 7.5    | 4.5 | 3.5                              | 0.5 | 7                                                                                             | 4    | 9       | 6    | 6.5    | 3.5 |
| 40                             | 10.5                                                      | 14   | 6.5             | 10   | 7                        | 10.5 | 12      | 15.5 | 0.5            | 4   | 4.5    | 8   | 0.5                              | 4   | 4                                                                                             | 7.5  | 6       | 9.5  | 3.5    | 7   |
| 50                             | 13                                                        | 14.5 | 9               | 10.5 | 9.5                      | 11   | 14.5    | 16   | 3              | 4.5 | 7      | 8.5 | 3                                | 4.5 | 6.5                                                                                           | 8    | 8.5     | 10   | 6      | 7.5 |
| 63                             | 13                                                        | 15.5 | 9               | 11.5 | 9.5                      | 12   | 14.5    | 17   | 3              | 5.5 | 7      | 9.5 | 3                                | 5.5 | 6.5                                                                                           | 9    | 8.5     | 11   | 6      | 8.5 |
| 80                             | 18.5                                                      | 18   | 14.5            | 14   | 15                       | 14.5 | 20      | 19.5 | 8.5            | 8   | 12.5   | 12  | 8.5                              | 8   | 12                                                                                            | 11.5 | 14      | 13.5 | 11.5   | 11  |
| 100                            | 18.5                                                      | 19   | 14.5            | 15   | 15                       | 15.5 | 20      | 20.5 | 8.5            | 9   | 12.5   | 13  | 8.5                              | 9   | 12                                                                                            | 12.5 | 14      | 14.5 | 11.5   | 12  |

\* Adjust the auto switch after confirming the operating conditions in the actual setting.

### Auto Switch Mounting Height

[mm]

| Auto switch model<br>Bore size | D-M9□<br>D-M9□W<br>D-M9□A<br>D-A9□ |      | D-A9□V |      | D-M9□V<br>D-M9□WV<br>D-M9□AV |      | D-F5□<br>D-J59<br>D-F59F<br>D-F5□W<br>D-J59W<br>D-F5BA<br>D-F5NT |      | D-A5□<br>D-A6□<br>D-A59W |      | D-G39<br>D-K39<br>D-A3□ |      | D-A44 |      | D-Y59□<br>D-Y7P<br>D-Y7□W<br>D-Y7BA<br>D-Z7□<br>D-Z80 |      | D-Y69□<br>D-Y7PV<br>D-Y7□WV |      | D-P3DWA |      | D-P4DW |      |
|--------------------------------|------------------------------------|------|--------|------|------------------------------|------|------------------------------------------------------------------|------|--------------------------|------|-------------------------|------|-------|------|-------------------------------------------------------|------|-----------------------------|------|---------|------|--------|------|
|                                | Hs                                 | Ht   | Hs     | Ht   | Hs                           | Ht   | Hs                                                               | Ht   | Hs                       | Ht   | Hs                      | Ht   | Hs    | Ht   | Hs                                                    | Ht   | Hs                          | Ht   | Hs      | Ht   | Hs     | Ht   |
| 32                             | 24.5                               | 23   | 27.5   | 23   | 30.5                         | 23   | 32.5                                                             | 25   | 35                       | 24.5 | 67                      | 27.5 | 77    | 27.5 | 25.5                                                  | 23   | 26.5                        | 23   | 38      | 31   | 38     | 31   |
| 40                             | 28.5                               | 25.5 | 31.5   | 25.5 | 34                           | 25.5 | 36.5                                                             | 27.5 | 38.5                     | 27.5 | 71.5                    | 27.5 | 81.5  | 27.5 | 29.5                                                  | 26   | 30                          | 26   | 39      | 25.5 | 42     | 33   |
| 50                             | 33.5                               | 31   | 36     | 31   | 38.5                         | 31   | 41                                                               | 34   | 43.5                     | 34.5 | 77                      | —    | 87    | —    | 33.5                                                  | 31   | 34.5                        | 31   | 43      | 31   | 46.5   | 39   |
| 63                             | 38.5                               | 36   | 40.5   | 36   | 43                           | 36   | 46                                                               | 39   | 48.5                     | 39.5 | 83.5                    | —    | 93.5  | —    | 39                                                    | 36   | 40                          | 36   | 48      | 36   | 51.5   | 44   |
| 80                             | 46.5                               | 45   | 49     | 45   | 52                           | 45   | 52.5                                                             | 46.5 | 55                       | 46.5 | 92.5                    | —    | 103   | —    | 47.5                                                  | 45   | 48.5                        | 45   | 56.5    | 45   | 58     | 51.5 |
| 100                            | 54                                 | 53.5 | 57     | 53.5 | 59.5                         | 53.5 | 59.5                                                             | 55   | 62                       | 55   | 103                     | —    | 113.5 | —    | 55.5                                                  | 53.5 | 56.5                        | 53.5 | 64.5    | 53.5 | 65.5   | 60.5 |

## Minimum Stroke for Auto Switch Mounting

### Mounting Brackets except Center Trunnion

n: Number of auto switches [mm]

| Auto switch model                                                                                | Number of auto switches                   | ø32                                                | ø40                                                | ø50 | ø63                                                | ø80                                                | ø100 |
|--------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------|----------------------------------------------------|-----|----------------------------------------------------|----------------------------------------------------|------|
| <b>D-M9□</b><br><b>D-M9□W</b>                                                                    | 2 (Different surfaces, same surface)<br>1 | 10                                                 |                                                    |     |                                                    |                                                    |      |
|                                                                                                  | n                                         | $10 + 40 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |                                                    |     |                                                    |                                                    |      |
| <b>D-M9□V</b><br><b>D-M9□WV</b>                                                                  | 2 (Different surfaces, same surface)<br>1 | 10                                                 |                                                    |     |                                                    |                                                    |      |
|                                                                                                  | n                                         | $10 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |                                                    |     |                                                    |                                                    |      |
| <b>D-M9□A</b>                                                                                    | 2 (Different surfaces, same surface)<br>1 | 15                                                 | 10                                                 |     |                                                    |                                                    |      |
|                                                                                                  | n                                         | $15 + 40 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 | $10 + 40 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |     |                                                    |                                                    |      |
| <b>D-M9□AV</b>                                                                                   | 2 (Different surfaces, same surface)<br>1 | 10                                                 |                                                    |     |                                                    |                                                    |      |
|                                                                                                  | n                                         | $10 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |                                                    |     |                                                    |                                                    |      |
| <b>D-A9□</b>                                                                                     | 2 (Different surfaces, same surface)<br>1 | 10                                                 |                                                    |     |                                                    |                                                    |      |
|                                                                                                  | n                                         | $10 + 40 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |                                                    |     |                                                    |                                                    |      |
| <b>D-A9□V</b>                                                                                    | 2 (Different surfaces, same surface)<br>1 | 10                                                 |                                                    |     |                                                    |                                                    |      |
|                                                                                                  | n                                         | $10 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |                                                    |     |                                                    |                                                    |      |
| <b>D-G39</b><br><b>D-K39</b><br><b>D-A3□</b>                                                     | 2 (Different surfaces)                    | 35                                                 |                                                    |     |                                                    |                                                    |      |
|                                                                                                  | 2 (Same surface)                          | 100                                                |                                                    |     |                                                    |                                                    |      |
|                                                                                                  | n (Different surfaces)                    | $35 + 30 (n - 2)$<br>(n = 2, 3, 4...)              |                                                    |     |                                                    |                                                    |      |
|                                                                                                  | n (Same surface)                          | $100 + 100 (n - 2)$<br>(n = 2, 3, 4...)            |                                                    |     |                                                    |                                                    |      |
|                                                                                                  | 1                                         | 10                                                 |                                                    |     |                                                    |                                                    |      |
| <b>D-A44</b>                                                                                     | 2 (Different surfaces)                    | 35                                                 |                                                    |     |                                                    |                                                    |      |
|                                                                                                  | 2 (Same surface)                          | 50                                                 |                                                    |     |                                                    |                                                    |      |
|                                                                                                  | n (Different surfaces)                    | $35 + 30 (n - 2)$<br>(n = 2, 3, 4...)              |                                                    |     |                                                    |                                                    |      |
|                                                                                                  | n (Same surface)                          | $50 + 50 (n - 2)$<br>(n = 2, 3, 4...)              |                                                    |     |                                                    |                                                    |      |
|                                                                                                  | 1                                         | 10                                                 |                                                    |     |                                                    |                                                    |      |
| <b>D-F5□</b><br><b>D-J59</b><br><b>D-F5□W</b><br><b>D-J59W</b><br><b>D-F5BA</b><br><b>D-F59F</b> | 2 (Different surfaces, same surface)<br>1 | 15                                                 |                                                    |     |                                                    |                                                    |      |
|                                                                                                  | n                                         | $15 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |                                                    |     |                                                    |                                                    |      |
| <b>D-A5□</b><br><b>D-A6□</b>                                                                     | 2 (Different surfaces, same surface)<br>1 | 15                                                 |                                                    |     |                                                    | 10                                                 |      |
|                                                                                                  | n                                         | $15 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |                                                    |     |                                                    | $10 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |      |
| <b>D-A59W</b>                                                                                    | 2 (Different surfaces, same surface)<br>1 | 20                                                 |                                                    |     | 15                                                 |                                                    |      |
|                                                                                                  | n                                         | $20 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |                                                    |     | $15 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |                                                    |      |
| <b>D-F5NTL</b>                                                                                   | 2 (Different surfaces, same surface)<br>1 | 25                                                 |                                                    |     |                                                    | 20                                                 |      |
|                                                                                                  | n                                         | $25 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |                                                    |     |                                                    | $20 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |      |
| <b>D-Y59□</b><br><b>D-Y7P</b><br><b>D-Y7□W</b><br><b>D-Z7□</b><br><b>D-Z80</b>                   | 2 (Different surfaces, same surface)<br>1 | 15                                                 | 10                                                 |     |                                                    |                                                    |      |
|                                                                                                  | n                                         | $15 + 40 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 | $10 + 40 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |     |                                                    |                                                    |      |

\*1 When "n" is an odd number, an even number that is one larger than the odd number is to be used for the calculation.

Model  
Selection

Working  
Principle

CP96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

C96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

Lock Unit  
MWB-UT

Accessories

Auto Switch

Made to  
Order

Specific Product  
Precautions

## Minimum Stroke for Auto Switch Mounting

### Mounting Brackets except Center Trunnion

n: Number of auto switches [mm]

| Auto switch model                               | Number of auto switches                   | ø32                                                | ø40 | ø50 | ø63 | ø80 | ø100 |
|-------------------------------------------------|-------------------------------------------|----------------------------------------------------|-----|-----|-----|-----|------|
| <b>D-Y69</b><br><b>D-Y7PV</b><br><b>D-Y7□WV</b> | 2 (Different surfaces, same surface)<br>1 | 10                                                 |     |     |     |     |      |
|                                                 | n                                         | $10 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |     |     |     |     |      |
| <b>D-Y7BA</b>                                   | 2 (Different surfaces, same surface)<br>1 | 20                                                 |     |     |     |     |      |
|                                                 | n                                         | $20 + 45 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |     |     |     |     |      |
| <b>D-P3DWA</b>                                  | 2 (Different surfaces, same surface)<br>1 | 15                                                 |     |     |     |     |      |
|                                                 | n (Different surfaces, same surface)      | $15 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |     |     |     |     |      |
| <b>D-P4DW</b>                                   | 2 (Different surfaces, same surface)<br>1 | 15                                                 |     |     |     |     |      |
|                                                 | n                                         | $15 + 65 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...)*1 |     |     |     |     |      |

\*1 When "n" is an odd number, an even number that is one larger than the odd number is to be used for the calculation.

### Center Trunnion

n: Number of auto switches [mm]

| Auto switch model               | Number of auto switches                   | ø32                                                  | ø40                                                  | ø50 | ø63                                                  | ø80                                                  | ø100                                                  |
|---------------------------------|-------------------------------------------|------------------------------------------------------|------------------------------------------------------|-----|------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------|
| <b>D-M9□</b><br><b>D-M9□W</b>   | 2 (Different surfaces, same surface)<br>1 | 75                                                   |                                                      |     | 85                                                   | 90                                                   | 95                                                    |
|                                 | n                                         | $75 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |                                                      |     | $85 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $90 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $95 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  |
| <b>D-M9□V</b><br><b>D-M9□WV</b> | 2 (Different surfaces, same surface)<br>1 | 50                                                   | 55                                                   |     | 60                                                   | 65                                                   | 70                                                    |
|                                 | n                                         | $50 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $55 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |     | $60 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $65 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $70 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  |
| <b>D-M9□A</b>                   | 2 (Different surfaces, same surface)<br>1 | 80                                                   |                                                      |     | 85                                                   | 95                                                   | 100                                                   |
|                                 | n                                         | $80 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |                                                      |     | $85 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $95 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $100 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |
| <b>D-M9□AV</b>                  | 2 (Different surfaces, same surface)<br>1 | 55                                                   |                                                      |     | 65                                                   | 70                                                   | 75                                                    |
|                                 | n                                         | $55 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |                                                      |     | $65 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $70 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $75 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  |
| <b>D-A9□</b>                    | 2 (Different surfaces, same surface)<br>1 | 70                                                   | 75                                                   |     | 80                                                   | 85                                                   | 90                                                    |
|                                 | n                                         | $70 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $75 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |     | $80 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $85 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $90 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  |
| <b>D-A9□V</b>                   | 2 (Different surfaces, same surface)<br>1 | 45                                                   | 50                                                   |     | 55                                                   | 60                                                   | 70                                                    |
|                                 | n                                         | $45 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $50 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |     | $55 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $60 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | $70 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  |

\*2 When "n" is an odd number, a multiple of 4 that is larger than the odd number is to be used for the calculation.

## Minimum Stroke for Auto Switch Mounting

### Center Trunnion

n: Number of auto switches [mm]

| Auto switch model                                                                                  | Number of auto switches                   | ø32                                                   | ø40                                                   | ø50 | ø63                                                   | ø80                                                   | ø100                                                  |
|----------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-----|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| <b>D-G39</b><br><b>D-K39</b><br><b>D-A3</b> □                                                      | 2 (Different surfaces)                    | 60                                                    | 65                                                    |     | 75                                                    | 80                                                    | 85                                                    |
|                                                                                                    | 2 (Same surface)                          | 90                                                    | 95                                                    |     | 100                                                   | 105                                                   | 110                                                   |
|                                                                                                    | n (Different surfaces)                    | 60 + 30 (n – 2)<br>(n = 2, 4, 6, 8...)*1              | 65 + 30 (n – 2)<br>(n = 2, 4, 6, 8...)*1              |     | 75 + 30 (n – 2)<br>(n = 2, 4, 6, 8...)*1              | 80 + 30 (n – 2)<br>(n = 2, 4, 6, 8...)*1              | 85 + 30 (n – 2)<br>(n = 2, 4, 6, 8...)*1              |
|                                                                                                    | n (Same surface)                          | 90 + 100 (n – 2)<br>(n = 2, 4, 6, 8...)*1             | 95 + 100 (n – 2)<br>(n = 2, 4, 6, 8...)*1             |     | 100 + 100 (n – 2)<br>(n = 2, 4, 6, 8...)*1            | 105 + 100 (n – 2)<br>(n = 2, 4, 6, 8...)*1            | 110 + 100 (n – 2)<br>(n = 2, 4, 6, 8...)*1            |
|                                                                                                    | 1                                         | 60                                                    | 65                                                    |     | 75                                                    | 80                                                    | 85                                                    |
| <b>D-A44</b>                                                                                       | 2 (Different surfaces)                    | 70                                                    |                                                       |     | 75                                                    | 80                                                    | 85                                                    |
|                                                                                                    | 2 (Same surface)                          |                                                       |                                                       |     |                                                       |                                                       |                                                       |
|                                                                                                    | n (Different surfaces)                    | 70 + 30 (n – 2)<br>(n = 2, 4, 6, 8...)*1              |                                                       |     | 75 + 30 (n – 2)<br>(n = 2, 4, 6, 8...)*1              | 80 + 30 (n – 2)<br>(n = 2, 4, 6, 8...)*1              | 85 + 30 (n – 2)<br>(n = 2, 4, 6, 8...)*1              |
|                                                                                                    | n (Same surface)                          | 70 + 50 (n – 2)<br>(n = 2, 4, 6, 8...)*1              |                                                       |     | 75 + 50 (n – 2)<br>(n = 2, 4, 6, 8...)*1              | 80 + 50 (n – 2)<br>(n = 2, 4, 6, 8...)*1              | 85 + 50 (n – 2)<br>(n = 2, 4, 6, 8...)*1              |
|                                                                                                    | 1                                         | 70                                                    |                                                       |     | 75                                                    | 80                                                    | 85                                                    |
| <b>D-F5</b> □<br><b>D-J59</b><br><b>D-F5</b> □W<br><b>D-J59W</b><br><b>D-F5BA</b><br><b>D-F59F</b> | 2 (Different surfaces, same surface)<br>1 | 90                                                    | 95                                                    |     | 100                                                   | 110                                                   | 115                                                   |
|                                                                                                    | n                                         | 90 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  | 95 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  |     | 100 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | 110 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | 115 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |
| <b>D-A5</b> □<br><b>D-A6</b> □                                                                     | 2 (Different surfaces, same surface)<br>1 | 75                                                    | 80                                                    |     | 95                                                    | 105                                                   | 110                                                   |
|                                                                                                    | n                                         | 75 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  | 80 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  |     | 95 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  | 105 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | 110 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |
| <b>D-A59W</b>                                                                                      | 2 (Different surfaces, same surface)<br>1 | 85                                                    |                                                       |     | 105                                                   | 110                                                   | 115                                                   |
|                                                                                                    | n                                         | 85 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  |                                                       |     | 105 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | 110 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | 115 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |
| <b>D-F5NTL</b>                                                                                     | 2 (Different surfaces, same surface)<br>1 | 100                                                   | 105                                                   |     | 110                                                   | 120                                                   | 125                                                   |
|                                                                                                    | n                                         | 100 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | 105 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |     | 110 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | 120 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | 125 + 55 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |
| <b>D-Y59</b> □<br><b>D-Y7P</b><br><b>D-Y7</b> □W<br><b>D-Z7</b> □<br><b>D-Z80</b>                  | 2 (Different surfaces, same surface)<br>1 | 75                                                    | 80                                                    |     | 85                                                    | 95                                                    | 100                                                   |
|                                                                                                    | n                                         | 75 + 40 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  | 80 + 40 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  |     | 85 + 40 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  | 95 + 40 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  | 100 + 40 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |
| <b>D-Y69</b><br><b>D-Y7PV</b><br><b>D-Y7</b> □WV                                                   | 2 (Different surfaces, same surface)<br>1 | 55                                                    |                                                       |     | 60                                                    | 70                                                    | 75                                                    |
|                                                                                                    | n                                         | 55 + 30 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  |                                                       |     | 60 + 30 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  | 70 + 30 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  | 75 + 30 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  |
| <b>D-Y7BA</b>                                                                                      | 2 (Different surfaces, same surface)<br>1 | 85                                                    | 90                                                    |     | 100                                                   | 105                                                   | 110                                                   |
|                                                                                                    | n                                         | 85 + 45 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  | 90 + 45 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  |     | 100 + 45 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | 105 + 45 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | 110 + 45 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |
| <b>D-P3DWA</b>                                                                                     | 2 (Different surfaces, same surface)<br>1 | 90                                                    | 95                                                    |     | 100                                                   | 105                                                   | 110                                                   |
|                                                                                                    | n (Different surfaces, same surface)      | 90 + 50 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  | 95 + 50 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2  |     | 100 + 50 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | 105 + 50 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | 110 + 50 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |
| <b>D-P4DW</b>                                                                                      | 2 (Different surfaces, same surface)<br>1 | 110                                                   |                                                       |     | 115                                                   | 125                                                   | 130                                                   |
|                                                                                                    | n                                         | 110 + 65 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |                                                       |     | 115 + 65 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | 125 + 65 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 | 130 + 65 $\frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...)*2 |

\*1 When "n" is an odd number, an even number that is one larger than the odd number is to be used for the calculation.

\*2 When "n" is an odd number, a multiple of 4 that is larger than the odd number is to be used for the calculation.

Model  
Selection

Working  
Principle

CP96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

C96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

Lock Unit  
MWB-UT

Accessories

Auto Switch

Made to  
Order

Specific Product  
Precautions

## Auto Switch Mounting Brackets/Part Nos.

| Auto switch model                                                   | Bore size [mm] |           |           |           |           |           |
|---------------------------------------------------------------------|----------------|-----------|-----------|-----------|-----------|-----------|
|                                                                     | 32             | 40        | 50        | 63        | 80        | 100       |
| D-M9□/M9□V<br>D-M9□W/M9□WV<br>D-M9□A/M9□AV<br>D-A9□/A9□V            | BMB5-032       | BMB5-032  | BA7-040   | BA7-040   | BA7-063   | BA7-063   |
| D-A3□/A44<br>D-G39/K39                                              | BMB2-032       | BMB2-040  | BMB1-050  | BMB1-063  | BMB1-080  | BMB1-100  |
| D-F5□/J59<br>D-F5□W/J59W<br>D-F59F/F5BA<br>D-F5NT<br>D-A5□/A6□/A59W | BT-03          | BT-03     | BT-05     | BT-05     | BT-06     | BT-06     |
| D-P3DWA                                                             | BA10-032S      | BA10-040S | BA10-050S | BA10-050S | BA10-063S | BA10-063S |
| D-P4DW                                                              | BMB3T-040      | BMB3T-040 | BMB3T-050 | BMB3T-050 | BMB3T-080 | BMB3T-080 |
| D-Y59□/Y69□<br>D-Y7P/Y7PV<br>D-Y7□W/Y7□WV<br>D-Y7BA<br>D-Z7□/Z80    | BMB4-032       | BMB4-032  | BMB4-050  | BMB4-050  | BA4-063   | BA4-063   |

### [Stainless Steel Mounting Screw]

The following stainless steel mounting screw kit (including set screws) is available. Use it in accordance with the operating environment. (Since the auto switch mounting bracket is not included, order it separately.)

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

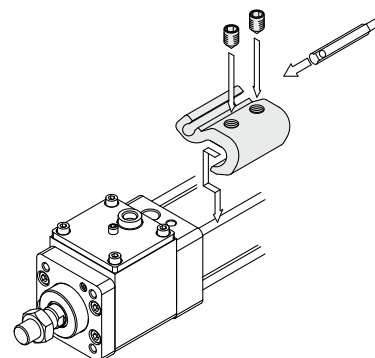
\* Refer to the **Web Catalog** or Best Pneumatics Catalog for details on the BBA1.

The above stainless steel screws are used when a cylinder is shipped with the D-F5BA auto switch. When only one auto switch is shipped independently, the BBA1 is attached.

\* When using the D-M9□A(V) or Y7BA, do not use the steel set screws which are included with the auto switch mounting brackets above (BMB5-032, BA7-□□□, BMB4-□□□, BA4-□□□).

Order a stainless steel screw kit (BBA1) separately, and use the M4 x 6 L stainless steel set screws included in the BBA1.

The figure shows the mounting example for the D-M9□(V)/M9□W(V)/M9□A(V)/A9□(V).

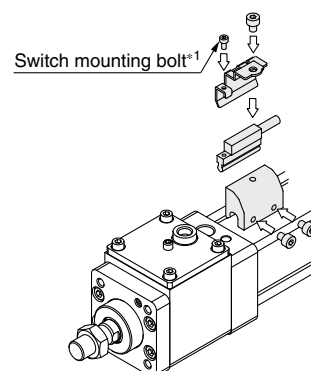


## Operating Range

| Auto switch model                                   | Bore size [mm] |     |     |     |     |      |
|-----------------------------------------------------|----------------|-----|-----|-----|-----|------|
|                                                     | 32             | 40  | 50  | 63  | 80  | 100  |
| D-M9□/M9□V<br>D-M9□W/M9□WV<br>D-M9□A/M9□AV          | 4              | 4.5 | 4.5 | 4.5 | 5   | 6    |
| D-Y59□/Y69□<br>D-Y7P/Y7□V<br>D-Y7□W/Y7□WV<br>D-Y7BA | 5.5            | 5.5 | 7   | 7.5 | 6.5 | 5.5  |
| D-F5□/J59<br>D-F5□W/J59W<br>D-F5BA/F5NT<br>D-F59F   | 3.5            | 4   | 4   | 4.5 | 4.5 | 4.5  |
| D-G39/K39                                           | 9              | 9   | 9   | 10  | 10  | 11   |
| D-P3DWA                                             | 3              | 4.5 | 4.5 | 5   | 5   | 5.5  |
| D-P4DW                                              | 4              | 4   | 4   | 4.5 | 4   | 4.5  |
| D-A9□/A9□V                                          | 7              | 7.5 | 8.5 | 9.5 | 9.5 | 10.5 |
| D-Z7□/Z80                                           | 7.5            | 8.5 | 7.5 | 9.5 | 9.5 | 10.5 |
| D-A5□/A6□                                           | 9              | 9   | 10  | 11  | 11  | 11   |
| D-A59W                                              | 13             | 13  | 13  | 14  | 14  | 15   |
| D-A3□/A44                                           | 9              | 9   | 10  | 11  | 11  | 11   |

\* Values which include hysteresis are for reference purposes only. They are not a guarantee (assuming approximately ±30% dispersion) and may change substantially depending on the ambient environment.

### <Mounting example for ø32, D-P3DWA>



\*1 The switch mounting bolt is supplied with the switch.



Other than the applicable auto switches listed in “How to Order,” the following auto switches are also mountable.  
Refer to the **Web Catalog** or Best Pneumatics Catalog for the detailed specifications.

| Type        | Model                 | Electrical entry        | Features                                     |
|-------------|-----------------------|-------------------------|----------------------------------------------|
| Solid state | D-Y69A, Y69B, Y7PV    | Grommet (Perpendicular) | —                                            |
|             | D-Y7NWV, Y7PWV, Y7BWV |                         | Diagnostic indication (2-color indicator)    |
|             | D-F59, F5P, J59       | Grommet (In-line)       | —                                            |
|             | D-Y59A, Y59B, Y7P     |                         | —                                            |
|             | D-Y7H                 |                         | —                                            |
|             | D-F59W, F5PW, J59W    |                         | Diagnostic indication (2-color indicator)    |
|             | D-Y7NW, Y7PW, Y7BW    |                         | Water-resistant (2-color indicator)          |
|             | D-F5BA, Y7BA          |                         | With timer                                   |
|             | D-F5NT                |                         | Magnetic field-resistant (2-color indicator) |
|             | D-P5DW                |                         | —                                            |
|             | D-A53, A56, Z73, Z76  | Grommet (In-line)       | Without indicator light                      |
| Reed        | D-A67, Z80            |                         | Without indicator light                      |

\* With pre-wired connector is also available for solid state switches. For details, refer to the **Web Catalog** or Best Pneumatics Catalog.

\* Normally closed (NC = b contact) solid state auto switches (D-M9□E, Y7G, Y7H) are also available. For details, refer to the **Web Catalog** or Best Pneumatics Catalog.

Model  
Selection

Working  
Principle

CP96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

C96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

Lock Unit  
MWB-UT

Accessories

Auto Switch

Made to  
Order

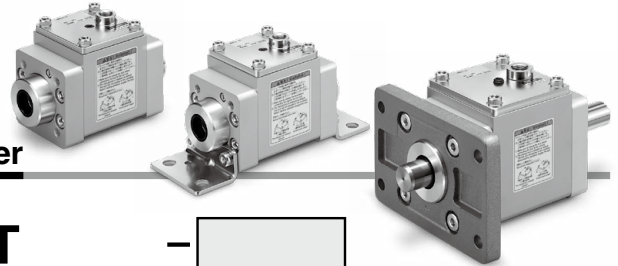
Specific Product  
Precautions

# Lock Unit

# MWB-UT Series

32, 40, 50, 63, 80, 100

RoHS



## How to Order

**MWB B 40 - UT**

**With rod MWB B 40 - UT - 500 -**

### Mounting

|          |            |
|----------|------------|
| <b>B</b> | Basic      |
| <b>L</b> | Axial foot |
| <b>F</b> | Flange     |

\* Mounting bracket is shipped together with the product.

### Model

| Model      | Applicable rod size |
|------------|---------------------|
| <b>32</b>  | 12 mm               |
| <b>40</b>  | 16 mm               |
| <b>50</b>  | 20 mm               |
| <b>63</b>  | 20 mm               |
| <b>80</b>  | 25 mm               |
| <b>100</b> | 30 mm               |

### Port thread type

|            |     |
|------------|-----|
| <b>Nil</b> | Rc  |
| <b>TN</b>  | NPT |
| <b>TF</b>  | G   |

### Made to order

|             |                         |
|-------------|-------------------------|
| <b>XC35</b> | With coil scraper       |
| <b>XC68</b> | Made of stainless steel |

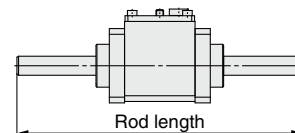
Refer to page 48 for details.

### Rod length [mm]

| Nil         |             | Without accessory rod |                                                                     |
|-------------|-------------|-----------------------|---------------------------------------------------------------------|
| Min. length | Max. length | Applicable model      | Note                                                                |
| 250         | 2500*1      | 32                    | Can be manufactured in increments of 1 mm up to the maximum length. |
|             |             | 40                    |                                                                     |
| 300         |             | 50                    |                                                                     |
|             |             | 63                    |                                                                     |
|             |             | 80                    |                                                                     |
|             |             | 100                   |                                                                     |

\*1 The maximum rod length of the MWB□32-XC68 is 1800 mm.

\* The rod length indicates the overall length of the rod.



\* Rod is shipped together with the product.

## Specifications

| Model                                  | 32              | 40     | 50     | 63     | 80     | 100    |
|----------------------------------------|-----------------|--------|--------|--------|--------|--------|
| Applicable rod size [mm]*2             | ø12 f8          | ø16 f8 | ø20 f8 | ø20 f8 | ø25 f8 | ø30 f8 |
| Locking action                         | Exhaust locking |        |        |        |        |        |
| Proof pressure                         | 1.5 MPa         |        |        |        |        |        |
| Max. operating pressure                | 1.0 MPa         |        |        |        |        |        |
| Min. operating pressure                | 0.3 MPa         |        |        |        |        |        |
| Locking direction                      | Both directions |        |        |        |        |        |
| Holding force (Max. static load) [N]*1 | 630             | 980    | 1570   | 2450   | 3920   | 6080   |
| Stopping accuracy [mm]                 | ±1.0            |        |        |        |        |        |

\*1 The holding force (max. static load) shows the maximum capability and does not show the normal holding capability. Refer to pages 6 and 7 to select an appropriate lock unit.

\*2 The applicable rod size affects the holding force, so use a rod with the rod size tolerance shown in the table above. For the shape of the rod end to be inserted, refer to page 54.

## Weight

| Model                                                      |                       | 32   | 40   | 50   | 63   | 80   | 100  |
|------------------------------------------------------------|-----------------------|------|------|------|------|------|------|
| Basic weight                                               | Lock unit             | 0.59 | 1.09 | 1.51 | 2.32 | 4.41 | 7.00 |
| Mounting bracket weight (including bracket mounting bolts) | Foot bracket (2 pcs.) | 0.12 | 0.14 | 0.22 | 0.26 | 0.50 | 0.66 |
|                                                            | Flange                | 0.24 | 0.32 | 0.53 | 0.74 | 1.45 | 3.31 |
| Additional rod weight per 50 mm                            |                       | 0.04 | 0.08 | 0.12 | 0.12 | 0.19 | 0.27 |

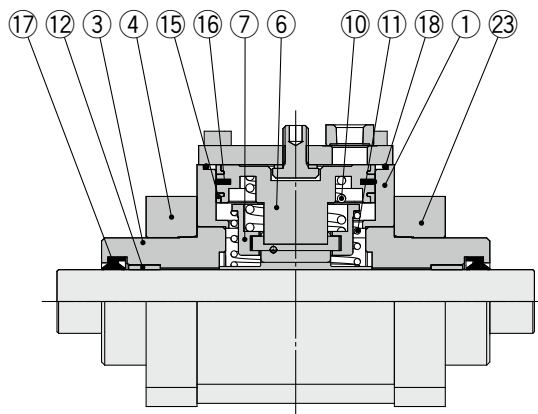
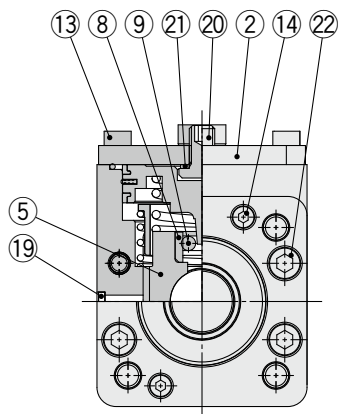
Calculation example)

**MWBL40-UT-500** (Axial foot, Model 40, With a 500 mm rod)

- Basic weight .....1.09 (Lock unit, Model 40)
- Additional weight .....0.08/50 mm
- Rod length .....500 mm
- Axial foot.....0.14

$$1.09 + (0.08/50) \times 500 + 0.14 = 2.03 \text{ kg}$$

## Construction



### Component Parts

| No. | Description     | Material        | Qty. | Note           |
|-----|-----------------|-----------------|------|----------------|
| 1   | Brake unit      | Aluminum alloy  | 1    | Hard anodized  |
| 2   | Cap             | Rolled steel    | 1    | Zinc chromated |
| 3   | Collar          | Aluminum alloy  | 2    | Chromated      |
| 4   | Retaining plate | Aluminum alloy  | 1    | Anodized       |
| 5   | Brake pad       | Cast iron       | 1    |                |
| 6   | Piston A        | Aluminum alloy  | 1    |                |
| 7   | Roller holder   | Carbon steel    | 1    |                |
| 8   | Roller receiver | Stainless steel | 2    | Heat treated   |
| 9   | Needle roller   | Carbon steel    | 2    | Heat treated   |
| 10  | Piston spring   | Spring steel    | 1    | Zinc chromated |
| 11  | Roller spring   | Spring steel    | 1    | Zinc chromated |
| 12  | Bushing         | Bearing alloy   | 2    |                |

| No. | Description                   | Material              | Qty. | Note |
|-----|-------------------------------|-----------------------|------|------|
| 13  | Hexagon socket head cap screw | Alloy steel           | 4    |      |
| 14  | Hexagon socket head cap screw | Alloy steel           | 2    |      |
| 15  | Wear ring                     | Resin                 | 2    |      |
| 16  | Piston seal                   | NBR                   | 1    |      |
| 17  | Rod seal                      | NBR                   | 2    |      |
| 18  | Gasket                        | NBR                   | 1    |      |
| 19  | Element                       | Bronze                | 1    |      |
| 20  | Release bolt                  | Alloy steel           | 1    |      |
| 21  | Seal washer                   | NBR + Stainless steel | 1    |      |
| 22  | Hexagon socket head cap screw | Alloy steel           | 4    |      |
| 23  | Unit cover                    | Aluminum alloy        | 1    |      |

\* The lock unit cannot be disassembled.

Model  
Selection

Working  
Principle

CP96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

C96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

Lock Unit  
MWB-UT

Accessories

Auto Switch

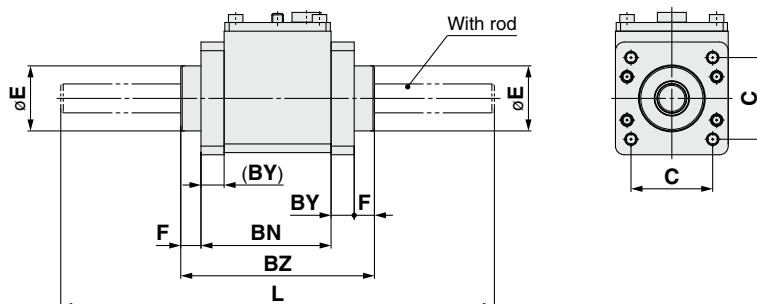
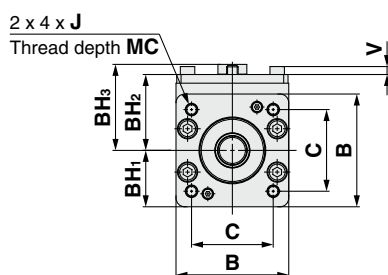
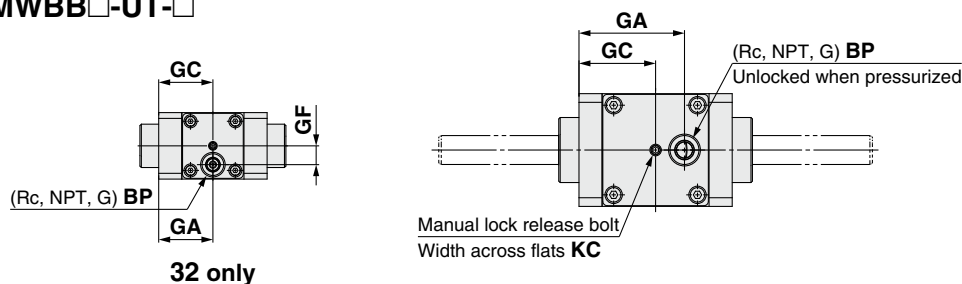
Made to  
Order

Specific Product  
Precautions

# MWB-UT Series

## Dimensions

### Basic: MWBB□-UT-□



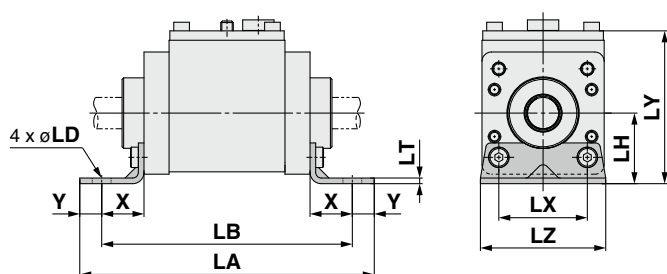
| Model | Applicable rod size | B   | BH <sub>1</sub> | BH <sub>2</sub> | BH <sub>3</sub> | BN  | BP  | BY | BZ  | C    | E  | F  | GA   | GC   | GF | J         | KC | MC | V   |
|-------|---------------------|-----|-----------------|-----------------|-----------------|-----|-----|----|-----|------|----|----|------|------|----|-----------|----|----|-----|
| 32    | ø12 f8              | 46  | 23              | 38.5            | 46.5            | 59  | 1/8 | 16 | 101 | 32.5 | 30 | 13 | 37.5 | 37.5 | 13 | M6 x 1.0  | 3  | 16 | 3.5 |
| 40    | ø16 f8              | 57  | 28.5            | 42.5            | 48.5            | 73  | 1/8 | 16 | 115 | 38   | 35 | 13 | 59.5 | 44.5 | —  | M6 x 1.0  | 3  | 16 | 4.5 |
| 50    | ø20 f8              | 66  | 33              | 49              | 55.5            | 78  | 1/8 | 16 | 122 | 46.5 | 40 | 14 | 64   | 47   | —  | M8 x 1.25 | 4  | 16 | 4.5 |
| 63    | ø20 f8              | 78  | 39              | 52.5            | 59.5            | 90  | 1/4 | 16 | 134 | 56.5 | 45 | 14 | 73   | 53   | —  | M8 x 1.25 | 4  | 16 | 5.5 |
| 80    | ø25 f8              | 98  | 49              | 64.5            | 71.5            | 113 | 1/4 | 17 | 170 | 72   | 45 | 20 | 92   | 65   | —  | M10 x 1.5 | 5  | 17 | 7.5 |
| 100   | ø30 f8              | 116 | 58              | 73.5            | 80.5            | 131 | 1/4 | 17 | 188 | 89   | 55 | 20 | 109  | 74   | —  | M10 x 1.5 | 5  | 17 | 9.5 |

### With Rod

| Model | L           |             |
|-------|-------------|-------------|
|       | Min. length | Max. length |
| 32    | 250         | 2500*1      |
| 40    | 250         |             |
| 50    | 300         |             |
| 63    | 300         |             |
| 80    | 300         |             |
| 100   | 300         |             |

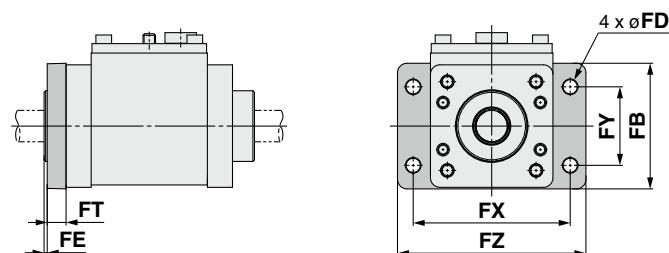
\*1 The maximum rod length of the MWB□32-XC68 is 1800 mm.

### Axial foot: MWBL□-UT-□



| Model | LA  | LB  | LD | LH | LT  | LX | LY    | LZ  | X  | Y  |
|-------|-----|-----|----|----|-----|----|-------|-----|----|----|
| 32    | 137 | 119 | 7  | 30 | 3.2 | 32 | 68.5  | 50  | 22 | 9  |
| 40    | 159 | 137 | 9  | 33 | 3.2 | 38 | 75.5  | 55  | 24 | 11 |
| 50    | 170 | 148 | 9  | 40 | 3.2 | 46 | 89    | 70  | 27 | 11 |
| 63    | 188 | 160 | 12 | 48 | 3.6 | 56 | 100.5 | 80  | 27 | 14 |
| 80    | 218 | 190 | 12 | 55 | 4.5 | 72 | 119.5 | 100 | 30 | 14 |
| 100   | 244 | 212 | 14 | 65 | 4.5 | 89 | 138.5 | 120 | 32 | 16 |

### Flange: MWBF□-UT-□



| Model | FB  | FD | FE | FT | FX  | FY | FZ  |
|-------|-----|----|----|----|-----|----|-----|
| 32    | 56  | 7  | 3  | 10 | 72  | 38 | 87  |
| 40    | 65  | 9  | 3  | 10 | 83  | 46 | 101 |
| 50    | 77  | 9  | 2  | 12 | 100 | 52 | 120 |
| 63    | 92  | 9  | 2  | 12 | 115 | 62 | 135 |
| 80    | 100 | 12 | 4  | 16 | 126 | 63 | 153 |
| 100   | 120 | 14 | 4  | 16 | 150 | 75 | 178 |

# CP96N/C96N Series Simple Specials

The following changes are dealt with through the Simple Specials System.

Please contact your local sales representative for more details.

## 1 Change of Rod End Shape

Symbol  
-XA0 to XA30

| Series   |               | Action                    | Symbol for change of rod end shape | Note                                      |
|----------|---------------|---------------------------|------------------------------------|-------------------------------------------|
| Standard | CP96N<br>C96N | Double acting, Single rod | XA0 to 30                          | Excludes cylinders with a rod end bracket |

### Precautions

- SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
- Standard dimensions marked with "\*" will be as follows to the rod diameter (D). Enter any special dimension you require.
- $6 < D \leq 25 \rightarrow D-2 \text{ mm}$ ,  $D > 25 \rightarrow D-4 \text{ mm}$   
 3. "A0" is the same shape as the standard type. (The specifications of A0 are that only dimensions A and H are changed from the standard type.)

|                        |                        |                        |                        |
|------------------------|------------------------|------------------------|------------------------|
| <b>Symbol: A0</b><br>  | <b>Symbol: A1</b><br>  | <b>Symbol: A2</b><br>  | <b>Symbol: A3</b><br>  |
| <b>Symbol: A4</b><br>  | <b>Symbol: A5</b><br>  | <b>Symbol: A6</b><br>  | <b>Symbol: A7</b><br>  |
| <b>Symbol: A8</b><br>  | <b>Symbol: A9</b><br>  | <b>Symbol: A10</b><br> | <b>Symbol: A11</b><br> |
| <b>Symbol: A12</b><br> | <b>Symbol: A13</b><br> | <b>Symbol: A14</b><br> | <b>Symbol: A15</b><br> |
| <b>Symbol: A16</b><br> | <b>Symbol: A17</b><br> | <b>Symbol: A18</b><br> | <b>Symbol: A19</b><br> |

Model  
Selection

Working  
Principle

CP96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

C96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

Lock Unit  
MWB-UT

Accessories

Auto Switch

Made to  
Order

Specific Product  
Precautions

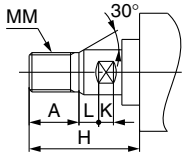
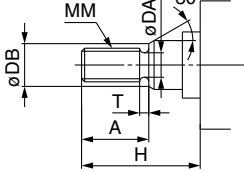
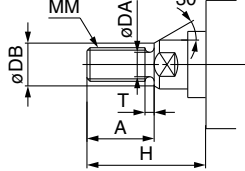
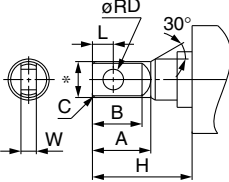
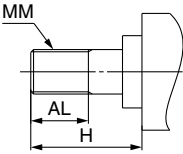
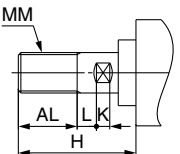
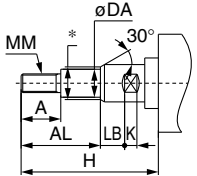
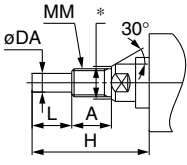
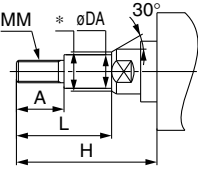
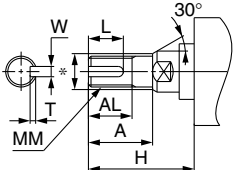
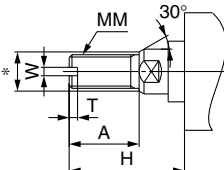
# CP96N/C96N Series

1

Change of Rod End Shape

Symbol

-XA0 to XA30

|                                                                                                           |                                                                                                           |                                                                                                            |                                                                                                            |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <div>Symbol: A20</div>   | <div>Symbol: A21</div>   | <div>Symbol: A22</div>   | <div>Symbol: A23</div>  |
| <div>Symbol: A24</div>   | <div>Symbol: A25</div>   | <div>Symbol: A26</div>   | <div>Symbol: A27</div>  |
| <div>Symbol: A28</div>  | <div>Symbol: A29</div>  | <div>Symbol: A30</div>  |                                                                                                            |



# Made to Order Common Specifications

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

## 1 With Coil Scraper

Symbol  
**-XC35**

Removes frost, ice, weld spatter, cutting chips, etc. adhered to the piston rod, protecting the seals.

### Applicable Series

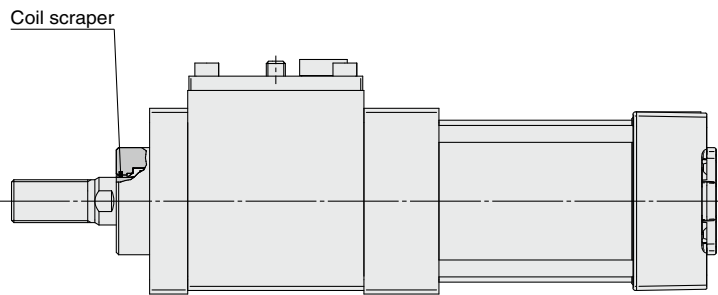
| Description | Model  | Action                               | Note      |
|-------------|--------|--------------------------------------|-----------|
| Standard    | CP96N  | Double acting, Single rod/Double rod | —         |
|             | C96N   | Double acting, Single rod/Double rod | —         |
|             | MWB-UT | —                                    | Lock unit |

### How to Order

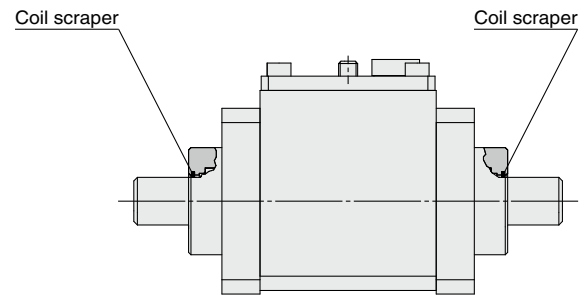
Standard model no. **-XC35**  
With coil scraper

Specifications and dimensions: Same as the standard type

### Construction



Cylinder with lock



Lock unit

## 2 Made of Stainless Steel (For Lock Unit, With Hard Chrome Plating)

Symbol  
**-XC68**

Suitable for environments where rust and corrosion are likely to be generated.

### Applicable Series

| Description | Model  | Note      |
|-------------|--------|-----------|
| Standard    | MWB-UT | Lock unit |

### How to Order

Standard model no. **-XC68**  
Made of stainless steel  
(For lock unit, With hard chrome plating)

Specifications and dimensions: Same as the standard type

### Stainless Steel Rod Length

| Model | Min. length | Max. length | Note                                                                |
|-------|-------------|-------------|---------------------------------------------------------------------|
| 32    | 250 mm      | 1800 mm     | Can be manufactured in increments of 1 mm up to the maximum length. |
| 40    | 250 mm      | 2500 mm     |                                                                     |
| 50    | 300 mm      |             |                                                                     |
| 63    | 300 mm      |             |                                                                     |
| 80    | 300 mm      |             |                                                                     |
| 100   | 300 mm      |             |                                                                     |

Model Selection

Working Principle

CP96N

Double Acting, Single Rod

Double Acting, Double Rod

C96N

Double Acting, Single Rod

Double Acting, Double Rod

Lock Unit MWB-UT

Accessories

Auto Switch

Made to Order

Specific Product Precautions



# CP96N/C96N Series Specific Product Precautions 1

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smcworld.com>

## Design of Equipment and Machinery

### Warning

1. Construct so that the human body will not come into direct contact with driven objects or the moving parts of the cylinders with lock.

Devise a safe structure by attaching protective covers that prevent direct contact with the human body, or in cases where there is a danger of contact, provide sensors or other devices to perform an emergency stop, etc., before contact occurs.

2. Use a balance circuit, taking cylinder lurching into consideration.

In cases such as an intermediate stop, where a lock is operated at a desired position within the stroke and air pressure is applied from only one side of the cylinder, the piston will lurch at high speed when the lock is released. In such situations, there is a danger of causing human injury by having hands or feet, etc. caught, and also a danger for causing damage to the equipment. In order to prevent this lurching, a balance circuit such as the recommended pneumatic circuits (page 51) should be used.

## Selection

### Warning

1. When in the locked state, do not apply a load accompanied by an impact shock, strong vibration or turning force, etc.

Use caution, because an external action such as an impacting load, strong vibration or turning force, may damage the locking mechanism or reduce its life.

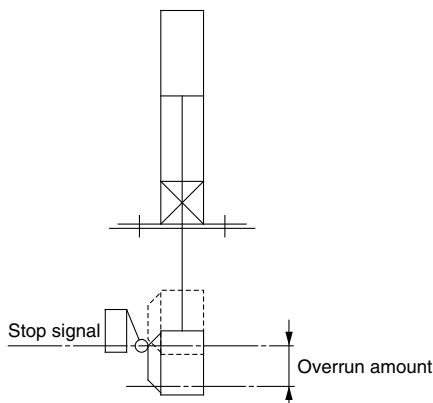
2. Consider stopping accuracy and the amount of overrun when an intermediate stop is performed.

Due to the nature of a mechanical lock, there is a momentary lag with respect to the stop signal, and a time delay occurs before stopping. The cylinder stroke resulting from this delay is the overrun amount. The difference between the maximum and minimum overrun amounts is the stopping accuracy.

- Place a limit switch before the desired stopping position, at a distance equal to the overrun amount.
- The limit switch must have a detection length (dog length) of the overrun amount +  $\alpha$ .
- SMC's auto switches have operating ranges from 8 to 14 mm (depending on the auto switch model).

When the overrun amount exceeds this range, self-holding of the contact should be performed at the auto switch load side.

\* For the stopping accuracy, refer to pages 10 and 26.



## Selection

### Warning

3. In order to further improve stopping accuracy, the time from the stop signal to the operation of the lock should be shortened as much as possible.

To accomplish this, use a device such as a highly responsive electric control circuit or solenoid valve, and place the solenoid valve as close as possible to the cylinder.

4. Note that the stopping accuracy will be influenced by changes in piston speed.

When piston speed changes during the course of the cylinder stroke due to variations in the load or disturbances, etc., the dispersion of stopping positions will increase. Therefore, consideration should be given to establishing a standard speed for the piston just before it reaches the stopping position.

Moreover, the dispersion of stopping positions will increase during the cushioned portion of the stroke and during the accelerating portion of the stroke after the start of operation, due to the large changes in piston speed.

5. The holding force (max. static load) indicates the maximum capability to hold a static load without loads, vibration and impact. This does not indicate a load that can be held in ordinary conditions.

Select the most suitable bore sizes for the operating conditions in accordance with the selection procedures. The Model Selection (pages 6 and 7) is based on use at the intermediate stop (including emergency stops during operation). However, when the cylinder is in a locked state, kinetic energy does not act upon it. Under these conditions, use the load mass at the maximum speed (V) of 100 mm/s shown in graphs [5] to [7] on page 7 depending on the operating pressure and select models.

## Mounting

### Warning

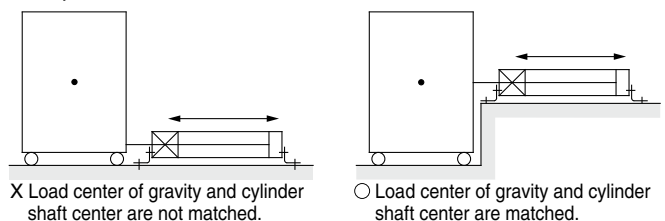
1. The manual lock is released as default. The lock will not operate in this condition. Before starting operation, engage the lock.

2. Be certain to connect the rod end to the load with the lock released.

If connected in the locked state, a load greater than the turning force or holding force, etc. may operate on the piston rod and cause damage to the lock mechanism. As the C(P)96N series is equipped with a manual lock release mechanism, it is possible to hold the lock released state without an air supply.

3. Do not apply offset loads to the piston rod.

Particular care should be taken to match the load's center of gravity with the center of the cylinder shaft. When there is a large discrepancy, the piston rod may be subjected to uneven wear or damage due to the inertial moment during locking stops.



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



# CP96N/C96N Series

## Specific Product Precautions 2

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smcworld.com>

### Mounting

#### ⚠ Caution

1. Use the hexagon wrenches shown below when replacing brackets.

| Bore size [mm] | Width across flats | Tightening torque [N·m] |
|----------------|--------------------|-------------------------|
| 32, 40         | 4                  | 4.8                     |
| 50, 63         | 5                  | 10.4                    |
| 80, 100        | 6                  | 18.2                    |

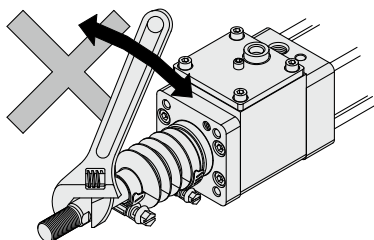
2. When replacing the head side bracket, the tie-rod nut on the cylinder body also loosens.

After retightening the tie-rod nut at the proper tightening torque (refer to the Mounting 1. above.), install the bracket.

3. Do not turn the piston rod with the rod boot kept locked.

When turning the piston rod, loosen the band once and do not twist the rod boot.

Set the breathing hole in the rod boot downward or in the direction that prevents entry of dust or water content.



4. Do not disassemble the trunnion type cylinder because the mounting precision is required.

It is difficult to align the axial center of the trunnion with the axial center of the cylinder. Thus, if this type of cylinder is disassembled and reassembled, the required dimensional accuracy cannot be attained, which may lead to malfunctions.

### Adjustment

#### ⚠ Warning

1. Do not open the cushion valve more than the allowable number of rotations (table on the right).

Although the cushion valve is caulked as a retaining mechanism, do not open the cushion valve more than the allowable number of rotations. If air is supplied and operation started without confirming the above condition, the cushion valve may be ejected from the cover.

The allowable number of rotations refers to the number of rotations until the restrictor of the cushion valve is completely opened from the completely closed state.

### Adjustment

#### ⚠ Warning

2. Keep the screwing torque and the unscrewing torque of the cushion valve to the allowable torque or below (following table).

If a screwing torque or unscrewing torque beyond the allowable torque is applied, the valve will be damaged when the valve is closed completely or exceeds the retaining mechanism when the valve is opened completely, which will dislocate the engagement of the screw and eject the valve.

| Bore size [mm] | Cushion valve width across flats | Hexagon wrench                   | Allowable number of rotations | Allowable torque [N·m] |
|----------------|----------------------------------|----------------------------------|-------------------------------|------------------------|
| 32, 40         | 2                                | JIS 4648<br>Hexagon wrench key 2 | 4                             | 0.02                   |
| 50, 63         | 2                                | JIS 4648<br>Hexagon wrench key 2 | 4.5                           | 0.02                   |
| 80, 100        | 3                                | JIS 4648<br>Hexagon wrench key 3 | 5.5                           | 0.06                   |

3. Be certain to activate the air cushion at the stroke end.

When the air cushion is inactivated, if the allowable kinetic energy exceeds the value on pages 11 and 27, the piston rod assembly or the tie-rod may be damaged. Set the air cushion to valid when operating the cylinder.

#### ⚠ Caution

1. Adjust the cylinder's air balance.

Balance the load by adjusting the air pressure in the rod and head sides of the cylinder with the load connected to the cylinder and the lock released. Lurching of the cylinder when unlocked can be prevented by carefully adjusting this air balance.

2. Adjust the mounting positions of the detectors on auto switches, etc.

When intermediate stops are to be performed, adjust the mounting positions of detectors on auto switches, etc., taking into consideration the overrun amount with respect to the desired stopping positions.

Model Selection

Working Principle

CP96N

Double Acting, Single Rod

Double Acting, Double Rod

C96N

Double Acting, Single Rod

Double Acting, Double Rod

Lock Unit MWB-UT

Accessories

Auto Switch

Made to Order

Specific Product Precautions



# CP96N/C96N Series Specific Product Precautions 3

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: <https://www.smcworld.com>

## Pneumatic Circuit

### Warning

1. Be certain to use a pneumatic circuit which will apply balancing pressure to both sides of the piston when in a locked stop.

In order to prevent cylinder lurching after a lock stop, when restarting or when manually unlocking, a circuit should be used to which will apply balancing pressure to both sides of the piston, thereby canceling the force generated by the load in the direction of piston movement.

2. The effective area of the unlocking solenoid valve should be at least 50% of the effective area of the cylinder driving solenoid valve, and it should be installed as close to the cylinder as possible so that it is closer than the cylinder driving solenoid valve.

If the effective area of the unlocking solenoid valve is small or if it is installed at a distance from the cylinder, the time required for exhausting air for unlocking will be longer, which may cause a delay in the locking operation.

The delay in the locking operation may result in problems such as increase of overruning when performing intermediate stop or emergency stop during operation, or if maintaining position from the operation stop state such as drop prevention, workpieces may be dropped depending on the timing of the load action to the operation delay of the lock.

3. Avoid backflow of the exhaust pressure when there is a possibility of interference of exhaust air, for example for a common exhaust type valve manifold.

The lock may not operate properly when the exhaust air pressure backflows due to interference of the exhaust air when exhausting air for lock release. It is recommended to use an individual exhaust type manifold or individual valves.

4. Allow at least 0.5 seconds from a locked stop (intermediate stop of the cylinder) until release of the lock.

When the locked stop time is too short, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

5. When restarting, control the switching signal for the unlocking solenoid valve so that it acts before or at the same time as the cylinder drive solenoid valve.

If the signal is delayed, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

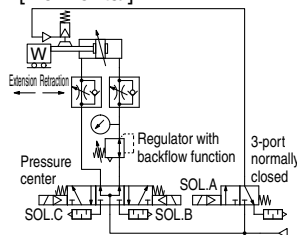
6. Carefully check for dew condensation due to repeated air supply and exhaust of the locking solenoid valve.

The operating stroke of the lock part is very small. So, if the piping is long and the air supply and exhaust are repeated, the dew condensation caused by the adiabatic expansion accumulates in the lock part. This may corrode internal parts, causing air leak or lock release fault.

### Warning

7. Basic circuit

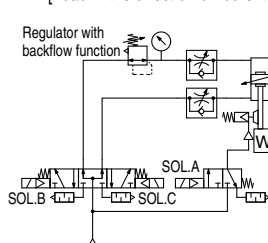
1. [Horizontal]



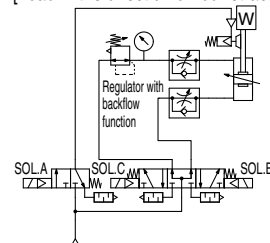
| SOL A | SOL B | SOL C | Action      |               |
|-------|-------|-------|-------------|---------------|
| ON    | ON    | OFF   | Extension   |               |
| OFF   | OFF   | OFF   | Locked stop | 0.5 s or more |
| ON    | OFF   | OFF   | Unlocked    | 0 to 0.5 s    |
| ON    | ON    | OFF   | Extension   |               |
| ON    | OFF   | ON    | Retraction  |               |
| OFF   | OFF   | OFF   | Locked stop | 0.5 s or more |
| ON    | OFF   | OFF   | Unlocked    | 0 to 0.5 s    |
| ON    | OFF   | ON    | Retraction  |               |

2. [Vertical]

[Load in the direction of rod extension]



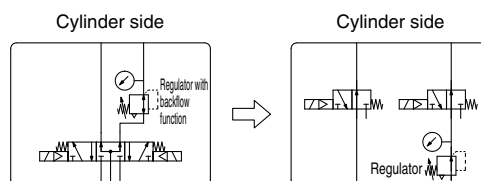
[Load in the direction of rod retraction]



\* The symbol for the cylinder with lock in the basic circuit uses SMC original symbol.

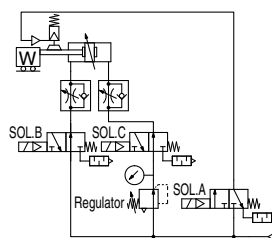
### Caution

1. 3-position pressure center solenoid valve and regulator with backflow function can be replaced with two 3-port normally open valves and a regulator with relief function.



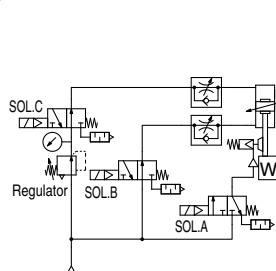
[Example]

1. [Horizontal]

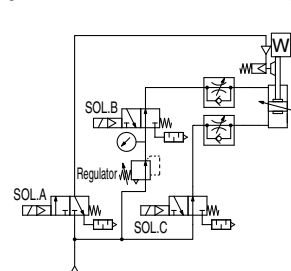


2. [Vertical]

[Load in the direction of rod extension]



[Load in the direction of rod retraction]



\* The symbol for the cylinder with lock in the pneumatic circuit uses SMC original symbol.



# CP96N/C96N Series Specific Product Precautions 4

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smcworld.com>

## Manual Lock Release

### Warning

- Never operate the lock release bolt until safety has been confirmed.**
  - When unlocking is performed with air pressure applied to only one side of the cylinder, the moving parts of the cylinder will lurch at high speed causing a serious hazard.
  - When unlocking is performed, be sure to confirm that personnel are not within the load movement range and that no other problems will occur if the load moves.
- Before operating the lock release bolt, exhaust any residual pressure which is in the system.**
- Take measures to prevent the load from dropping.**
  - Perform work with the load in its lowest position.
  - Take measures for drop prevention by strut, etc.

### Caution

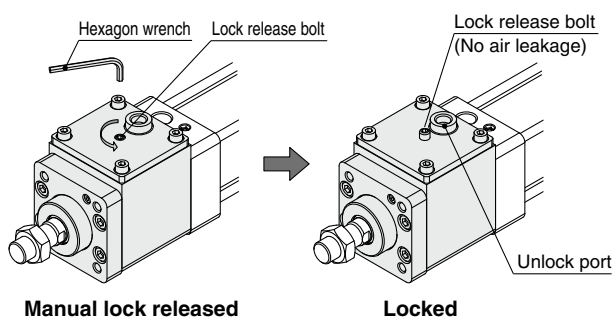
- When releasing the locked state with the lock release bolt for the purpose of mounting or adjustment, be sure to return the lock release bolt to the locked state.**

If the lock release bolt is not returned to the locked state, the lock might not function correctly or lock release might not be completed due to air leakage from the lock release bolt.

#### [How to return to locked state]

- Rotate the lock release bolt counterclockwise by hand with a hexagon wrench until it stops. Once that position is reached, rotate it an additional 1/6th of a turn to securely tighten the lock release bolt.

\* Do not use an electric screwdriver or pneumatic screwdriver.



| Bore size [mm] | Hexagon wrench size of the lock release bolt |
|----------------|----------------------------------------------|
| 32, 40         | 3                                            |
| 50, 63         | 4                                            |
| 80, 100        | 5                                            |

- Pressurize the unlock port with 0.3 MPa or more and check that there is no air leakage from the lock release bolt and lock correctly functions.

## Maintenance

### Caution

- Lock units are replaceable.**

When ordering the lock unit for maintenance, select the suitable lock based on the cylinder bore size.

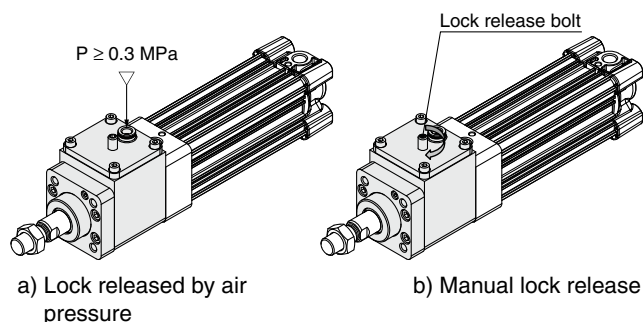
| Bore size [mm] | Port type | Replacement lock unit part no. |
|----------------|-----------|--------------------------------|
| 32             | G         | MWB32TF-UA                     |
| 40             | G         | MWB40TF-UA                     |
| 50             | G         | MWB50TF-UA                     |
| 63             | G         | MWB63TF-UA                     |
| 80             | G         | MWB80TF-UA                     |
| 100            | G         | MWB100TF-UA                    |

\* For lock unit with a rod boot, add -J to the part number suffix.  
Example) MWB50TF-UA-J

- How to replace lock units**

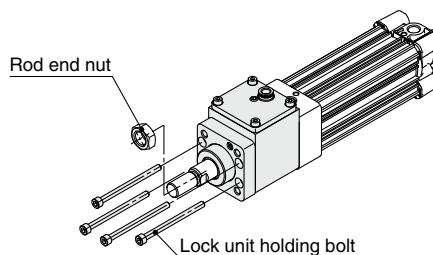
The following method is described using CP96N, however, it can equally be applied to the C96N.

- To release the locked state, screw-in the lock release bolt to the body cap end or pressurize the unlock port with 0.3 MPa or more.



- Remove the lock unit holding bolt (hexagon socket head cap screw) with a hexagon wrench. For the applicable hexagon wrench, refer to the table below.  
If using the rod end nut, remove it.

| Bore size [mm] | Hexagon wrench size of the lock unit holding bolt |
|----------------|---------------------------------------------------|
| 32             | 3                                                 |
| 40, 50         | 5                                                 |
| 63             | 6                                                 |
| 80             | 8                                                 |
| 100            | 10                                                |



Model  
Selection

Working  
Principle

CP96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

C96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

Lock Unit  
MWB-UT

Accessories

Auto Switch

Made to  
Order

Specific Product  
Precautions





# CP96N/C96N Series

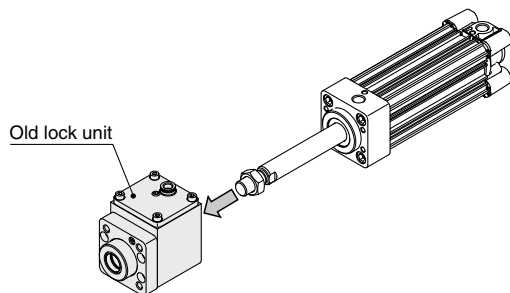
## Specific Product Precautions 5

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smcworld.com>

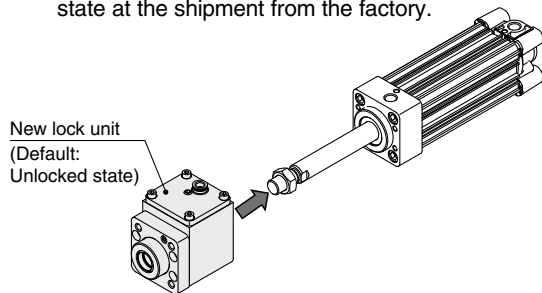
### Maintenance

#### Caution

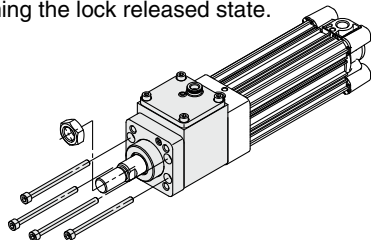
- 3) Pull out the old lock unit from the cylinder.



- 4) Insert a new lock unit into the cylinder.  
The lock unit for maintenance is supplied with lock released state at the shipment from the factory.



- 5) Insert the lock unit holding bolt and tighten it temporarily.  
Check that the piston rod operates smoothly by hand while maintaining the lock released state.



- 6) Confirm that the operation of 5) is performed correctly, and then tighten the lock unit holding bolt with an appropriate tightening torque as shown in the table below.

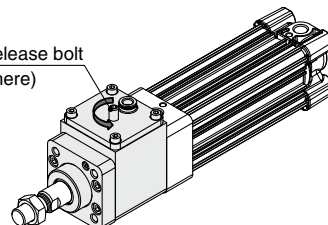
| Bore size [mm] | Appropriate tightening torque of the lock unit holding bolt [N·m] |
|----------------|-------------------------------------------------------------------|
| 32             | 1.35 to 1.65                                                      |
| 40, 50         | 4.7 to 5.7                                                        |
| 63             | 11.3 to 13.7                                                      |
| 80             | 22.1 to 26.9                                                      |
| 100            | 37.8 to 46.2                                                      |

- 7) After assembly is completed, rotate the lock release bolt counterclockwise by hand with a hexagon wrench until it stops. Once that position is reached, rotate it for an additional 1/6th of a turn to securely tighten the lock release bolt.

\* Do not use an electric screwdriver or pneumatic screwdriver.

| Bore size [mm] | Hexagon wrench size of the lock release bolt |
|----------------|----------------------------------------------|
| 32, 40         | 3                                            |
| 50, 63         | 4                                            |
| 80, 100        | 5                                            |

Lock release bolt  
(Lock here)



Check that the cylinder is locked and confirm that the lock is released when air pressure of 0.3 MPa or more is applied to the unlock port on the lock unit. In addition to this, the piston rod should operate smoothly with the minimum operating pressure. Check that there is no air leakage from the lock release bolt.





# MWB□-UT Series Specific Product Precautions

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smcworld.com>

## <Precautions for the lock unit MWB□-UT>

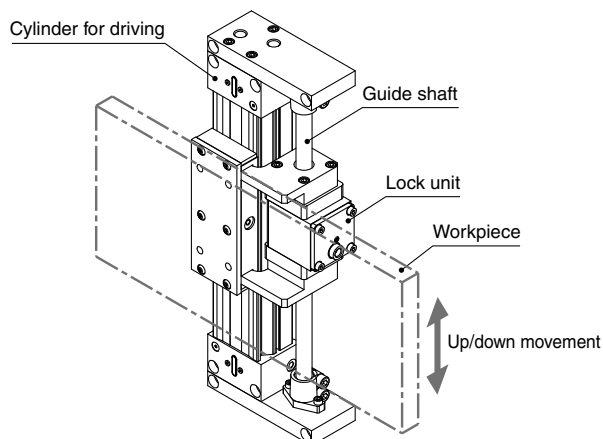
### Design / Selection

- When selecting a lock unit, refer to Model Selection on pages 6 and 7.
- Use a rod of the size recommended in the following table.

| Unit model          | MWB32-UT                       | MWB40-UT | MWB50-UT | MWB63-UT | MWB80-UT | MWB100-UT |
|---------------------|--------------------------------|----------|----------|----------|----------|-----------|
| Applicable rod size | ø12 f8                         | ø16 f8   | ø20 f8   | ø20 f8   | ø25 f8   | ø30 f8    |
| Material            | Carbon steel/Stainless steel   |          |          |          |          |           |
| Surface treatment   | Hard chrome plating: 10 μm     |          |          |          |          |           |
| Surface roughness   | Maximum height: Rz 1.6 or less |          |          |          |          |           |

Using any rod other than the rods recommended above may cause damage to internal parts of the lock unit, faulty mounting of the lock unit, operation failure, decrease in holding force, etc.

- The lock unit may be damaged if an excessive lateral load or external force is applied to it. Fully consider this point.
- Do not use the lock unit for any application where the rod rotates.
- When in the locked state, do not apply a load accompanied by an impact shock, strong vibration, turning force, etc.  
Note that an external action, such as an impacting load, strong vibration, or turning force, may damage the lock unit or reduce its life.
- Excessively long piping between the unlock port of the lock unit and the solenoid valve for the lock, or a pipe that is too small may affect the stopping accuracy of the lock unit.
- When unlocking is performed from the locked state with some thrust or load still applied to the lock unit, cylinder lurching may occur. In addition, frequent occurrence of excessive cylinder lurching or a similar problem due to the load being applied will damage the lock unit or reduce its life. Take appropriate measures for the circuit and/or the system. When using the lock unit in combination with a pneumatic cylinder, cylinder lurching can be prevented by using a balance circuit, such as the recommended pneumatic circuits on page 51.
- When using the lock unit by placing it in parallel with the cylinder for driving as shown in the figure below, align the cylinder with the rod.

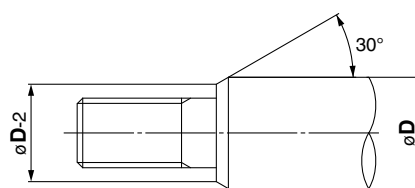


### Mounting / Adjustment

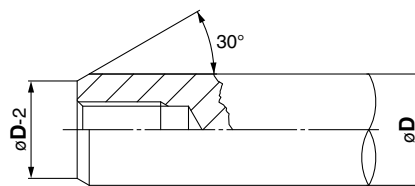
- Ensure that the sliding surface of the rod to be inserted into the lock unit is not scratched or dented during the mounting or adjustment of this product.

Scratches or dents on the surface of the rod may cause unusual wear on the inner surface of the brake pad or decrease its holding force.

- Chamfer the rod end to be inserted into the lock unit as shown in the figures below to prevent the seal and inner periphery of the lock unit from being scratched.



For male thread



For female thread

- Refer to page 52 for the manual lock release.

### Maintenance / Inspection

- Do not disassemble the lock unit and perform maintenance.  
Please contact our nearest sales office when you require repair or maintenance.
- Do not apply any grease or lubricant to the inner periphery of the lock unit or the surface of the rod to be inserted into the lock unit.  
Doing so may result in a decrease in holding force.
- Take additional safety measures when conducting equipment maintenance.

Model  
Selection

Working  
Principle

CP96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

C96N

Double Acting,  
Single Rod

Double Acting,  
Double Rod

Lock Unit  
MWB-UT

Accessories

Auto Switch

Made to  
Order

Specific Product  
Precautions

## Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)\*1), and other safety regulations.

 **Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

 **Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

 **Danger :** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

\*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.  
ISO 4413: Hydraulic fluid power – General rules relating to systems.  
IEC 60204-1: Safety of machinery – Electrical equipment of machines.  
(Part 1: General requirements)  
ISO 10218-1: Manipulating industrial robots – Safety.  
etc.

### Warning

#### 1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

#### 2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

#### 3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

#### 4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

### Caution

#### 1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.  
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.  
If anything is unclear, contact your nearest sales branch.

## Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

### Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.\*2)  
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.  
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

#### \*2) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.  
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

### Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

### Caution

#### SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

## Safety Instructions

Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.