

# ISO15552 Cylinders

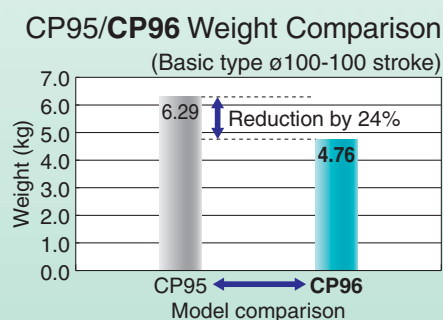
Ø32, Ø40, Ø50, Ø63, Ø80, Ø100, Ø125

- CNOMO and circular grooves are on all four sides.
- Switch can be slid in.
- Reduced weight due to a change in the configuration of the cover
- Small sized D-M9□ auto switch mountable

## Profile Design ISO Cylinder Series **CP96**



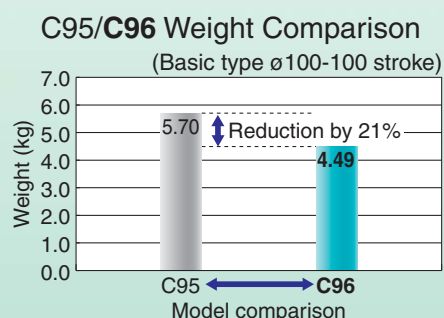
**New** Non-rotating Rod Type Added !



## ISO Cylinder Series **C96**



**New** Non-rotating Rod Type,  
Smooth Cylinder Added !



### Series Variations

| Series                                                                                                                                              | Action        | Type       | Basic    | Built-in magnet | Rod boot | Bore (mm)                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|----------|-----------------|----------|--------------------------------|
| <b>Series CP96</b><br>Standard                                   | Double acting | Single rod | Non-lube |                 |          | 32, 40, 50, 63<br>80, 100, 125 |
|                                                                                                                                                     |               | Double rod | Non-lube |                 |          |                                |
| <b>Series CP96K</b> <b>New</b><br>Standard/<br>Non-rotating rod  | Double acting | Single rod | Non-lube |                 |          | 32, 40, 50, 63<br>80, 100      |
|                                                                                                                                                     |               | Double rod | Non-lube |                 |          |                                |
| <b>Series C96</b><br>Standard                                    | Double acting | Single rod | Non-lube |                 |          | 32, 40, 50, 63<br>80, 100, 125 |
|                                                                                                                                                     |               | Double rod | Non-lube |                 |          |                                |
| <b>Series C96K</b> <b>New</b><br>Standard/<br>Non-rotating rod   | Double acting | Single rod | Non-lube |                 |          | 32, 40, 50, 63<br>80, 100      |
|                                                                                                                                                     |               | Double rod | Non-lube |                 |          |                                |
| <b>Series C96Y</b> <b>New</b><br>Smooth cylinder                 | Double acting | Single rod | Non-lube |                 |          | 32, 40, 50, 63<br>80, 100, 125 |

## Series **CP96/C96**



CAT.EUS20-204B-UK



# Profile Design ISO Cylinder Series CP96

ø32, ø40, ø50, ø63, ø80, ø100, ø125

Compliance to ISO 15552

Profile design with enclosed tie-rods



**New Series Expanded**  
 • Non-rotating rod type (Single rod/Double rod) added !  
 • 9 Made to Order types added !

## Variations

| Series                                                                                                                                         | Action        | Type       |          | Basic | Built-in magnet | Rod boot | Bore (mm)                      |
|------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|----------|-------|-----------------|----------|--------------------------------|
| <b>Standard</b><br><b>Series CP96</b><br>                   | Double acting | Single rod | Non-lube | ●     | ●               | ●        | 32, 40, 50, 63<br>80, 100, 125 |
|                                                                                                                                                |               | Double rod | Non-lube | ●     | ●               | ●        |                                |
| <b>Standard/Non-rotating rod</b><br><b>Series CP96K</b><br> | Double acting | Single rod | Non-lube | ●     | ●               |          | 32, 40, 50, 63<br>80, 100      |
|                                                                                                                                                |               | Double rod | Non-lube | ●     | ●               |          |                                |

CP96

CP96K

55-CP96

C96

C96K

C96Y

55-C96

Auto Switch

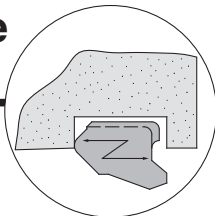
Simple Specials  
Made to Order

Precautions

## Series CP96

### Improved end of stroke cushion capacity

Piston rod lurching has been eliminated at the end of stroke positions by means of a floating seal mechanism.



### Air cylinder Compact and light design

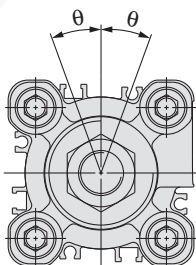
Reduced weight due to a change in the configuration of the cover.

### New Non-rotating rod type added !

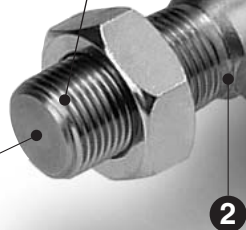
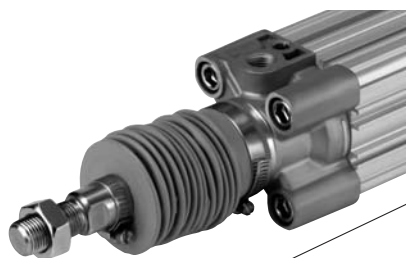


#### Non-rotating accuracy (mm)

| Bore size              | $\theta$        |
|------------------------|-----------------|
| $\phi 32$ to $\phi 63$ | $\pm 0.5^\circ$ |
| $\phi 80$ , $\phi 100$ | $\pm 0.3^\circ$ |



### New Standard type with rod boot specifications.

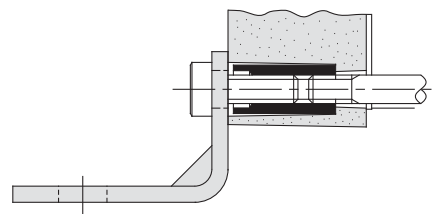


### Improved mounting accuracy

High accuracy covers and tie rod nuts simplify the mounting process and also extend cylinder life.

### Piston rod deflection reduced

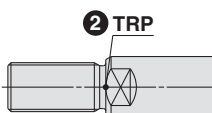
Deflection of the piston rod has been reduced by increasing the precision of the bushing and piston rod, and reducing the tolerances.



### [Differences between the CP96 and the CP95 series]

①  $\phi 25$  mm piston rod diameter for  $\phi 100$   
Conforming to German automobile association standard (VDA)

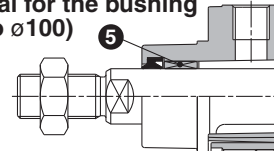
② Rod end nut can be screwed up to TRP.



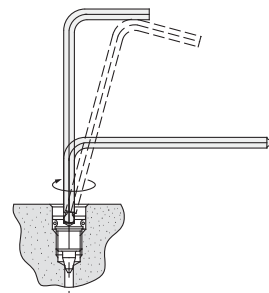
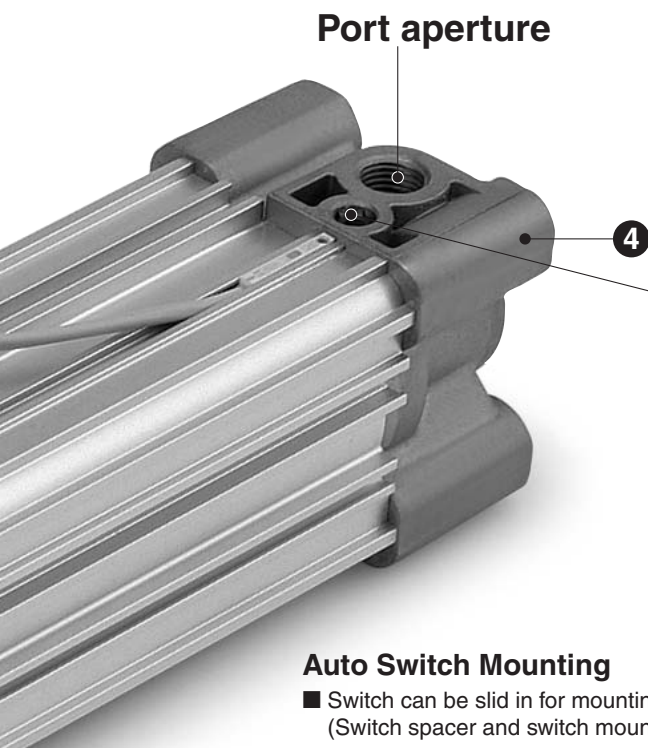
③ Tie-rod nuts changed to conform to the ISO 15552 standard ( $\phi 80$  to  $\phi 125$ )

④ Surface treatment painting is now avoided due to environmental concerns. Coating trivalent chromate only.

⑤ Uses an iron-based sintered material for the bushing ( $\phi 32$  to  $\phi 100$ )



ø32, ø40, ø50, ø63, ø80, ø100, ø125



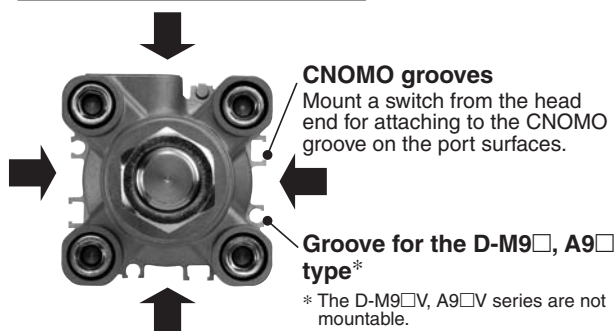
### Simple end of stroke cushion valve adjustment

Since the adjustment of the cushion valve is performed with a hex wrench key, even finite control can be easily accomplished. Furthermore, the cushion valve has been recessed so that it does not protrude from the cover.

### Auto Switch Mounting

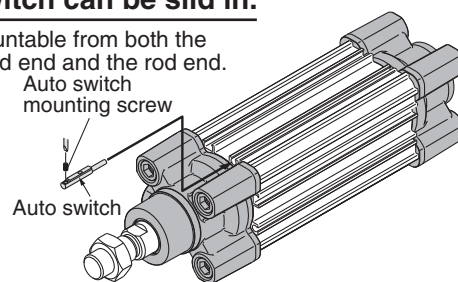
- Switch can be slid in for mounting.  
(Switch spacer and switch mounting bracket are required for the CP95.)
- SMC groove for M9, A9 switches and CNOMO groove are on all four sides.  
Max. four sides, Slide-in mountable

### Switch mounting surface



### Switch can be slid in.

Mountable from both the head end and the rod end.  
Auto switch mounting screw



## New Made to Order added !

Improvement in applications by made to order specifications.

| Symbol | Specifications                                                    | Standard type |            | Non-rotating rod type |            |
|--------|-------------------------------------------------------------------|---------------|------------|-----------------------|------------|
|        |                                                                   | Single rod    | Double rod | Single rod            | Double rod |
| -XA□   | Change of rod end shape                                           | ○             | ○          | —                     | —          |
| -XB6   | Heat resistant cylinder (−10 to 150°C)                            | ○             | ○          | —                     | —          |
| -XC4   | With heavy duty scraper                                           | ○             | ○          | —                     | —          |
| -XC7   | Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel | ○             | ○          | —                     | —          |
| -XC10  | Dual stroke cylinder/Double rod type                              | ○             | —          | —                     | —          |
| -XC11  | Dual stroke cylinder/Single rod type                              | ○             | —          | —                     | —          |
| -XC22  | Fluororubber seals                                                | ○             | ○          | —                     | —          |
| -XC35  | With coil scraper                                                 | ○             | ○          | —                     | —          |
| -XC68  | Made of stainless steel (With hard chrome plated piston rod)      | ○             | ○          | —                     | —          |

# ISO Cylinder: Standard Double Acting, Single/Double Rod Series **CP96** ø32, ø40, ø50, ø63, ø80, ø100, ø125

## How to Order

**With auto switch** **CP96SD B 32-100 J W-M9BW S-**

**Built-in magnet**

**Mounting**

|          |                       |
|----------|-----------------------|
| <b>B</b> | Basic/Without bracket |
| <b>L</b> | Axial foot            |
| <b>F</b> | Rod end flange        |
| <b>G</b> | Head end flange       |
| <b>C</b> | Single rear clevis    |
| <b>D</b> | Double rear clevis    |

**Bore size**

|            |        |
|------------|--------|
| <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 |
| <b>125</b> | 125 mm |

**Stroke (mm)**  
(Refer to "Standard Stroke" on page 6.)

**Rod boot**

|           |                                      |
|-----------|--------------------------------------|
| <b>-</b>  | Without 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**

|          |            |
|----------|------------|
| <b>-</b> | Single rod |
| <b>W</b> | Double rod |

**Number of auto switches**

|          |          |
|----------|----------|
| <b>-</b> | 2 pcs.   |
| <b>S</b> | 1 pc.    |
| <b>3</b> | 3 pcs.   |
| <b>n</b> | "n" pcs. |

**Auto switch**

|          |                     |
|----------|---------------------|
| <b>-</b> | Without auto switch |
|----------|---------------------|

**Made to Order**  
Refer to the page 6 for details.

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

## Applicable 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        |                   | 0.5<br>—             | 1<br>(M) | 3<br>(L) | 5<br>(Z) |                     |                 |    |            |    |   |
| Solid state switch | —                               | Grommet          | Yes             | 3-wire (NPN)           | 24 V         | 5 V, 12 V | —                 | M9N                  | ●        | ●        | ●        | ○                   | ○               | IC | Relay, PLC |    |   |
|                    |                                 |                  |                 | 3-wire (PNP)           |              | 12 V      |                   | M9P                  | ●        | ●        | ●        | ○                   | ○               |    |            |    |   |
|                    |                                 |                  |                 | 2-wire                 |              |           |                   | M9B                  | ●        | ●        | ●        | ○                   | ○               |    |            |    |   |
|                    | Diagnosis indication (2-colour) | Grommet          |                 | 3-wire (NPN)           | 24 V         | 5 V, 12 V |                   | —                    | M9NW     | ●        | ●        | ●                   | ○               | ○  |            | IC |   |
|                    |                                 |                  |                 | 3-wire (PNP)           |              | 12 V      |                   |                      | M9PW     | ●        | ●        | ●                   | ○               | ○  |            |    |   |
|                    |                                 |                  |                 | 2-wire                 |              |           |                   |                      | M9BW     | ●        | ●        | ●                   | ○               | ○  |            |    | — |
|                    | Water resistant (2-colour)      | Grommet          |                 | 3-wire (NPN)           | 24 V         | 5 V, 12 V |                   | —                    | M9NA**   | ○        | ○        | ●                   | ○               | ○  |            | IC |   |
|                    |                                 |                  |                 | 3-wire (PNP)           |              | 12 V      |                   |                      | M9PA**   | ○        | ○        | ●                   | ○               | ○  |            |    |   |
|                    |                                 |                  |                 | 2-wire                 |              |           |                   |                      | 12 V     | M9BA**   | ○        | ○                   | ●               | ○  |            |    | ○ |
|                    |                                 |                  |                 | 2-wire                 |              | 12 V      |                   |                      |          |          |          | ○                   | ○               | ●  |            |    | ○ |
| Reed switch        | —                               | Grommet          | Yes             | 3-wire (Equiv. to NPN) | —            | 5 V       | —                 | A96                  | ●        | —        | ●        | —                   | —               | IC | —          |    |   |
|                    |                                 |                  |                 | None                   | 24 V         | 12 V      | 100 V             | A93                  | ●        | —        | ●        | —                   | —               | —  | Relay, PLC |    |   |
|                    |                                 |                  | 100 V or less   |                        |              |           | A90               | ●                    | —        | ●        | —        | —                   | —               | IC |            |    |   |

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

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

\* Since there are other applicable auto switches than listed, refer to the auto switch guide.

\* For details about auto switches with pre-wired connector, refer to the auto switch guide.

\* D-A9□, M9□, M9□W, M9□AL are shipped together, (but not assembled).

(Switch mounting bracket is only assembled at the time of shipment.)

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

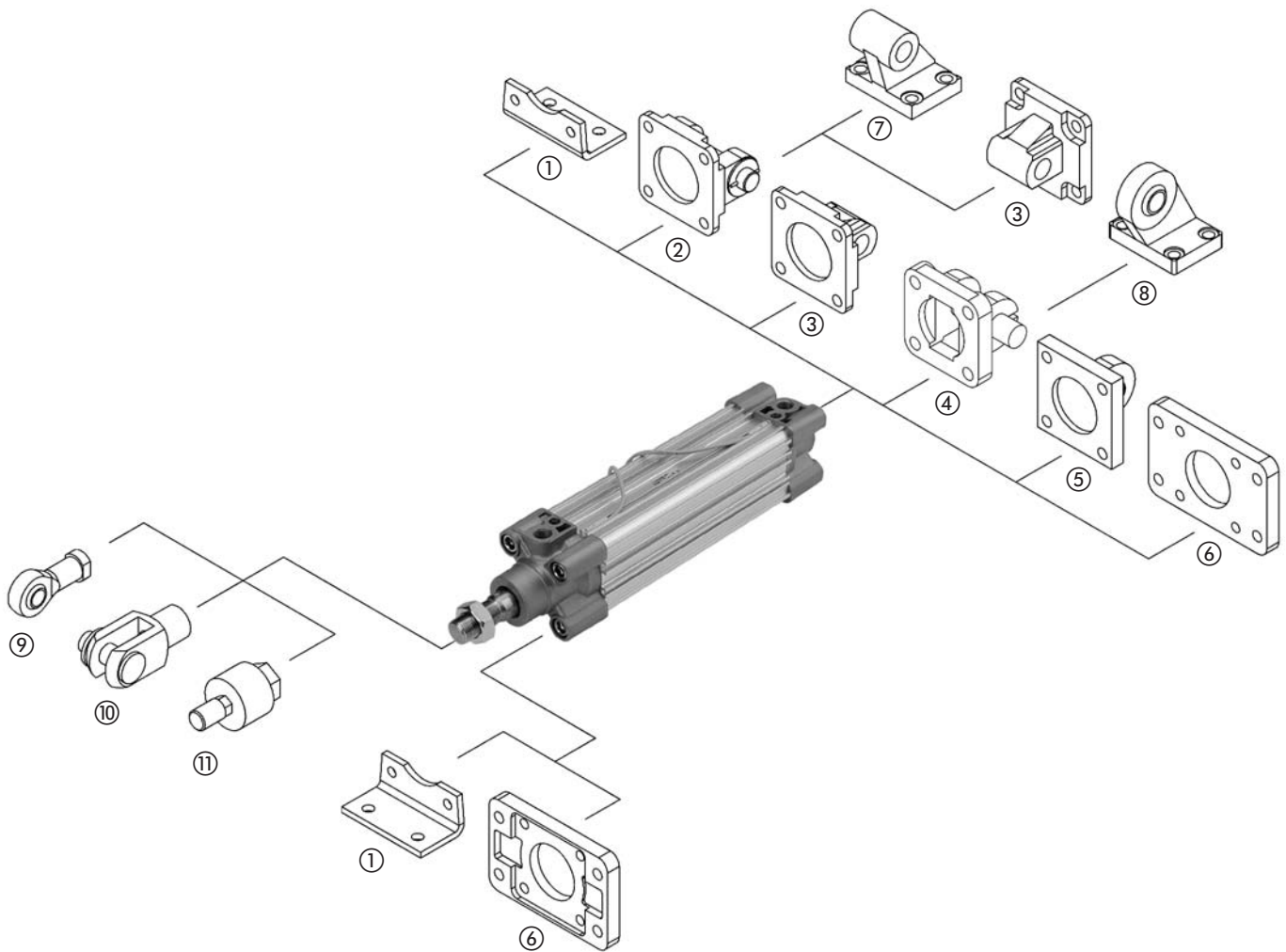
Consult with SMC regarding water resistant types with the above model numbers.

Note) D-Y59A, Y69A, Y7P, Y7□W, Z7□, Z80 type cannot be mounted on the CP96 series.

Moreover, D-M9□□ and A9□ type cannot be mounted on square groove of the CP96 series.

## Accessories

### Cylinder Mounting Accessories



| Bore size (mm) | ①                                               | ②                                                                                                          | ③                                                | ④                                                                                             | ⑤                                                                | ⑥                                               | ⑦                      | ⑧                                      | ⑨                                | ⑩                                                               | ⑪              |
|----------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------|------------------------|----------------------------------------|----------------------------------|-----------------------------------------------------------------|----------------|
|                | Foot<br>(Supplied with two pieces and 4 screws) | Female head end clevis<br>(Corresponds to E accessory)<br>(Supplied with bolt, safety device and 4 screws) | Male head end clevis<br>(Supplied with 4 screws) | Female head end clevis (for ES accessory)<br>(Supplied with bolt, safety device and 4 screws) | Male head end clevis with ball joint<br>(Supplied with 4 screws) | Rod/Head end flange<br>(Supplied with 4 screws) | Angled head end clevis | Angled head end clevis with ball joint | Piston rod ball joint (ISO 8139) | Rod clevis (ISO 8140)<br>(Supplied with bolt and safety device) | Floating joint |
| 32             | L5032                                           | D5032                                                                                                      | C5032                                            | DS5032                                                                                        | CS5032                                                           | F5032                                           | E5032                  | ES5032                                 | KJ10D                            | GKM10-20                                                        | JA30-10-125    |
| 40             | L5040                                           | D5040                                                                                                      | C5040                                            | DS5040                                                                                        | CS5040                                                           | F5040                                           | E5040                  | ES5040                                 | KJ12D                            | GKM12-24                                                        | JA40-12-125    |
| 50             | L5050                                           | D5050                                                                                                      | C5050                                            | DS5050                                                                                        | CS5050                                                           | F5050                                           | E5050                  | ES5050                                 | KJ16D                            | GKM16-32                                                        | JA50-16-150    |
| 63             | L5063                                           | D5063                                                                                                      | C5063                                            | DS5063                                                                                        | CS5063                                                           | F5063                                           | E5063                  | ES5063                                 | KJ16D                            | GKM16-32                                                        | JA50-16-150    |
| 80             | L5080                                           | D5080                                                                                                      | C5080                                            | DS5080                                                                                        | CS5080                                                           | F5080                                           | E5080                  | ES5080                                 | KJ20D                            | GKM20-40                                                        | JAH50-20-150   |
| 100            | L5100                                           | D5100                                                                                                      | C5100                                            | DS5100                                                                                        | CS5100                                                           | F5100                                           | E5100                  | ES5100                                 | KJ20D                            | GKM20-40                                                        | JAH50-20-150   |
| 125            | L5125                                           | D5125                                                                                                      | C5125                                            | DS5125                                                                                        | CS5125                                                           | F5125                                           | E5125                  | ES5125                                 | KJ27D                            | GKM30-54                                                        | JA125-27-200   |

CP96

CP96K

55-CP96

C96

C96K

C96Y

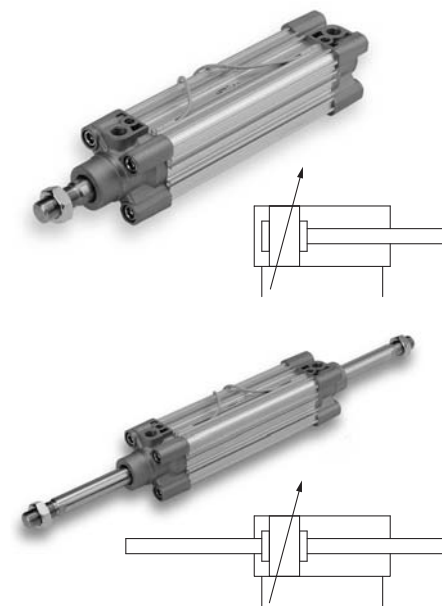
55-C96

Auto Switch

Simple Specials  
Made to Order

Precautions

# Series CP96



## Minimum Stroke for Auto Switch Mounting

Refer to page 19 for "Minimum Stroke for Auto Switch Mounting".



## Made to Order Specifications (For details, refer to pages 57 to 64.)

| Symbol | Specifications                                                     |
|--------|--------------------------------------------------------------------|
| -XA□   | Change of rod end shape                                            |
| -XB6   | Heat resistant cylinder (150°C)                                    |
| -XC4   | With heavy duty scraper                                            |
| -XC7   | Tie rod, cushion valve, tie rod nut, etc. made of stainless steel  |
| -XC10  | Dual stroke cylinder/Double rod                                    |
| -XC11  | Dual stroke cylinder/Single rod                                    |
| -XC22  | Fluororubber seals                                                 |
| -XC35  | With coil scraper                                                  |
| -XC68  | Made of stainless steel.<br>(With hard chromium plated piston rod) |

## Specifications

| Bore size (mm)                | 32                                                                                                                    | 40    | 50    | 63    | 80    | 100   | 125            |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|----------------|
| Action                        | Double acting                                                                                                         |       |       |       |       |       |                |
| Fluid                         | Air                                                                                                                   |       |       |       |       |       |                |
| Proof pressure                | 1.5 MPa                                                                                                               |       |       |       |       |       |                |
| Max. operating pressure       | 1.0 MPa                                                                                                               |       |       |       |       |       |                |
| Min. operating pressure       | 0.05 MPa                                                                                                              |       |       |       |       |       |                |
| Ambient and fluid temperature | Without auto switch: -20 to 70°C*<br>With auto switch: -10 to 60°C*                                                   |       |       |       |       |       |                |
| Lubrication                   | Not required (Non-lube)                                                                                               |       |       |       |       |       |                |
| Operating piston speed        | 50 to 1000 mm/s                                                                                                       |       |       |       |       |       | 50 to 700 mm/s |
| Allowable stroke tolerance    | Up to 250 st: $^{+1.0}_0$ , 251 to 1000 st: $^{+1.4}_0$ , 1001 to 1500 st: $^{+1.8}_0$ , 1501 to 2000 st: $^{+2.2}_0$ |       |       |       |       |       |                |
| Cushion                       | Both ends (Air cushion)                                                                                               |       |       |       |       |       |                |
| Port size                     | G 1/8                                                                                                                 | G 1/4 | G 1/4 | G 3/8 | G 3/8 | G 1/2 | G 1/2          |
| Mounting                      | Basic, Axial foot, Rod end flange,<br>Head end flange, Single clevis, Double clevis,<br>Centre trunnion               |       |       |       |       |       |                |

\* No freezing

## Standard Stroke

| Bore size (mm) | Standard stroke (mm)                                              | Max. stroke* |            |
|----------------|-------------------------------------------------------------------|--------------|------------|
|                |                                                                   | Single rod   | Double rod |
| 32             | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500                | 2000         | 1000       |
| 40             | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500                | 2000         |            |
| 50             | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600           | 2000         |            |
| 63             | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600           | 2000         |            |
| 80             | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600, 700, 800 | 2000         |            |
| 100            | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600, 700, 800 | 2000         |            |
| 125            | —                                                                 | 2000         |            |

Intermediate strokes are available.

\* Please consult with SMC for longer strokes.

\* ø125 and Double rod are produced upon receipt of order.

## Accessories

| Mounting |                       | Basic | Foot | Rod end flange | Head end flange | Single clevis | Double clevis | Centre trunnion |
|----------|-----------------------|-------|------|----------------|-----------------|---------------|---------------|-----------------|
| Standard | Rod end nut           | ●     | ●    | ●              | ●               | ●             | ●             | —               |
|          | Clevis pin            | —     | —    | —              | —               | —             | ●             | —               |
| Option   | Piston rod ball joint | ●     | ●    | ●              | ●               | ●             | ●             | —               |
|          | Rod clevis            | ●     | ●    | ●              | ●               | ●             | ●             | —               |
|          | Rod boot              | ●     | ●    | ●              | ●               | ●             | ●             | —               |

\* Please do not use a piston rod ball joint (or floating joint) together with a head end clevis with a ball joint (or angled head end clevis with a ball joint).

## X option combinations available to order

| Symbol                  | -XA□ | -XB6 <sup>Note 1)</sup> | -XC7 | -XC22 |
|-------------------------|------|-------------------------|------|-------|
| -XA□                    |      |                         |      |       |
| -XB6 <sup>Note 1)</sup> | ●    |                         |      |       |
| -XC7                    | ●    | ●                       |      |       |
| -XC22                   | ●    | —                       | ●    |       |
| -XC68                   | ●    | ●                       | ●    | ●     |

●: Combination possible to produce.

—: Combination not produced.

Note 1) Only for without magnet type.

If you want to order a combination of non Simple Special options, just add the X options by alphabetical order at the end of the part number, for example: XC7C22.

## Theoretical Output



| Bore size (mm) | Rod diameter (mm) | Operating direction | Piston area (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            | 25                | OUT                 | 7854                           | 1571                     | 2356 | 3142 | 3927 | 4712 | 5498 | 6283 | 7068  | 7854  |
|                |                   | IN                  | 7363                           | 1473                     | 2209 | 2945 | 3682 | 4418 | 5154 | 5890 | 6627  | 7363  |
| 125            | 32                | OUT                 | 12272                          | 2454                     | 3682 | 4909 | 6136 | 7363 | 8590 | 9817 | 11045 | 12272 |
|                |                   | IN                  | 11468                          | 2294                     | 3440 | 4587 | 5734 | 6881 | 8027 | 9174 | 10321 | 11468 |

Note) Theoretical out put (N) = Pressure (MPa) x Piston area (mm<sup>2</sup>)

## Weight (Single rod)

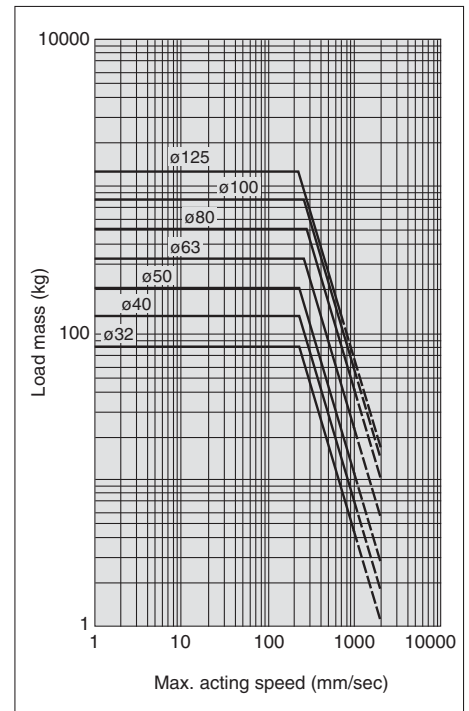
| Bore size (mm)                          |                   | 32   | 40   | 50   | 63   | 80   | 100  | 125  |
|-----------------------------------------|-------------------|------|------|------|------|------|------|------|
| Basic Weight                            | Basic             | 0.55 | 0.84 | 1.36 | 1.77 | 2.84 | 3.77 | 6.82 |
|                                         | Foot              | 0.16 | 0.20 | 0.38 | 0.46 | 0.89 | 1.09 | 2.60 |
|                                         | Flange            | 0.20 | 0.23 | 0.47 | 0.58 | 1.30 | 1.81 | 4.10 |
|                                         | Single clevis     | 0.16 | 0.23 | 0.37 | 0.60 | 1.07 | 1.73 | 4.15 |
|                                         | Double clevis     | 0.20 | 0.32 | 0.45 | 0.71 | 1.28 | 2.11 | 4.25 |
|                                         | Trunnion          | 0.71 | 1.10 | 1.73 | 2.48 | 4.25 | 5.95 | 2.98 |
| Additional Weight per each 50 mm stroke |                   |      |      |      |      |      |      |      |
| All mounting brackets                   |                   | 0.14 | 0.18 | 0.30 | 0.32 | 0.49 | 0.54 | 0.84 |
| Accessory                               | Single rod clevis | 0.07 | 0.11 | 0.22 |      | 0.40 |      | 1.20 |
|                                         | Double rod clevis | 0.09 | 0.15 | 0.34 |      | 0.69 |      | 1.84 |

Calculation: (Example) CP96SD40-100

- Basic Weight ..... 0.84 (kg) (Basic, ø40) • Mounting ..... 0.32 (kg) (Double clevis)
- Additional Weight .... 0.18 (kg/50 st)
- Cylinder stroke ..... 100 (st)

$$0.84 + 0.18 \times 100 \div 50 + 0.32 = 1.52 \text{ kg}$$

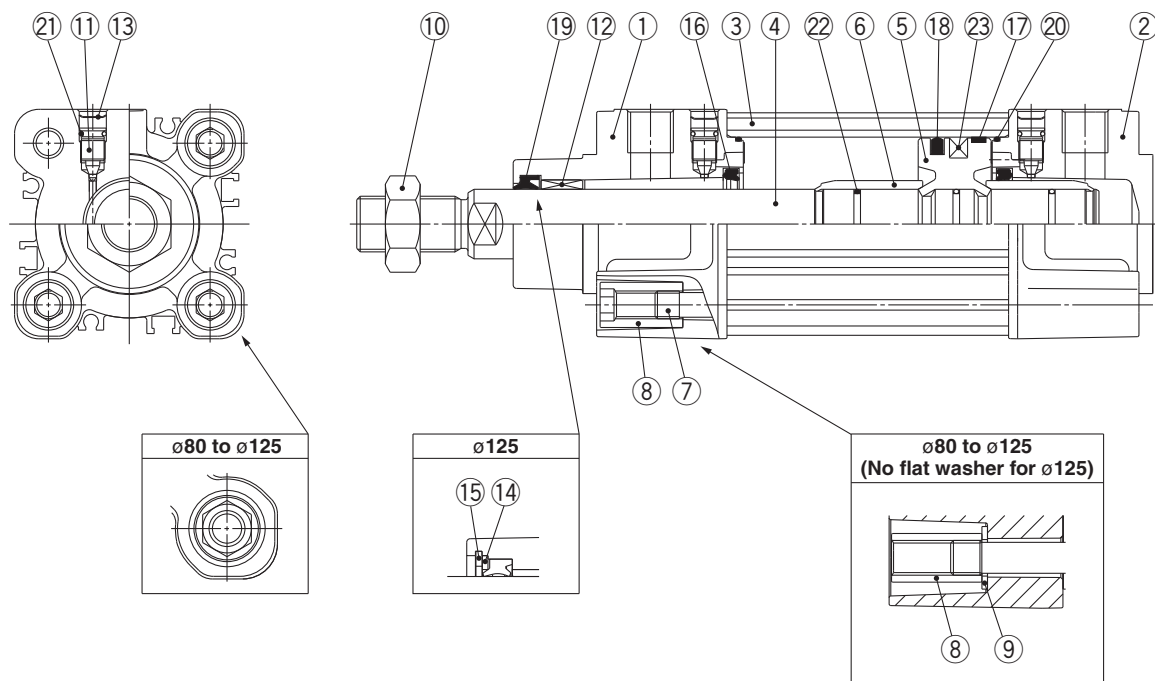
## Allowable Kinetic Energy



Example: Load limit at rod end when air cylinder ø63 is actuated with max. actuating speed 500 mm/s. See the intersection of lateral axis 500 mm/s and ø63 line, and extend the intersection to left. Thus, the allowable load is 80 kg.

## Construction

[First angle projection]



## Component Parts

| No. | Description          | Material             | Note         |
|-----|----------------------|----------------------|--------------|
| 1   | Rod cover            | Aluminium die-casted |              |
| 2   | Head cover           | Aluminium die-casted |              |
| 3   | Cylinder tube        | Aluminium alloy      |              |
| 4   | Piston rod           | Carbon steel         |              |
| 5   | Piston               | Aluminium alloy      |              |
| 6   | Cushion ring         | Aluminium alloy      |              |
| 7   | Tie-rod              | Carbon steel         |              |
| 8   | Tie-rod nut          | Steel                |              |
| 9   | Flat washer          | Steel                | ø80 and ø100 |
| 10  | Rod end nut          | Steel                |              |
| 11  | Cushion valve        | Steel wire           |              |
| 12  | Bushing              | Bearing alloy        |              |
| 13  | Snap ring            | Steel for spring     | ø40 to ø125  |
| 14  | Rod seal holder      | Stainless steel      | ø125         |
| 15  | Snap ring            | Steel for spring     | ø125         |
| 16  | Cushion seal         | Urethane rubber      |              |
| 17  | Wearing              | Resin                |              |
| 18  | Piston seal          | NBR                  |              |
| 19  | Rod seal             | NBR                  |              |
| 20  | Cylinder tube gasket | NBR                  |              |
| 21  | Cushion valve seal   | NBR                  |              |
| 22  | Piston gasket        | NBR                  |              |
| 23  | Magnet               |                      |              |

## Replacement Parts: Seal Kit/Single rod

| Bore size (mm) | Kit no.  | Contents                     |
|----------------|----------|------------------------------|
| 32             | CS95-32  | Kits include items 16 to 20. |
| 40             | CS95-40  |                              |
| 50             | CS95-50  |                              |
| 63             | CS95-63  |                              |
| 80             | CS95-80  |                              |
| 100            | CS96-100 |                              |
| 125            | CS96-125 |                              |

\* Seal kits consist of items 16 to 20 contained in one kit, and can be ordered using the number for each respective tube bore size.

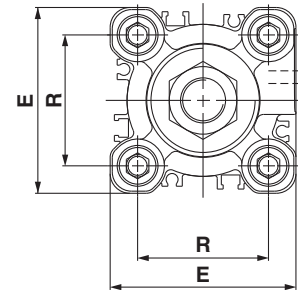
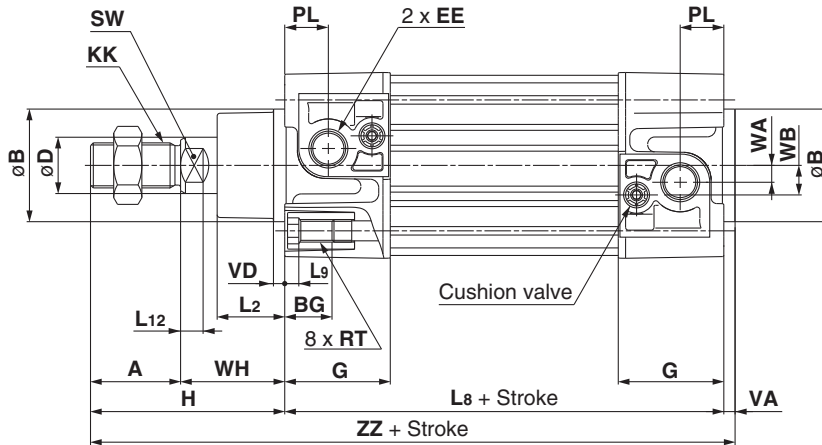
## Seal Kit/Double rod

| Bore size (mm) | Kit no.   | Contents                           |
|----------------|-----------|------------------------------------|
| 32             | CS95W-32  | Kits include items 16 and 18 to 20 |
| 40             | CS95W-40  |                                    |
| 50             | CS95W-50  |                                    |
| 63             | CS95W-63  |                                    |
| 80             | CS95W-80  |                                    |
| 100            | CS96W-100 |                                    |
| 125            | CS96W-125 |                                    |

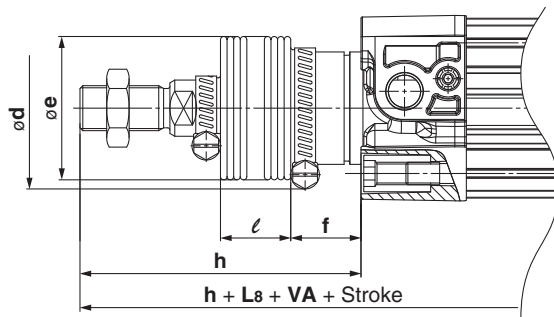
## Dimensions: Without Mounting Bracket

[First angle projection]

CP96S(D)B Bore size – Stroke



## With rod boot



| Bore size<br>(mm) | Stroke Range(mm) |               | A  | ØB<br>d11 | ØD | EE    | PL   | RT         | L12 | KK         | SW | G    | BG | L8  | VD | VA | WA   | WB   | WH | ZZ  | E   | R    |
|-------------------|------------------|---------------|----|-----------|----|-------|------|------------|-----|------------|----|------|----|-----|----|----|------|------|----|-----|-----|------|
|                   | Without rod boot | With rod boot |    |           |    |       |      |            |     |            |    |      |    |     |    |    |      |      |    |     |     |      |
| 32                | to 2000          | to 1000       | 22 | 30        | 12 | G 1/8 | 13   | M6 x 1     | 6   | M10 x 1.25 | 10 | 32   | 16 | 94  | 4  | 4  | 4    | 7    | 26 | 146 | 47  | 32.5 |
| 40                | to 2000          | to 1000       | 24 | 35        | 16 | G 1/4 | 14   | M6 x 1     | 6.5 | M12 x 1.25 | 13 | 37.5 | 16 | 105 | 4  | 4  | 5    | 9    | 30 | 163 | 54  | 38   |
| 50                | to 2000          | to 1000       | 32 | 40        | 20 | G 1/4 | 15.5 | M8 x 1.25  | 8   | M16 x 1.5  | 17 | 37.5 | 16 | 106 | 4  | 4  | 6    | 10.5 | 37 | 179 | 66  | 46.5 |
| 63                | to 2000          | to 1000       | 32 | 45        | 20 | G 3/8 | 16.5 | M8 x 1.25  | 8   | M16 x 1.5  | 17 | 45   | 16 | 121 | 4  | 4  | 9    | 12   | 37 | 194 | 77  | 56.5 |
| 80                | to 2000          | to 1000       | 40 | 45        | 25 | G 3/8 | 19   | M10 x 1.5  | 10  | M20 x 1.5  | 22 | 45   | 17 | 128 | 4  | 4  | 11.5 | 14   | 46 | 218 | 99  | 72   |
| 100               | to 2000          | to 1000       | 40 | 55        | 25 | G 1/2 | 19   | M10 x 1.5  | 10  | M20 x 1.5  | 22 | 50   | 17 | 138 | 4  | 4  | 17   | 15   | 51 | 233 | 118 | 89   |
| 125               | to 2000          | to 1000       | 54 | 60        | 32 | G 1/2 | 19   | M12 x 1.75 | 13  | M27 x 2    | 27 | 58   | 20 | 160 | 6  | 6  | 17   | 15   | 65 | 285 | 144 | 110  |

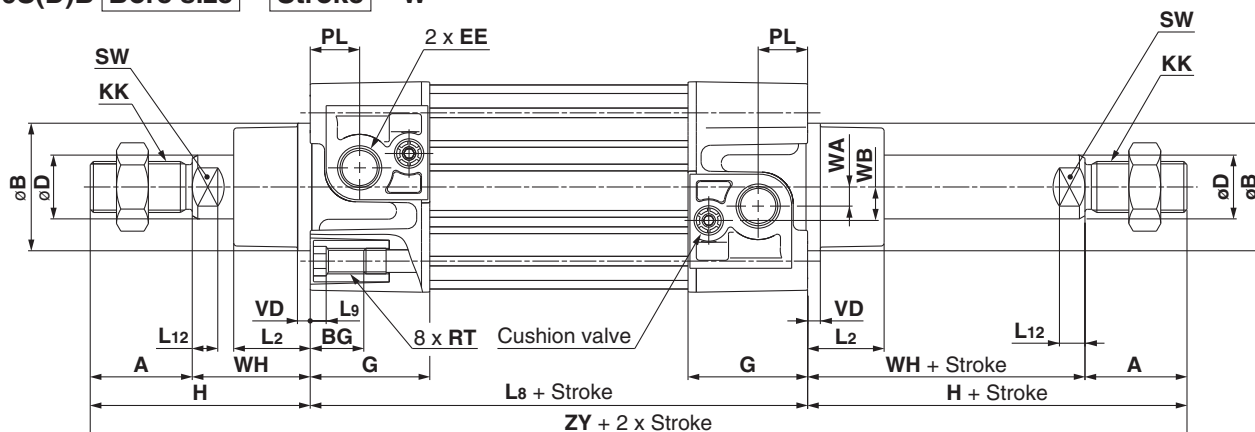
| Bore size<br>(mm) | L <sub>2</sub> | L <sub>9</sub> | H   | ød | øe | f  | ℓ       |           |            |            |            |            |            |            |            |            |            |             | h       |           |            |            |            |            |            |            |            |            |            |             |
|-------------------|----------------|----------------|-----|----|----|----|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
|                   |                |                |     |    |    |    | 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 | 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                | 15             | 4              | 48  | 54 | 36 | 23 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 75      | 88        | 100        | 113        | 138        | 163        | 188        | 213        | 238        | 263        | 288        | 313         |
| 40                | 17             | 4              | 54  | 54 | 36 | 23 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 75      | 88        | 100        | 113        | 138        | 163        | 188        | 213        | 238        | 263        | 288        | 313         |
| 50                | 24             | 5              | 69  | 64 | 51 | 25 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 87      | 100       | 112        | 125        | 150        | 175        | 200        | 225        | 250        | 275        | 300        | 325         |
| 63                | 24             | 5              | 69  | 64 | 51 | 25 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 87      | 100       | 112        | 125        | 150        | 175        | 200        | 225        | 250        | 275        | 300        | 325         |
| 80                | 30             | —              | 86  | 68 | 56 | 30 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 103     | 116       | 128        | 141        | 166        | 191        | 216        | 241        | 266        | 291        | 316        | 341         |
| 100               | 32             | —              | 91  | 76 | 56 | 32 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 103     | 116       | 128        | 141        | 166        | 191        | 216        | 241        | 266        | 291        | 316        | 341         |
| 125               | 40             | —              | 119 | 82 | 75 | 40 | 10      | 20        | 30         | 40         | 60         | 80         | 100        | 120        | 140        | 160        | 180        | 200         | 130     | 140       | 150        | 160        | 180        | 200        | 220        | 240        | 260        | 280        | 300        | 320         |

# Series CP96

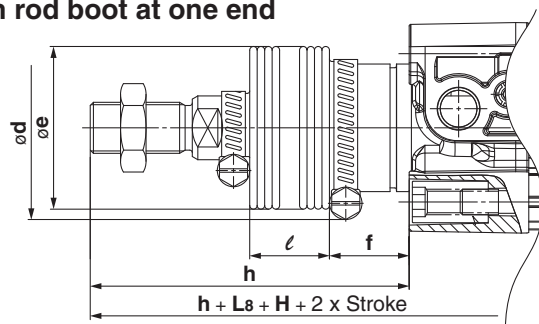
## Dimensions: Without Mounting Bracket

[First angle projection]

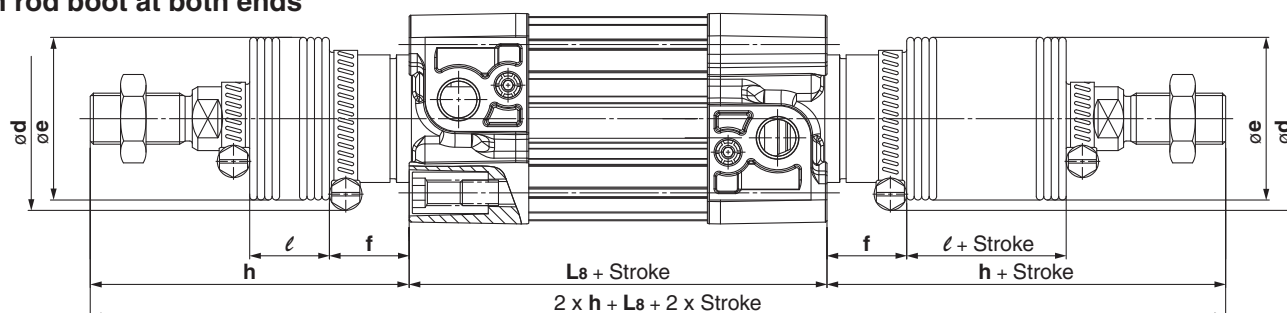
CP96S(D)B Bore size – Stroke W



### With rod boot at one end



### With rod boot at both ends



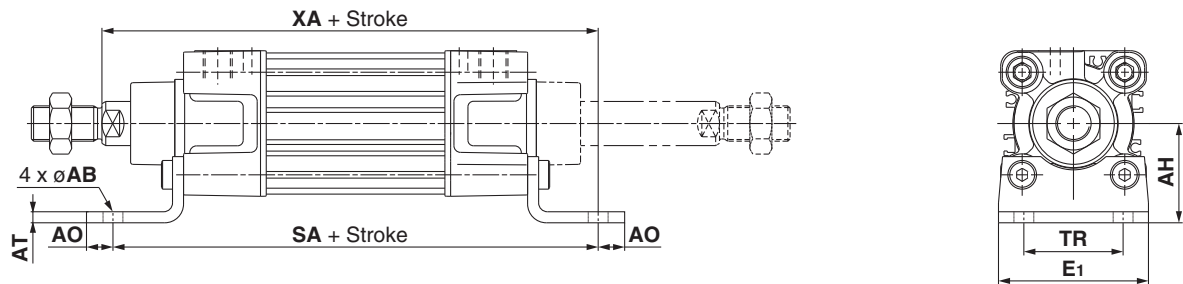
| Bore size<br>(mm) | Stroke Range<br>(mm) | A  | øB<br>d11 | øD | EE    | PL   | RT         | L12 | KK         | SW | G    | BG | L8  | VD | WA   | WB   | WH | ZY  | L2 | L9 |
|-------------------|----------------------|----|-----------|----|-------|------|------------|-----|------------|----|------|----|-----|----|------|------|----|-----|----|----|
| 32                | to 1000              | 22 | 30        | 12 | G 1/8 | 13   | M6 x 1     | 6   | M10 x 1.25 | 10 | 32   | 16 | 94  | 4  | 4    | 7    | 26 | 190 | 15 | 4  |
| 40                | to 1000              | 24 | 35        | 16 | G 1/4 | 14   | M6 x 1     | 6.5 | M12 x 1.25 | 13 | 37.5 | 16 | 105 | 4  | 5    | 9    | 30 | 213 | 17 | 4  |
| 50                | to 1000              | 32 | 40        | 20 | G 1/4 | 15.5 | M8 x 1.25  | 8   | M16 x 1.5  | 17 | 37.5 | 16 | 106 | 4  | 6    | 10.5 | 37 | 244 | 24 | 5  |
| 63                | to 1000              | 32 | 45        | 20 | G 3/8 | 16.5 | M8 x 1.25  | 8   | M16 x 1.5  | 17 | 45   | 16 | 121 | 4  | 9    | 12   | 37 | 259 | 24 | 5  |
| 80                | to 1000              | 40 | 45        | 25 | G 3/8 | 19   | M10 x 1.5  | 10  | M20 x 1.5  | 22 | 45   | 17 | 128 | 4  | 11.5 | 14   | 46 | 300 | 30 | —  |
| 100               | to 1000              | 40 | 55        | 25 | G 1/2 | 19   | M10 x 1.5  | 10  | M20 x 1.5  | 22 | 50   | 17 | 138 | 4  | 17   | 15   | 51 | 320 | 32 | —  |
| 125               | to 1000              | 54 | 60        | 32 | G 1/2 | 19   | M12 x 1.75 | 13  | M27 x 2    | 27 | 58   | 20 | 160 | 6  | 17   | 15   | 65 | 398 | 40 | —  |

| Bore size<br>(mm) | H   | ød | øe | f  | ℓ       |           |            |            |            |            |            |            |            |            |            |             | 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 | 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                | 48  | 54 | 36 | 23 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 75      | 88        | 100        | 113        | 138        | 163        | 188        | 213        | 238        | 263        | 288        | 313         |
| 40                | 54  | 54 | 36 | 23 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 75      | 88        | 100        | 113        | 138        | 163        | 188        | 213        | 238        | 263        | 288        | 313         |
| 50                | 69  | 64 | 51 | 25 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 87      | 100       | 112        | 125        | 150        | 175        | 200        | 225        | 250        | 275        | 300        | 325         |
| 63                | 69  | 64 | 51 | 25 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 87      | 100       | 112        | 125        | 150        | 175        | 200        | 225        | 250        | 275        | 300        | 325         |
| 80                | 86  | 68 | 56 | 30 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 103     | 116       | 128        | 141        | 166        | 191        | 216        | 241        | 266        | 291        | 316        | 341         |
| 100               | 91  | 76 | 56 | 32 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 103     | 116       | 128        | 141        | 166        | 191        | 216        | 241        | 266        | 291        | 316        | 341         |
| 125               | 119 | 82 | 75 | 40 | 10      | 20        | 30         | 40         | 60         | 80         | 100        | 120        | 140        | 160        | 180        | 200         | 130     | 140       | 150        | 160        | 180        | 200        | 220        | 240        | 260        | 280        | 300        | 320         |

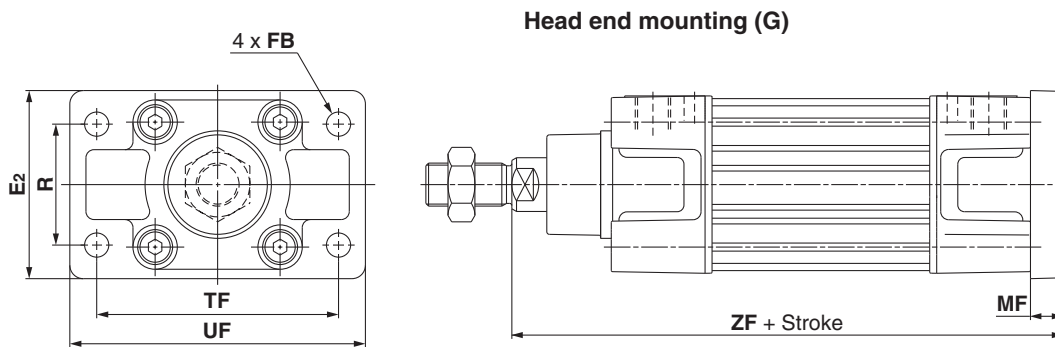
## Dimensions: Cylinder Mounting Accessories (L/F/G/C/D)

[First angle projection]

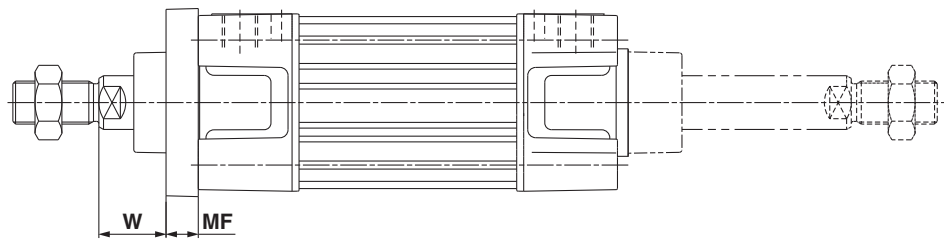
### Mounting (L)



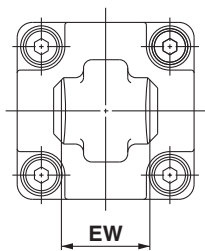
### Mounting (F/G)



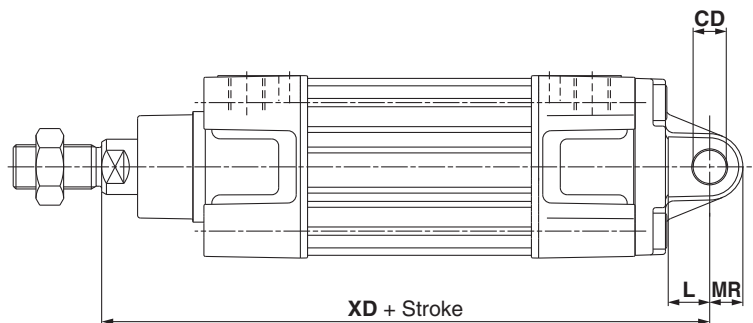
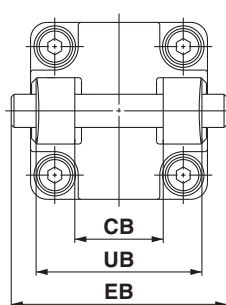
### Rod end mounting (F)



### Mounting (C)



### Mounting (D)

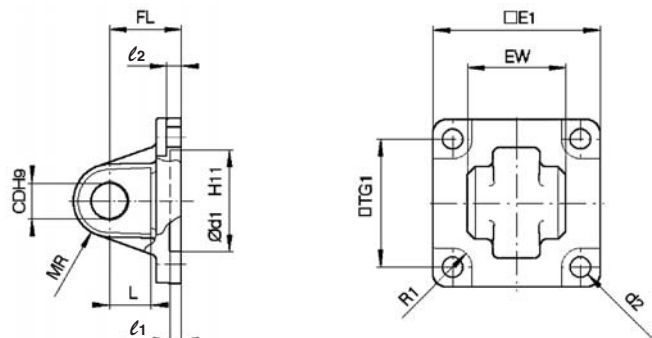


| Bore size<br>(mm) | E <sub>1</sub> | TR | AH | AO         | AT  | φAB  | SA  | XA  | R  | TF  | φFB | E <sub>2</sub> | UF          | W  | MF | ZF  | UB<br>h14 | CB<br>H14 | EW          | φCD<br>H9 | L          | MR         | XD  | EB          |
|-------------------|----------------|----|----|------------|-----|------|-----|-----|----|-----|-----|----------------|-------------|----|----|-----|-----------|-----------|-------------|-----------|------------|------------|-----|-------------|
| 32                | 48             | 32 | 32 | 10         | 4.5 | 7    | 142 | 144 | 32 | 64  | 7   | 50             | 79          | 16 | 10 | 130 | 45        | 26        | 26-0.2/-0.6 | 10        | 12         | 9.5        | 142 | 65          |
| 40                | 55             | 36 | 36 | 11         | 4.5 | 10   | 161 | 163 | 36 | 72  | 9   | 55             | 90          | 20 | 10 | 145 | 52        | 28        | 28-0.2/-0.6 | 12        | 15         | 12         | 160 | 75          |
| 50                | 68             | 45 | 45 | 12         | 5.5 | 10   | 170 | 175 | 45 | 90  | 9   | 70             | 110         | 25 | 12 | 155 | 60        | 32        | 32-0.2/-0.6 | 12        | 15         | 12         | 170 | 80          |
| 63                | 80             | 50 | 50 | 12         | 5.5 | 10   | 185 | 190 | 50 | 100 | 9   | 80             | 120         | 25 | 12 | 170 | 70        | 40        | 40-0.2/-0.6 | 16        | 20         | 16         | 190 | 90          |
| 80                | 100            | 63 | 63 | 14         | 6.5 | 12   | 210 | 215 | 63 | 126 | 12  | 100            | 153         | 30 | 16 | 190 | 90        | 50        | 50-0.2/-0.6 | 16        | 20         | 16         | 210 | 110         |
| 100               | 120            | 75 | 71 | 16         | 6.5 | 14.5 | 220 | 230 | 75 | 150 | 14  | 120            | 178         | 35 | 16 | 205 | 110       | 60        | 60-0.2/-0.6 | 20        | 25         | 20         | 230 | 140         |
| 125               | Max.<br>157    | 90 | 90 | Max.<br>25 | 8   | 16   | 250 | 270 | 90 | 180 | 16  | Max.<br>157    | Max.<br>224 | 45 | 20 | 245 | 130       | 70        | 70-0.5/-1.2 | 25        | Min.<br>30 | Max.<br>26 | 275 | Max.<br>157 |

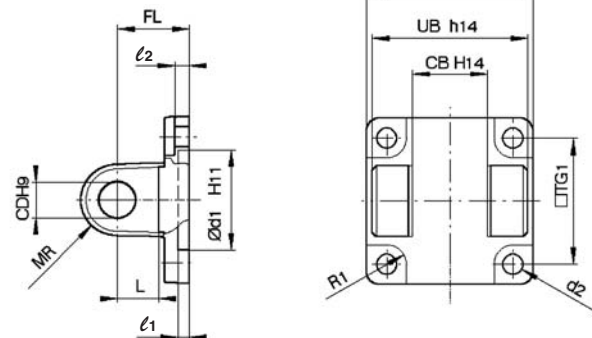
## Dimensions: Cylinder Mounting Accessories (C/D/E/CS)

[First angle projection]

### Mounting (C)

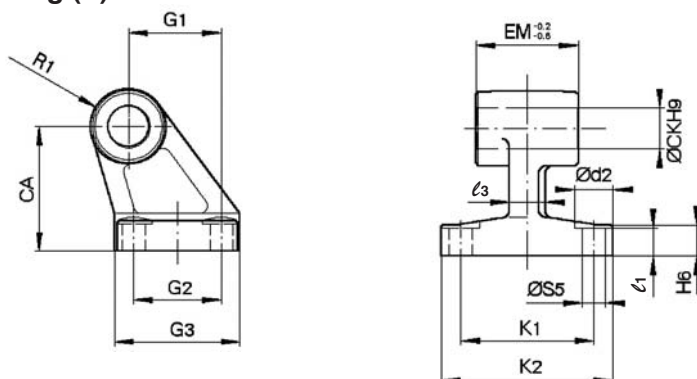


### Mounting (D)



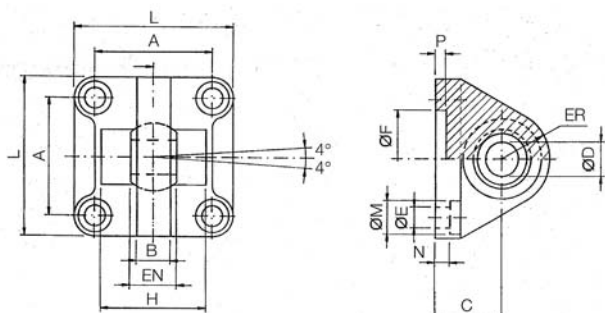
| Bore size (mm) | E1       | EW                                 | TG1  | FL | l1 | L  | l2  | Ød1 | ØCD | MR  | Ød2  | R1  | E2       | UB  | CB |
|----------------|----------|------------------------------------|------|----|----|----|-----|-----|-----|-----|------|-----|----------|-----|----|
| 32             | 45       | 26 <sup>-0.2</sup> <sub>-0.6</sub> | 32.5 | 22 | 5  | 12 | 5.5 | 30  | 10  | 9.5 | 6.6  | 6.5 | 48       | 45  | 26 |
| 40             | 51       | 28 <sup>-0.2</sup> <sub>-0.6</sub> | 38   | 25 | 5  | 15 | 5.5 | 35  | 12  | 12  | 6.6  | 6.5 | 56       | 52  | 28 |
| 50             | 64       | 32 <sup>-0.2</sup> <sub>-0.6</sub> | 46.5 | 27 | 5  | 15 | 6.5 | 40  | 12  | 12  | 9    | 8.5 | 64       | 60  | 32 |
| 63             | 74       | 40 <sup>-0.2</sup> <sub>-0.6</sub> | 56.5 | 32 | 5  | 20 | 6.5 | 45  | 16  | 16  | 9    | 8.5 | 75       | 70  | 40 |
| 80             | 94       | 50 <sup>-0.2</sup> <sub>-0.6</sub> | 72   | 36 | 5  | 20 | 10  | 45  | 16  | 16  | 11   | 11  | 95       | 90  | 50 |
| 100            | 113      | 60 <sup>-0.2</sup> <sub>-0.6</sub> | 89   | 41 | 5  | 25 | 10  | 55  | 20  | 20  | 11   | 12  | 115      | 110 | 60 |
| 125            | Max. 157 | 70 <sup>-0.5</sup> <sub>-1.2</sub> | 110  | 50 | 7  | 30 | 10  | 60  | 25  | 26  | 13.5 | 10  | Max. 157 | 130 | 70 |

### Mounting (E)



| Bore size (mm) | Ød2 | ØCK | ØS5 | K1 | K2 max. | l3 max. | G1 | l1   | G2 | EM                                 | G3 max. | CA | H6 | R1   |
|----------------|-----|-----|-----|----|---------|---------|----|------|----|------------------------------------|---------|----|----|------|
| 32             | 11  | 10  | 6.6 | 38 | 51      | 10      | 21 | 7    | 18 | 26 <sup>-0.2</sup> <sub>-0.6</sub> | 31      | 32 | 8  | 10   |
| 40             | 11  | 12  | 6.6 | 41 | 54      | 10      | 24 | 9    | 22 | 28 <sup>-0.2</sup> <sub>-0.6</sub> | 35      | 36 | 10 | 11   |
| 50             | 15  | 12  | 9   | 50 | 65      | 12      | 33 | 11   | 30 | 32 <sup>-0.2</sup> <sub>-0.6</sub> | 45      | 45 | 12 | 12   |
| 63             | 15  | 16  | 9   | 52 | 67      | 14      | 37 | 11   | 35 | 40 <sup>-0.2</sup> <sub>-0.6</sub> | 50      | 50 | 12 | 15   |
| 80             | 18  | 16  | 11  | 66 | 86      | 18      | 47 | 12.5 | 40 | 50 <sup>-0.2</sup> <sub>-0.6</sub> | 60      | 63 | 14 | 15   |
| 100            | 18  | 20  | 11  | 76 | 96      | 20      | 55 | 13.5 | 50 | 60 <sup>-0.2</sup> <sub>-0.6</sub> | 70      | 71 | 15 | 19   |
| 125            | 20  | 25  | 14  | 94 | 124     | 30      | 70 | 17   | 60 | 70 <sup>-0.5</sup> <sub>-1.5</sub> | 90      | 90 | 20 | 22.5 |

### Mounting (CS): Head end clevis with ball joint



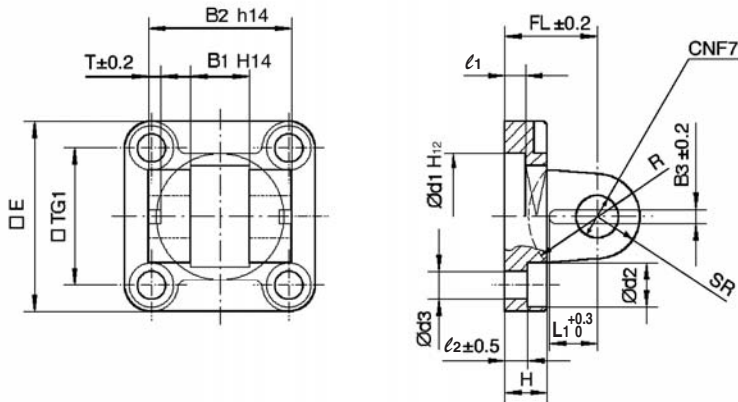
| Bore size (mm) | A    | B max. | C  | ØD H7 | EN 0 -0.1 | ER max. | ØF H11 | ØE   | L   | ØM   | N   | P | H ±0.5 |
|----------------|------|--------|----|-------|-----------|---------|--------|------|-----|------|-----|---|--------|
| 32             | 32.5 | 10.5   | 22 | 10    | 14        | 15      | 30     | 6.6  | 45  | 10.5 | 5.5 | 5 | —      |
| 40             | 38   | 12     | 25 | 12    | 16        | 18      | 35     | 6.6  | 55  | 11   | 5.5 | 5 | —      |
| 50             | 46.5 | 15     | 27 | 16    | 21        | 20      | 40     | 9    | 65  | 15   | 6.5 | 5 | 51     |
| 63             | 56.5 | 15     | 32 | 16    | 21        | 23      | 45     | 9    | 75  | 15   | 6.5 | 5 | —      |
| 80             | 72   | 18     | 36 | 20    | 25        | 27      | 45     | 11   | 95  | 18   | 10  | 5 | 70     |
| 100            | 89   | 18     | 41 | 20    | 25        | 30      | 55     | 11   | 115 | 18   | 10  | 5 | —      |
| 125            | 110  | 25     | 50 | 30    | 37        | 40      | 60     | 13.5 | 140 | 20   | 10  | 7 | 100    |

\* Black colour

## Dimensions: Cylinder Mounting Accessories (DS/ES)

[First angle projection]

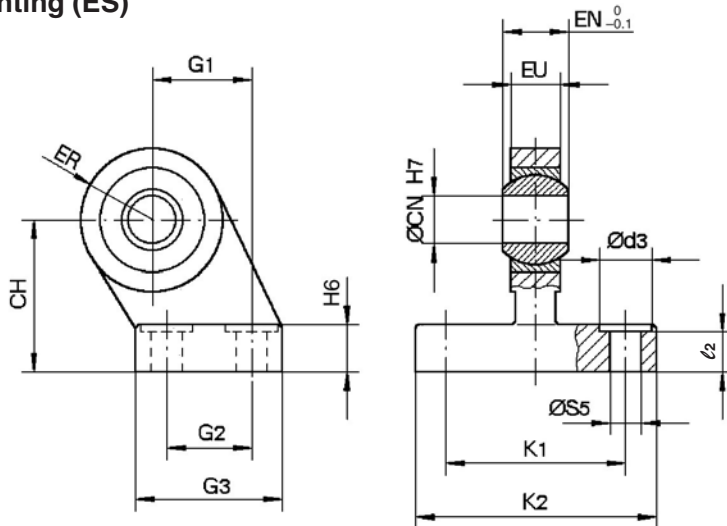
### Mounting (DS)



| Bore size (mm) | E   | B1 | B2 | B3  | L1   | TG1  | T | $\ell_1$ min. | $\ell_2$ | FL | H max. | Ød1 | Ød2  | Ød3  | ØCN | SR max. | R  |
|----------------|-----|----|----|-----|------|------|---|---------------|----------|----|--------|-----|------|------|-----|---------|----|
| 32             | 45  | 14 | 34 | 3.3 | 11.5 | 32.5 | 3 | 5             | 5.5      | 22 | 10     | 30  | 10.5 | 6.6  | 10  | 11      | 17 |
| 40             | 55  | 16 | 40 | 4.3 | 12   | 38   | 4 | 5             | 5.5      | 25 | 10     | 35  | 11   | 6.6  | 12  | 13      | 20 |
| 50             | 65  | 21 | 45 | 4.3 | 14   | 46.5 | 4 | 5             | 6.5      | 27 | 12     | 40  | 15   | 9    | 16  | 18      | 22 |
| 63             | 75  | 21 | 51 | 4.3 | 14   | 56.5 | 4 | 5             | 6.5      | 32 | 12     | 45  | 15   | 9    | 16  | 18      | 25 |
| 80             | 95  | 25 | 65 | 4.3 | 16   | 72   | 4 | 5             | 10       | 36 | 16     | 45  | 18   | 11   | 20  | 22      | 30 |
| 100            | 115 | 25 | 75 | 6.3 | 16   | 89   | 4 | 5             | 10       | 41 | 16     | 55  | 18   | 11   | 20  | 22      | 32 |
| 125            | 140 | 37 | 97 | 6.3 | 24   | 110  | 6 | 7             | 10       | 50 | 20     | 60  | 20   | 13.5 | 30  | 30      | 42 |

\* Black colour

### Mounting (ES)



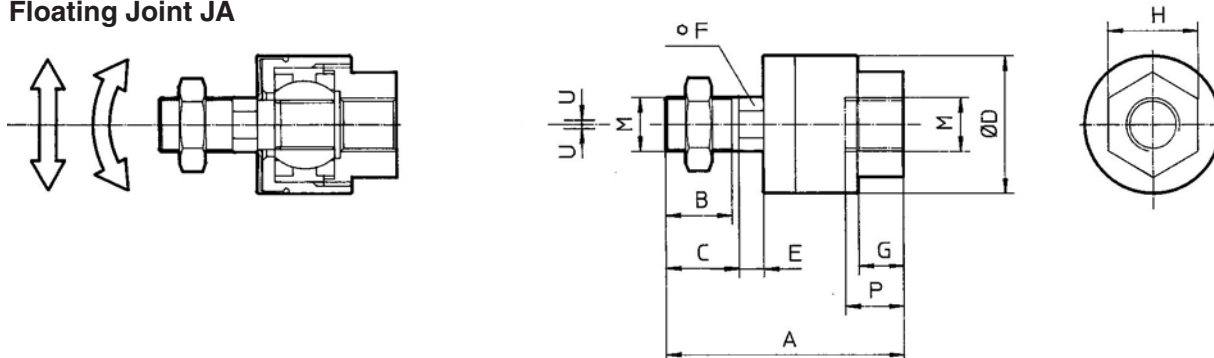
| Bore size (mm) | Ød3 | ØCN | ØS5  | K1 | K2 max. | $\ell_2$ | G1 | G2 | G3 max. | EN | EU   | CH | H6 | ER max. |
|----------------|-----|-----|------|----|---------|----------|----|----|---------|----|------|----|----|---------|
| 32             | 11  | 10  | 6.6  | 38 | 51      | 8.5      | 21 | 18 | 31      | 14 | 10.5 | 32 | 10 | 15      |
| 40             | 11  | 12  | 6.6  | 41 | 54      | 8.5      | 24 | 22 | 35      | 16 | 12   | 36 | 10 | 18      |
| 50             | 15  | 16  | 9    | 50 | 65      | 10.5     | 33 | 30 | 45      | 21 | 15   | 45 | 12 | 20      |
| 63             | 15  | 16  | 9    | 52 | 67      | 10.5     | 37 | 35 | 50      | 21 | 15   | 50 | 12 | 23      |
| 80             | 18  | 20  | 11   | 66 | 86      | 11.5     | 47 | 40 | 60      | 25 | 18   | 63 | 14 | 27      |
| 100            | 18  | 20  | 11   | 76 | 96      | 12.5     | 55 | 50 | 70      | 25 | 18   | 71 | 15 | 30      |
| 125            | 20  | 30  | 13.5 | 94 | 124     | 17       | 70 | 60 | 90      | 37 | 25   | 90 | 20 | 40      |

\* Black colour

## Dimensions: Piston Rod Mounting Accessories

[First angle projection]

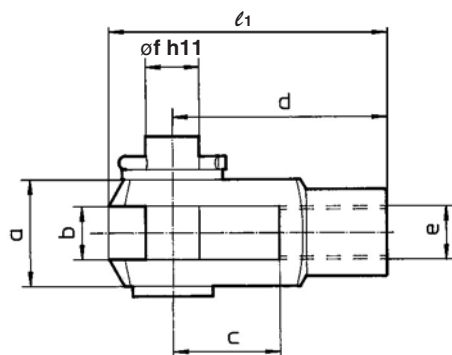
### Floating Joint JA



| Bore size (mm) | M          | Part no.     | A    | B    | C  | ØD   | E    | F  | G    | H  | P  | U    | Load (kN) | Weight (g) | Angle |
|----------------|------------|--------------|------|------|----|------|------|----|------|----|----|------|-----------|------------|-------|
| 32             | M10 x 1.25 | JA30-10-125  | 49.5 | 19.5 | —  | 24   | 5    | 8  | 8    | 17 | 9  | 0.5  | 2.5       | 70         | ±5°   |
| 40             | M12 x 1.25 | JA40-12-125  | 60   | 20   | —  | 31   | 6    | 11 | 11   | 22 | 13 | 0.75 | 4.4       | 160        |       |
| 50, 63         | M16 x 1.5  | JA50-16-150  | 71.5 | 22   | —  | 41   | 7.5  | 14 | 13.5 | 27 | 15 | 1    | 11        | 300        |       |
| 80, 100        | M20 x 1.5  | JAH50-20-150 | 101  | 28   | 31 | 59.5 | 11.5 | 24 | 16   | 32 | 18 | 2    | 18        | 1080       |       |
| 125            | M27 x 2    | JA125-27-200 | 123  | 34   | 38 | 66   | 13   | 27 | 20   | 41 | 24 | 2    | 28        | 1500       |       |

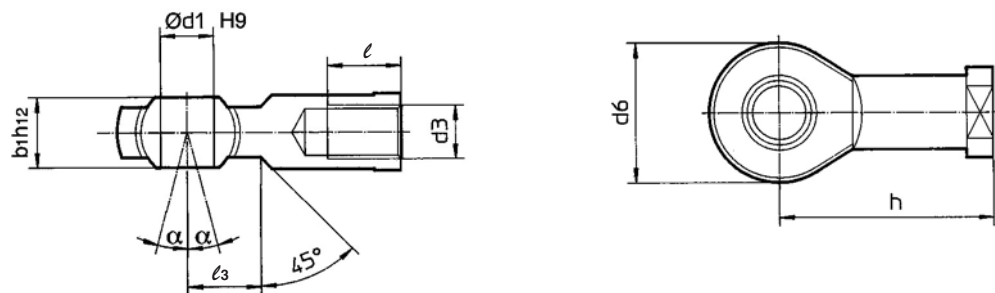
\* Black colour

### Rod Clevis GKM (ISO 8140), Supplied with Bolt and Safety Device



| Bore size (mm) | e          | Part no. | b                                   | d   | Øf h11 (Shaft) | Øf H9 (Hole) | ℓ1  | c min. | a max. |
|----------------|------------|----------|-------------------------------------|-----|----------------|--------------|-----|--------|--------|
| 32             | M10 x 1.25 | GKM10-20 | 10 <sup>+0.5</sup> <sub>+0.15</sub> | 40  | 10             | 10           | 52  | 20     | 20     |
| 40             | M12 x 1.25 | GKM12-24 | 12 <sup>+0.5</sup> <sub>+0.15</sub> | 48  | 12             | 12           | 62  | 24     | 24     |
| 50, 63         | M16 x 1.5  | GKM16-32 | 16 <sup>+0.5</sup> <sub>+0.15</sub> | 64  | 16             | 16           | 83  | 32     | 32     |
| 80, 100        | M20 x 1.5  | GKM20-40 | 20 <sup>+0.5</sup> <sub>+0.15</sub> | 80  | 20             | 20           | 105 | 40     | 40     |
| 125            | M27 x 2    | GKM30-54 | 30 <sup>+0.5</sup> <sub>+0.15</sub> | 110 | 30             | 30           | 148 | 54     | 55     |

### Piston Rod Ball Joint KJ (ISO 8139)



| Bore size (mm) | d3         | Part no. | Ød1 H9 | h   | d6 max. | b1 h12 | ℓ min. | α  | ℓ3 |
|----------------|------------|----------|--------|-----|---------|--------|--------|----|----|
| 32             | M10 x 1.25 | KJ10D    | 10     | 43  | 28      | 14     | 20     | 4° | 15 |
| 40             | M12 x 1.25 | KJ12D    | 12     | 50  | 32      | 16     | 22     | 4° | 17 |
| 50, 63         | M16 x 1.5  | KJ16D    | 16     | 64  | 42      | 21     | 28     | 4° | 23 |
| 80, 100        | M20 x 1.5  | KJ20D    | 20     | 77  | 50      | 25     | 33     | 4° | 27 |
| 125            | M27 x 2    | KJ27D    | 30     | 110 | 70      | 37     | 51     | 4° | 36 |

# ISO Cylinder: Non-rotating Rod Type

## Double Acting, Single/Double Rod

# Series *CP96K*

ø32, ø40, ø50, ø63, ø80, ø100

### How to Order

With auto switch

**CP96KD B 32 - 100 W - M9BW S**

Built-in magnet

Mounting

|          |                       |
|----------|-----------------------|
| <b>B</b> | Basic/Without bracket |
| <b>L</b> | Axial foot            |
| <b>F</b> | Rod end flange        |
| <b>G</b> | Head end flange       |
| <b>C</b> | Single rear clevis    |
| <b>D</b> | Double rear clevis    |

Bore size

|            |        |
|------------|--------|
| <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 |

Number of auto switches

|          |          |
|----------|----------|
| —        | 2 pcs.   |
| <b>S</b> | 1 pc.    |
| <b>3</b> | 3 pcs.   |
| <b>n</b> | "n" pcs. |

Auto switch

— Without auto switch

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

Rod

|          |            |
|----------|------------|
| —        | Single rod |
| <b>W</b> | Double rod |

Stroke (mm)

(Refer to "Maximum Stroke" on page 16.)

### Applicable Auto Switches/Tie-rod Mounting

| 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        |                   | 0.5 (—)              | 1 (M) | 3 (L) | 5 (Z) |                     |                 |    |            |
| Solid state switch | —                               | Grommet          | Yes             | 3-wire (NPN)               | 24 V         | 5 V, 12 V | —                 | M9N                  | ●     | ●     | ●     | ○                   | ○               | IC | Relay, PLC |
|                    | Diagnosis indication (2-colour) | Grommet          |                 | 3-wire (PNP)               |              | 12 V      |                   | M9P                  | ●     | ●     | ●     | ○                   | ○               |    |            |
|                    |                                 |                  |                 | 2-wire                     |              |           |                   | M9B                  | ●     | ●     | ●     | ○                   | ○               |    |            |
|                    |                                 |                  |                 | 3-wire (NPN)               | 5 V, 12 V    | M9NW      |                   | ●                    | ●     | ●     | ○     | ○                   | IC              |    |            |
|                    |                                 |                  |                 | 3-wire (PNP)               |              | M9PW      |                   | ●                    | ●     | ●     | ○     | ○                   |                 |    |            |
|                    |                                 |                  |                 | Water resistant (2-colour) | Grommet      | 2-wire    |                   | 12 V                 | M9BW  | ●     | ●     | ●                   | ○               | ○  |            |
|                    | 3-wire (NPN)                    | 5 V, 12 V        |                 |                            |              | M9NA**    |                   | ○                    | ○     | ●     | ○     | ○                   | IC              |    |            |
|                    | 3-wire (PNP)                    |                  |                 |                            |              | M9PA**    |                   | ○                    | ○     | ●     | ○     | ○                   |                 |    |            |
|                    | 2-wire                          | 12 V             |                 | M9BA**                     | ○            | ○         |                   | ●                    | ○     | ○     | —     |                     |                 |    |            |
| Reed switch        | —                               | Grommet          | Yes             | 3-wire (Equiv. to NPN)     | —            | 5 V       | —                 | A96                  | ●     | —     | ●     | —                   | —               | IC | Relay, PLC |
|                    |                                 |                  |                 | None                       | 2-wire       | 24 V      | 12 V              | 100 V                | A93   | ●     | —     | ●                   | —               | —  |            |
|                    |                                 |                  | 100 V or less   |                            |              |           |                   | A90                  | ●     | —     | ●     | —                   | —               | —  |            |

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

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

\* Since there are other applicable auto switches than listed, refer to the auto switch guide.

\* For details about auto switches with pre-wired connector, refer to the auto switch guide.

\* D-A9□, M9□, M9□W, M9□AL are shipped together, (but not assembled).

(Switch mounting bracket is only assembled at the time of shipment.)

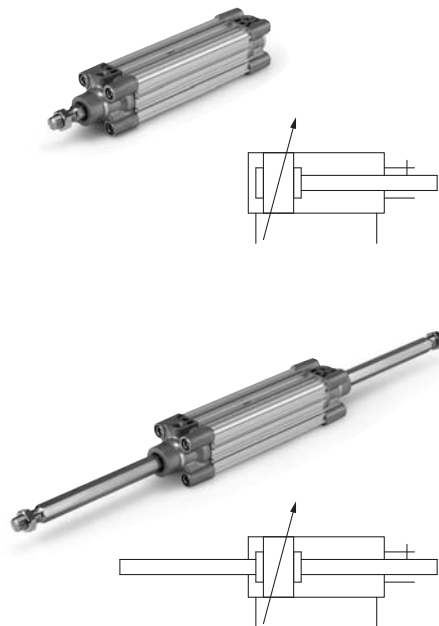
\*\* Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.

Consult with SMC regarding water resistant types with the above model numbers.

Note) D-Y59A, Y69A, Y7P, Y7□W, Z7□, Z80 type cannot be mounted on the CP96 series.

Moreover, D-M9□□ and A9□ type cannot be mounted on square groove of the CP96 series.

# Series CP96K



## 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              | 0.05 MPa                                                                                                |       |                 |       |                 |       |
| Ambient and fluid temperature        | Without auto switch: -20 to 70°C*<br>With auto switch: -10 to 60°C*                                     |       |                 |       |                 |       |
| Lubrication                          | Not required (Non-lube)                                                                                 |       |                 |       |                 |       |
| Operating piston speed               | 50 to 1000 mm/s                                                                                         |       |                 |       |                 |       |
| Allowable stroke tolerance           | Up to 250 st: $+1.0_0$ , 251 to 1000 st: $+1.4_0$                                                       |       |                 |       |                 |       |
| Cushion                              | Both ends (Air cushion)                                                                                 |       |                 |       |                 |       |
| Port size                            | G 1/8                                                                                                   | G 1/4 | G 1/4           | G 3/8 | G 3/8           | G 1/2 |
| Mounting                             | Basic, Axial foot, Rod end flange,<br>Head end flange, Single clevis, Double clevis,<br>Centre trunnion |       |                 |       |                 |       |
| Non-rotating accuracy                | $\pm 0.5^\circ$                                                                                         |       | $\pm 0.5^\circ$ |       | $\pm 0.3^\circ$ |       |
| Allowable rotating torque<br>Nm max. | 0.25                                                                                                    | 0.45  | 0.64            |       | 0.79            |       |

\* No freezing

## Minimum Stroke for Auto Switch Mounting

Refer to page 19 for "Minimum Stroke for Auto Switch Mounting".

## Maximum stroke

| Bore size (mm) | Max. stroke* |
|----------------|--------------|
| 32             | 500          |
| 40             | 500          |
| 50             | 600          |
| 63             | 600          |
| 80             | 800          |
| 100            | 800          |

Intermediate strokes are available.

\* Please consult with SMC for longer strokes.

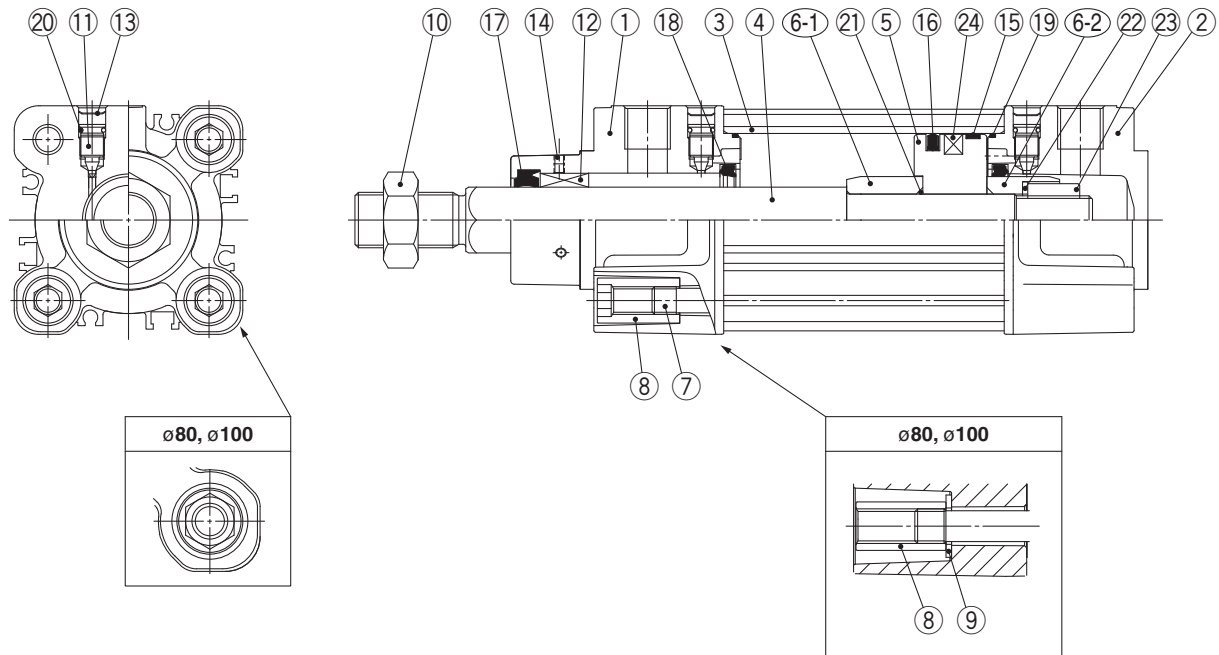
## Accessories

|          | Mounting              | Basic | Foot | Rod end flange | Head end flange | Single clevis | Double clevis | Centre trunnion |
|----------|-----------------------|-------|------|----------------|-----------------|---------------|---------------|-----------------|
| Standard | Rod end nut           | ●     | ●    | ●              | ●               | ●             | ●             | —               |
|          | Clevis pin            | —     | —    | —              | —               | —             | ●             | —               |
| Option   | Piston rod ball joint | ●     | ●    | ●              | ●               | ●             | ●             | —               |
|          | Rod clevis            | ●     | ●    | ●              | ●               | ●             | ●             | —               |
|          | Rod boot              | —     | —    | —              | —               | —             | —             | —               |

\* Please do not use a piston rod ball joint (or floating joint) together with a head end clevis with a ball joint (or angled head end clevis with a ball joint).

## Construction

[First angle projection]



## Component Parts

| No. | Description          | Material             | Note         |
|-----|----------------------|----------------------|--------------|
| 1   | Rod cover            | Aluminium die-casted |              |
| 2   | Head cover           | Aluminium die-casted |              |
| 3   | Cylinder tube        | Aluminium alloy      |              |
| 4   | Piston rod           | Stainless steel      |              |
| 5   | Piston               | Aluminium alloy      |              |
| 6-1 | Cushion ring         | steel                |              |
| 6-2 | Cushion ring         | steel                |              |
| 7   | Tie-rod              | Carbon steel         |              |
| 8   | Tie-rod nut          | Steel                |              |
| 9   | Flat washer          | Steel                | ø80 and ø100 |
| 10  | Rod end nut          | Steel                |              |
| 11  | Cushion valve        | Steel wire           |              |
| 12  | Non-rotating guide   | Bearing alloy        |              |
| 13  | Snap ring            | Steel for spring     | ø40 to ø100  |
| 14  | Set screw            | Steel                |              |
| 15  | Wearing              | Resin                |              |
| 16  | Piston seal          | NBR                  |              |
| 17  | Rod seal             | NBR                  |              |
| 18  | Cushion seal         | Urethane rubber      |              |
| 19  | Cylinder tube gasket | NBR                  |              |
| 20  | Cushion valve seal   | NBR                  |              |
| 21  | Piston gasket        | NBR                  |              |
| 22  | Spring washer        | Steel                |              |
| 23  | Piston nut           | Steel                |              |
| 24  | Magnet               |                      |              |

## Replacement Parts: Seal Kit/Single rod

| Bore size (mm) | Kit no.  | Contents                      |
|----------------|----------|-------------------------------|
| 32             | CK95-32  | Kits include items<br>⑮ to ⑲. |
| 40             | CK95-40  |                               |
| 50             | CK95-50  |                               |
| 63             | CK95-63  |                               |
| 80             | CK95-80  |                               |
| 100            | CK96-100 |                               |

\* Seal kits consist of items ⑮ to ⑲ contained in one kit, and can be ordered using the number for each respective tube bore size.

## Seal Kit/Double rod

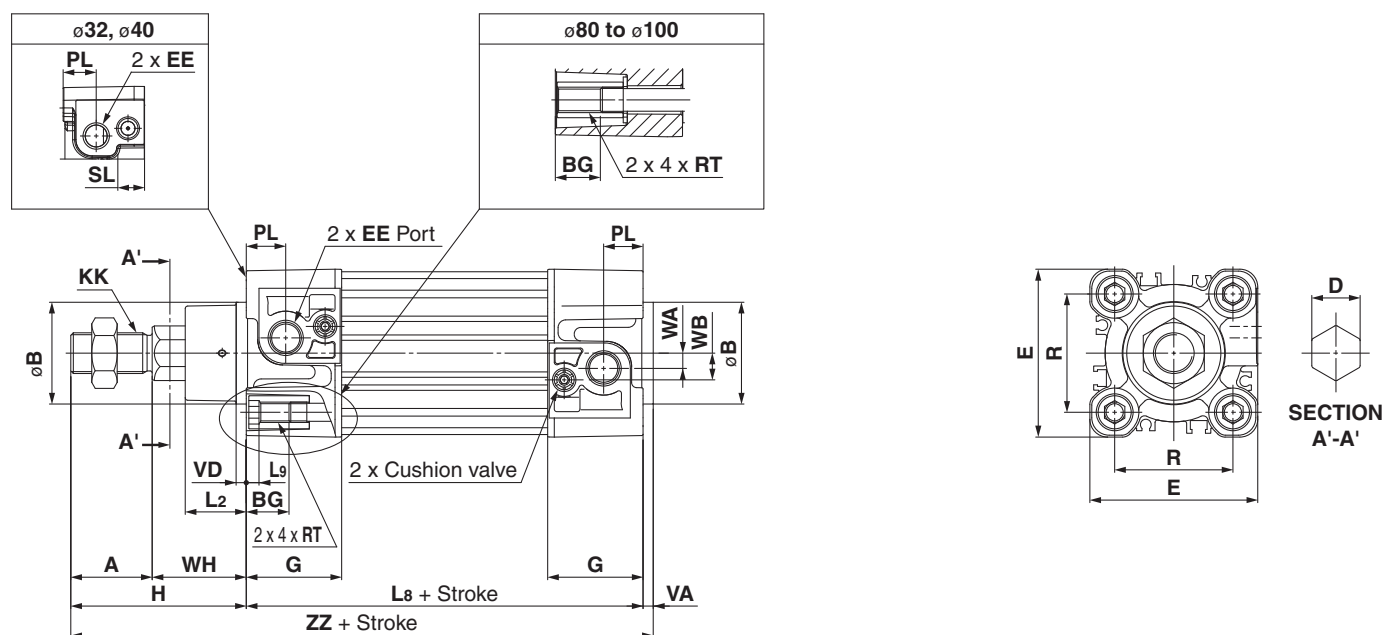
| Bore size (mm) | Kit no.   | Contents                      |
|----------------|-----------|-------------------------------|
| 32             | CK95W-32  | Kits include items<br>⑮ to ⑲. |
| 40             | CK95W-40  |                               |
| 50             | CK95W-50  |                               |
| 63             | CK95W-63  |                               |
| 80             | CK95W-80  |                               |
| 100            | CK96W-100 |                               |

# Series CP96K

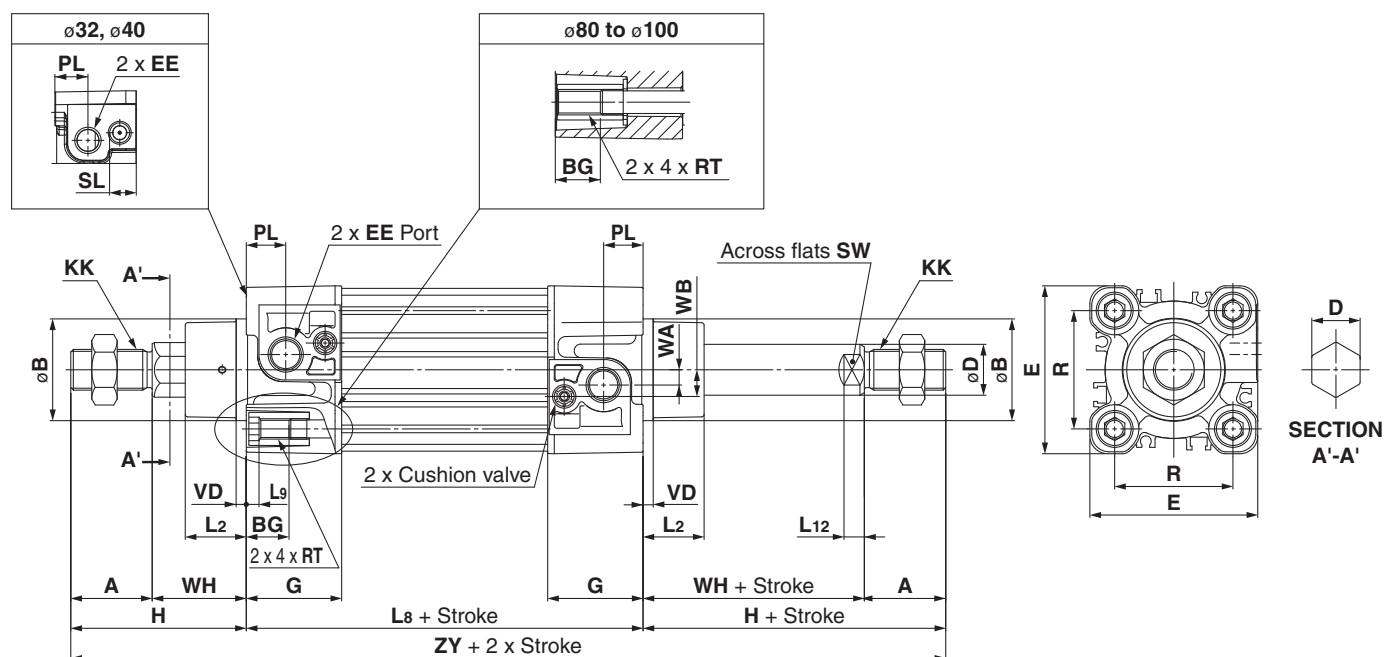
## Dimensions: Without Mounting Bracket

[First angle projection]

### CP96K(D)B Bore size – Stroke



### CP96K(D)B Bore size – Stroke W



\* Mounting bracket are the same as standard type.  
Refer to page 11 for details.

| Bore size (mm) | Stroke Range (mm) | A  | ØB d11 | D    | ØD | EE    | PL   | RT        | L12 | KK         | SW | G    | BG | L8  | VD | VA | WA   | WB   | WH | ZZ  | ZY  | E   | R    | L2 | L9 | H  | SL |
|----------------|-------------------|----|--------|------|----|-------|------|-----------|-----|------------|----|------|----|-----|----|----|------|------|----|-----|-----|-----|------|----|----|----|----|
| 32             | to 500            | 22 | 30     | 12.2 | 12 | G 1/8 | 13   | M6 x 1    | 6   | M10 x 1.25 | 10 | 32   | 16 | 94  | 4  | 4  | 4    | 7    | 26 | 146 | 190 | 47  | 32.5 | 15 | 4  | 48 | 10 |
| 40             | to 500            | 24 | 35     | 14.2 | 16 | G 1/4 | 14   | M6 x 1    | 6.5 | M12 x 1.25 | 13 | 37.5 | 16 | 105 | 4  | 4  | 5    | 9    | 30 | 163 | 213 | 54  | 38   | 17 | 4  | 54 | 12 |
| 50             | to 600            | 32 | 40     | 19   | 20 | G 1/4 | 15.5 | M8 x 1.25 | 8   | M16 x 1.5  | 17 | 37.5 | 16 | 106 | 4  | 4  | 6    | 10.5 | 37 | 179 | 244 | 66  | 46.5 | 24 | 5  | 69 | —  |
| 63             | to 600            | 32 | 45     | 19   | 20 | G 3/8 | 16.5 | M8 x 1.25 | 8   | M16 x 1.5  | 17 | 45   | 16 | 121 | 4  | 4  | 9    | 12   | 37 | 194 | 259 | 77  | 56.5 | 24 | 5  | 69 | —  |
| 80             | to 800            | 40 | 45     | 23   | 25 | G 3/8 | 19   | M10 x 1.5 | 10  | M20 x 1.5  | 22 | 45   | 17 | 128 | 4  | 4  | 11.5 | 14   | 46 | 218 | 300 | 99  | 72   | 30 | —  | 86 | —  |
| 100            | to 800            | 40 | 55     | 23   | 25 | G 1/2 | 19   | M10 x 1.5 | 10  | M20 x 1.5  | 22 | 50   | 17 | 138 | 4  | 4  | 17   | 15   | 51 | 233 | 320 | 118 | 89   | 32 | —  | 91 | —  |

## Series CP96

# Auto Switch Mounting 1

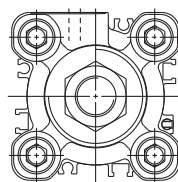
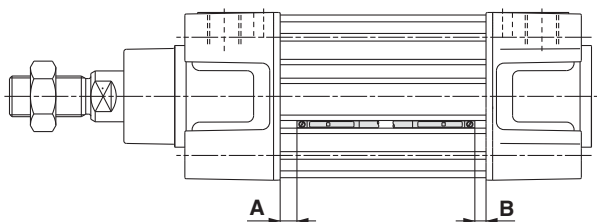
## Minimum Stroke for Auto Switch Mounting



| (mm)              |                                        |             |    |             |    |             |             |             |
|-------------------|----------------------------------------|-------------|----|-------------|----|-------------|-------------|-------------|
| Auto switch model | Number of auto switch mounted          | 32          | 40 | 50          | 63 | 80          | 100         | 125         |
| D-M9□             | 2 switches (Different side, Same side) | 15          |    |             |    | 10          |             |             |
|                   | 1 switch                               | 15          |    |             |    | 10          |             |             |
|                   | Other qty.                             | 15+5 (n-2)  |    |             |    | 10+10 (n-2) |             |             |
| D-M9□W<br>D-M9□AL | 2 switches (Different side, Same side) | 15          |    |             |    | 10          |             |             |
|                   | 1 switch                               | 15          |    |             |    | 10          |             |             |
|                   | Other qty.                             | 15+10 (n-2) |    |             |    | 10+10 (n-2) |             | 10+15 (n-2) |
| D-A9□             | 2 switches (Different side, Same side) | 15          |    |             |    |             |             |             |
|                   | 1 switch                               | 15          |    |             |    | 10          |             |             |
|                   | Other qty.                             | 15+10 (n-2) |    | 15+15 (n-2) |    |             | 15+20 (n-2) |             |

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

## Recommended Mounting Position for Stroke Ends



## Auto Switch Proper Mounting Position

|                   |           | (mm)                       |      |       |     |
|-------------------|-----------|----------------------------|------|-------|-----|
| Auto switch model | Bore size | D-M9□<br>D-M9□W<br>D-M9□AL |      | D-A9□ |     |
|                   |           | A                          | B    | A     | B   |
|                   | 32        | 10.5                       | 8    | 6.5   | 4   |
|                   | 40        | 10.5                       | 8    | 6.5   | 4   |
|                   | 50        | 11                         | 8.5  | 7     | 4.5 |
|                   | 63        | 11                         | 8.5  | 7     | 4.5 |
|                   | 80        | 14                         | 12.5 | 10    | 8.5 |
|                   | 100       | 14                         | 12.5 | 10    | 8.5 |
|                   | 125       | 16                         | 16   | 12    | 12  |

\* Adjust the auto switch after confirming the operation to set actually.

## Operating Range

| Auto switch model          | Bore size (mm) |    |     |     |     |      |      |
|----------------------------|----------------|----|-----|-----|-----|------|------|
|                            | 32             | 40 | 50  | 63  | 80  | 100  | 125  |
| D-M9□<br>D-M9□W<br>D-M9□AL | 4              | 4  | 5   | 6   | 5.5 | 6    | 7    |
| D-A9□                      | 7              | 8  | 8.5 | 9.5 | 9.5 | 10.5 | 12.5 |

Note) Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion)  
There may be the case it will vary substantially depending on an ambient environment.

Besides the models listed "How to Order," the following auto switches are applicable.

\* Normally closed (NC = b contact), solid state switch (D-F9G, F9H type) are also available.  
For details, refer to the auto switch guide.

# Auto Switch Mounting 2

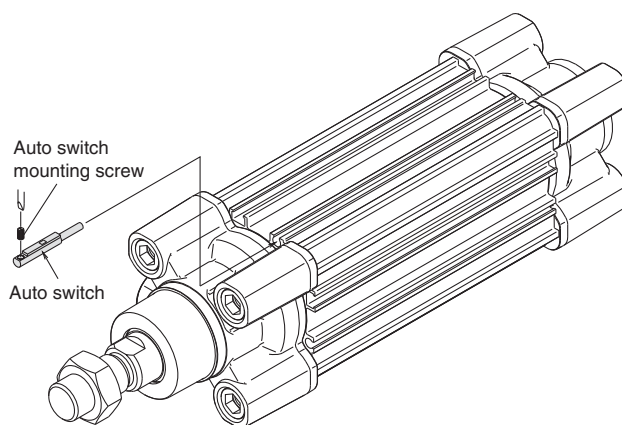
## How to Mount and Move the Auto Switch

---

### <Applicable Auto Switch>

Solid state switch ..... D-M9N/M9P/M9B  
                                          D-M9NW/M9PW/M9BW  
                                          D-M9NAL/M9PAL/M9BAL  
Reed switch ..... D-A90/A93/A96

## How to Mount and Move the Auto Switch



- Please use a watchmaker's screwdriver with a handle diameter of 5 to 6 mm when tightening the auto switch mounting screw.  
A torque of 0.05 to 0.15 N·m should be used for D-M9□, M9□W, M9□AL, and 0.10 to 0.20 N·m for D-A9□.  
Once the screw starts to feel tight, tighten it further by approximately another 90°.

Note) D-M9□□ and A9□ type cannot be mounted on square groove of the CP96 series.

# ISO Cylinder: Double Acting

## Series 55-CP96

Ø32, Ø40, Ø50, Ø63, Ø80, Ø100, Ø125

### How to Order



**55-CP96SD B 32 - 100 W**

**ATEX category 2**

**Piston rod type**

|          |                                |
|----------|--------------------------------|
| <b>S</b> | Standard                       |
| <b>K</b> | Non-rotating rod (32~100 only) |

**Built-in magnet**

**Mounting**

|          |                       |
|----------|-----------------------|
| <b>B</b> | Basic/Without bracket |
| <b>L</b> | Axial foot            |
| <b>F</b> | Rod end flange        |
| <b>G</b> | Head end flange       |
| <b>C</b> | Single clevis         |
| <b>D</b> | Double clevis         |

**Bore size**

|            |        |
|------------|--------|
| <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 |
| <b>125</b> | 125 mm |

**Made to order \***

|              |                                                                   |
|--------------|-------------------------------------------------------------------|
| —            | Standard                                                          |
| <b>-XA</b>   | Special rod end change                                            |
| <b>-XC4</b>  | With heavy duty scraper (32 ~ 100 only)                           |
| <b>-XC7</b>  | Tie rod, cushion valve, tie-rod nut, etc, made of stainless steel |
| <b>-XC22</b> | Fluororubber seals                                                |
| <b>-XC68</b> | Stainless steel rod and nut                                       |

\* Only for Standard type

**Rod Specifications**

|          |            |
|----------|------------|
| —        | Single rod |
| <b>W</b> | Double rod |

**Stroke (mm)**  
Refer to standard stroke table

| Classification | Without magnet type                                          | With magnet type D                                           |
|----------------|--------------------------------------------------------------|--------------------------------------------------------------|
| 2 GD c         | T 85°C (T5) Ta -20°C to 40°C<br>T 105°C (T4) Ta 40°C to 60°C | T 85°C (T5) Ta -10°C to 40°C<br>T 105°C (T4) Ta 40°C to 60°C |

[For 55-CP96]

When using an Auto switch, select the appropriate switch from the following table and order it separately.

#### Applicable auto switch specifications

Auto switch only conforms to Category 3. (II 3GD EEx nA II T5x -10°C ≤ Ta ≤ +60°C IP67.)

For detailed specifications on the D-M9□, D-M9□W, D-A93 and D-A90, please refer to the auto switch guide.

(Note: Reed auto switches for AC 100V and DC 100V are not within the specification.)

| Type               | Special function | Model No.    | Electrical entry | Indicator | Wiring (Output) | Load voltage |           | Lead wire (m) |         |       |       | Applicable load |    |           |
|--------------------|------------------|--------------|------------------|-----------|-----------------|--------------|-----------|---------------|---------|-------|-------|-----------------|----|-----------|
|                    |                  |              |                  |           |                 | DC           |           | AC            | 0.5 (—) | 1 (M) | 3 (L) |                 |    | 5 (Z)     |
| Solid state switch | —                | D-M9N□-588   | Grommet          | Yes       | 3-wire (NPN)    | 24 V         | 5 V, 12 V | —             | ●       | —     | ●     | ○               | IC | Relay PLC |
|                    |                  | 3-wire (PNP) |                  |           | ●               |              |           |               | —       | ●     | ○     |                 |    |           |
|                    |                  | 2-wire       |                  |           | 12 V            |              | ●         |               | —       | ●     | ○     | —               |    |           |
|                    | 3-wire (NPN)     | 5 V, 12 V    |                  |           |                 |              | ●         |               | ●       | ●     | ○     |                 | IC |           |
|                    | 3-wire (PNP)     |              |                  |           | ●               | ●            | ●         | ○             |         |       |       |                 |    |           |
|                    | 2-wire           |              |                  |           | 12 V            | —            | ●         | ●             | ●       | ○     | —     |                 |    |           |
|                    | Reed switch      | —            |                  |           | D-A93□-588      | Grommet      | Yes       | 2-wire        | 24 V    | 12 V  | 100 V | ●               | —  |           |
| None               |                  |              | 100 V or less    | ●         | —               |              | ●         |               |         | —     | IC    |                 |    |           |

\* Lead wire length symbols: 0.5 m ..... — (Example) D-M9BW-588  
 1 m ..... M (Example) D-M9BWM-588  
 3 m ..... L (Example) D-M9BWL-588  
 5 m ..... Z (Example) D-M9BWZ-588

Note 1) ○ solid state auto switch is available after receiving an order.

Note 2) When mounting an auto switch on a 55- series (Category 2) Model, the ATEX category of the auto switch cylinder changes to Category 3, which is the same category as the auto switch.

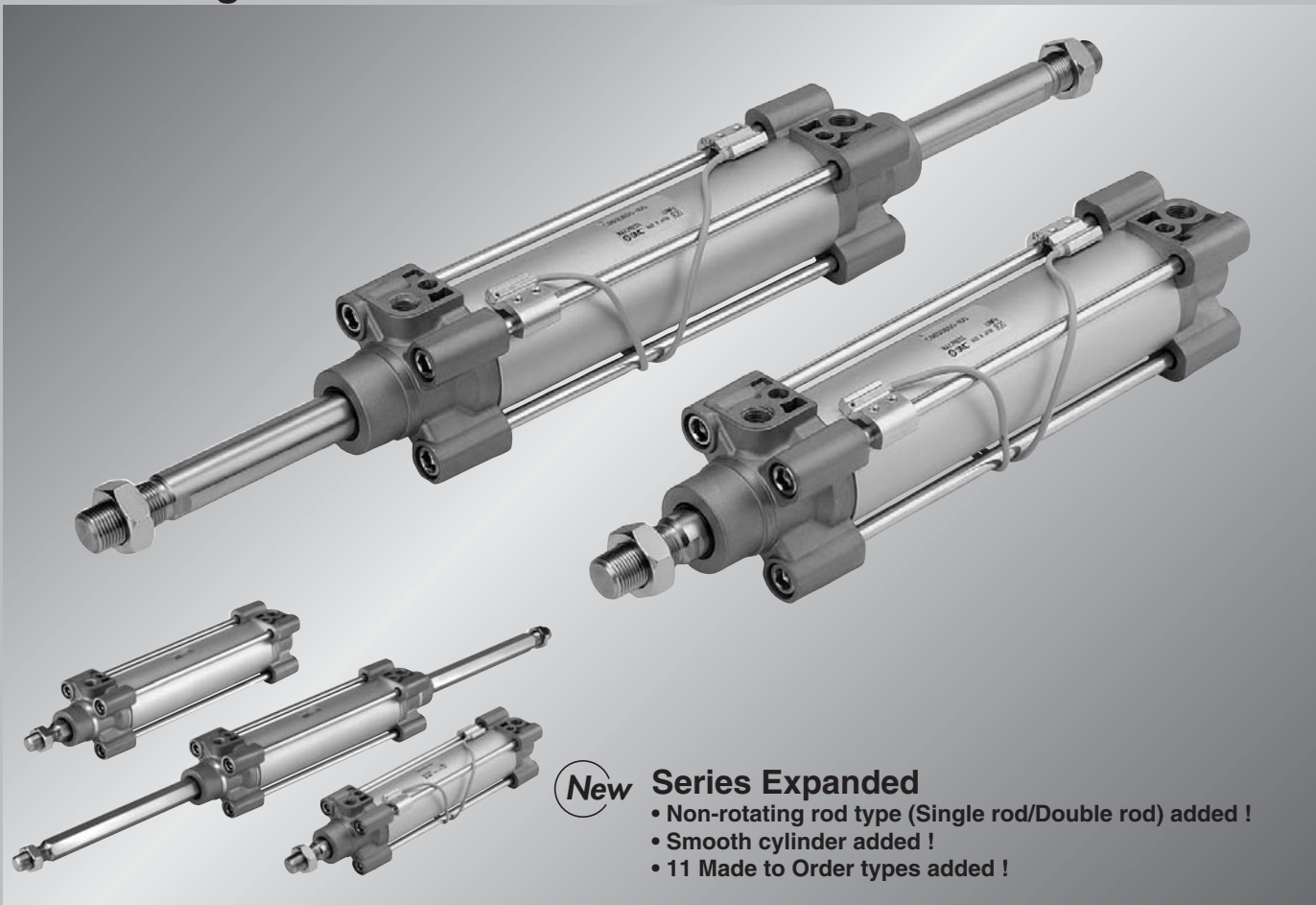


# ISO Cylinder

## Series C96

ø32, ø40, ø50, ø63, ø80, ø100, ø125

Conforming to ISO 15552



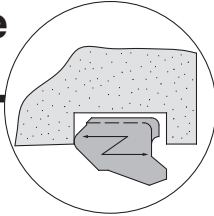
### Variations

| Series                                                                                                                                        | Action        | Type       | Basic    | Built-in magnet | Rod boot | Bore (mm)                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|----------|-----------------|----------|--------------------------------|
| <b>Standard</b><br><b>Series C96</b><br>                   | Double acting | Single rod | Non-lube |                 |          | 32, 40, 50, 63<br>80, 100, 125 |
|                                                                                                                                               |               | Double rod | Non-lube |                 |          |                                |
| <b>Standard/Non-rotating rod</b><br><b>Series C96K</b><br> | Double acting | Single rod | Non-lube |                 |          | 32, 40, 50, 63<br>80, 100      |
|                                                                                                                                               |               | Double rod | Non-lube |                 |          |                                |
| <b>Smooth cylinder</b><br><b>Series C96Y</b><br>           | Double acting | Single rod | Non-lube |                 |          | 32, 40, 50, 63<br>80, 100, 125 |

## Series C96

### Improved end of stroke cushion capacity

Piston rod lurching has been eliminated at the end of stroke positions by means of a floating seal mechanism.



### Air cylinder Compact and light design

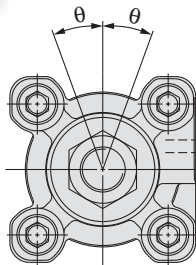
Reduced weight due to a change in the configuration of the cover.

### New Non-rotating rod type added !

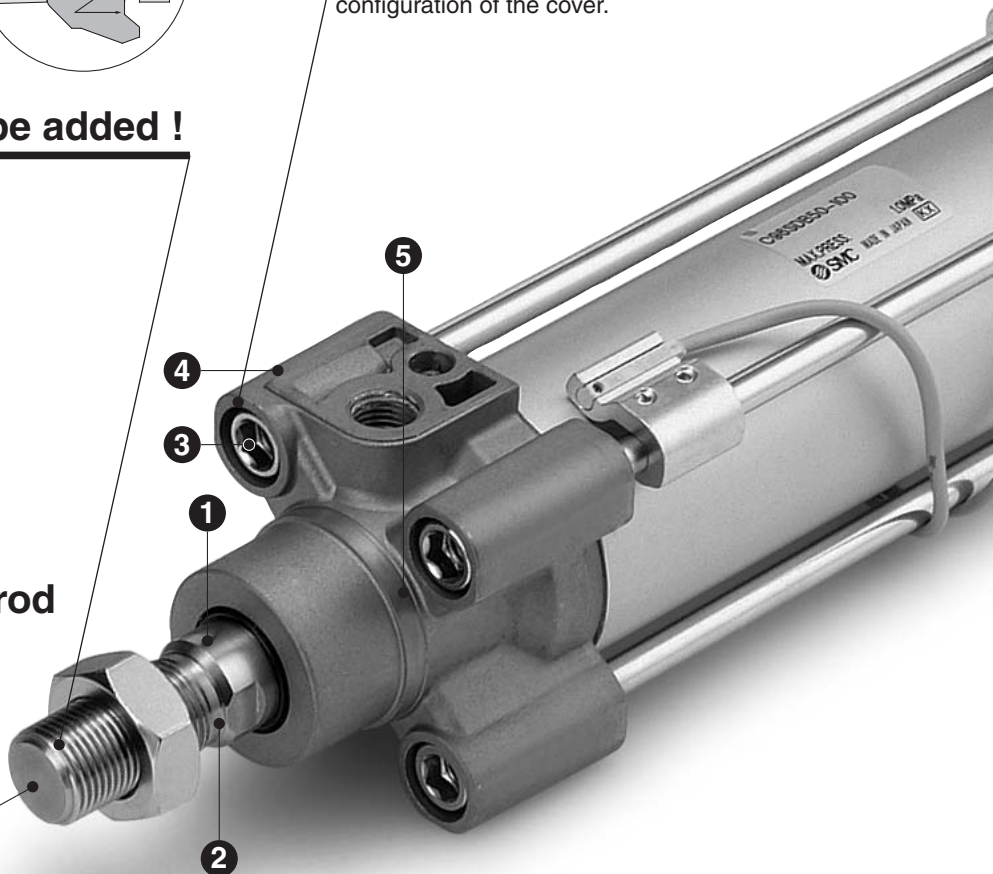


#### Non-rotating accuracy (mm)

| Bore size              | $\theta$        |
|------------------------|-----------------|
| $\phi 32$ to $\phi 63$ | $\pm 0.5^\circ$ |
| $\phi 80$ , $\phi 100$ | $\pm 0.3^\circ$ |



### New Standard type with rod boot specifications.

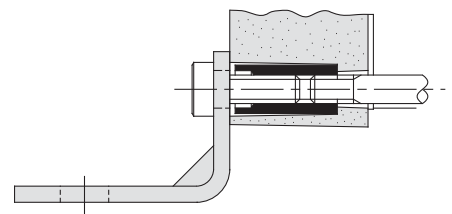


### Piston rod deflection reduced

Deflection of the piston rod has been reduced by increasing the precision of the bushing and piston rod, and reducing the tolerances.

### Improved mounting accuracy

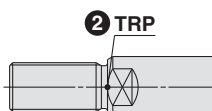
High accuracy covers and tie rod nuts simplify the mounting process and also extend cylinder life.



### [Differences between the C96 and the CP95 series]

①  $\phi 25$  mm piston rod diameter for  $\phi 100$   
Conforming to German automobile association standard (VDA)

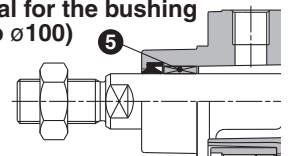
② Rod end nut can be screwed up to TRP.



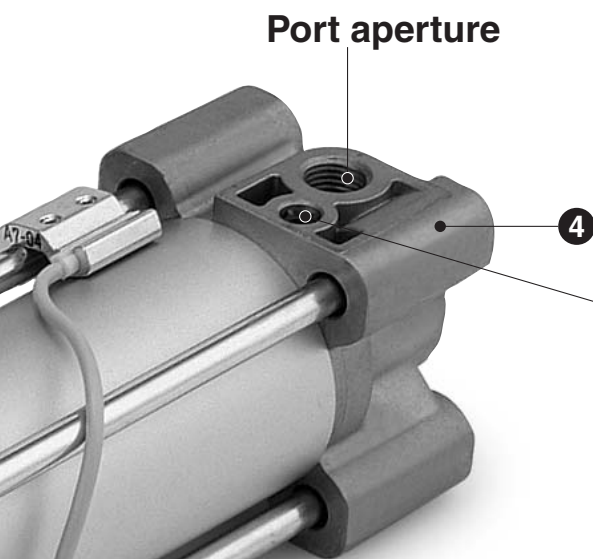
③ Tie-rod nuts changed to conform to the ISO 15552 standard ( $\phi 80$  to  $\phi 125$ )

④ Surface treatment painting is now avoided due to environmental concerns. Coating trivalent chromate only.

⑤ Uses an iron-based sintered material for the bushing ( $\phi 32$  to  $\phi 100$ )

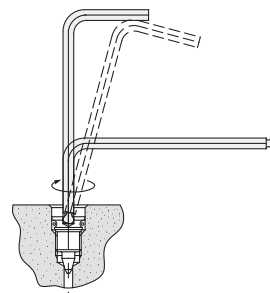


ø32, ø40, ø50, ø63, ø80, ø100, ø125



Port aperture

4



## Simple end of stroke cushion valve adjustment

Since the adjustment of the cushion valve is performed with a hex wrench key, even finite control can be easily accomplished. Furthermore, the cushion valve has been recessed so that it does not protrude from the cover.

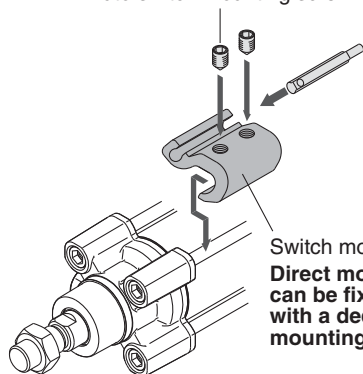
## Helpful for auto switch inventory control

Easier inventory control of numerous direct mounting auto switch models.

## Small sized auto switch can be attached.\*

Solid state: D-M9□ Reed: D-A9□  
D-M9□W

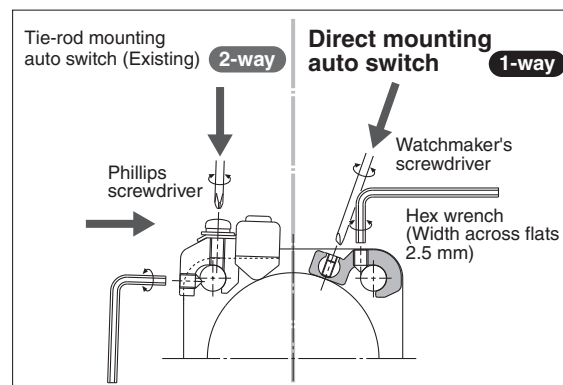
Auto switch mounting screw



Switch mounting bracket  
Direct mounting auto switch can be fixed to the tie-rod with a dedicated switch mounting bracket.

## Improved handling performance

Auto switch mounting and mounting position adjustment can be made in a one way direction.



## New Made to Order added !

Improvement in applications by made to order specifications.

| Symbol | Specifications                                                    | Standard type |            | Non-rotating rod type |            | Smooth cylinder |
|--------|-------------------------------------------------------------------|---------------|------------|-----------------------|------------|-----------------|
|        |                                                                   | Single rod    | Double rod | Single rod            | Double rod | Single rod      |
| -XA□   | Change of rod end shape                                           | ○             | ○          | —                     | —          | ○               |
| -XC14  | Change of trunnion bracket mounting position                      | ○             | ○          | —                     | —          | —               |
| -XB6   | Heat resistant cylinder (−10 to 150°C)                            | ○             | ○          | —                     | —          | —               |
| -XB7   | Cold resistant cylinder (−40 to 70°C)                             | ○             | —          | —                     | —          | —               |
| -XC4   | With heavy duty scraper                                           | ○             | ○          | —                     | —          | —               |
| -XC7   | Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel | ○             | ○          | —                     | —          | —               |
| -XC10  | Dual stroke cylinder/Double rod type                              | ○             | —          | —                     | —          | —               |
| -XC11  | Dual stroke cylinder/Single rod type                              | ○             | —          | —                     | —          | —               |
| -XC22  | Fluororubber seals                                                | ○             | ○          | —                     | —          | —               |
| -XC35  | With coil scraper                                                 | ○             | ○          | —                     | —          | —               |
| -XC68  | Made of stainless steel (With hard chrome plated piston rod)      | ○             | ○          | —                     | —          | —               |

# ISO Cylinder: Standard Double Acting, Single/Double Rod Series C96

ø32, ø40, ø50, ø63, ø80, ø100, ø125

## How to Order

**With auto switch** **C96SD B 32-100 J W-M9BW S-**

**Built-in magnet**

**Mounting**

|          |                       |
|----------|-----------------------|
| <b>B</b> | Basic/Without bracket |
| <b>L</b> | Axial foot            |
| <b>F</b> | Rod end flange        |
| <b>G</b> | Head end flange       |
| <b>C</b> | Single clevis         |
| <b>D</b> | Double clevis         |
| <b>T</b> | Centre trunnion       |

**Bore size**

|            |        |
|------------|--------|
| <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 |
| <b>125</b> | 125 mm |

**Stroke (mm)**  
Refer to "Standard Stroke" on page 28.

**Auto switch**  
— Without auto switch  
\* For applicable auto switch model, refer to the below table.

**Number of auto switches**

|          |          |
|----------|----------|
| —        | 2 pcs.   |
| <b>S</b> | 1 pc.    |
| <b>3</b> | 3 pcs.   |
| <b>n</b> | "n" pcs. |

**Rod boot**

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

|          |            |
|----------|------------|
| —        | Single rod |
| <b>W</b> | Double rod |

**Made to Order**  
Refer to the page 28 for details.

## Applicable Auto Switches/Tie-rod Mounting

| 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 (—)              | 1 (M) | 3 (L) | 5 (Z)      |                     |                 |    |            |
| Solid state switch | —                | Grommet                 | Yes             | 3-wire (NPN)    | 24 V         | 5 V, 12 V              | —                 | M9N           | —                    | ●     | ●     | ●          | ○                   | ○               | IC | Relay, PLC |
|                    |                  |                         |                 | 3-wire (PNP)    |              |                        |                   | M9P           | —                    | ●     | ●     | ●          | ○                   | ○               |    |            |
|                    |                  | 2-wire                  |                 | —               |              |                        |                   | —             | 100 V, 200 V         | M9B   | —     | ●          | ●                   | ●               |    |            |
|                    |                  | Terminal conduit        |                 | 3-wire (NPN)    | 24 V         | 5 V, 12 V              | —                 | —             | G39                  | —     | —     | —          | —                   | —               | IC |            |
|                    | 2-wire           |                         |                 | —               |              |                        |                   | K39           | —                    | —     | —     | —          | —                   | —               |    |            |
|                    | Grommet          | 3-wire (NPN)            |                 | M9NW            |              |                        |                   | —             | ●                    | ●     | ●     | ○          | ○                   | IC              |    |            |
|                    |                  | 3-wire (PNP)            |                 | M9PW            |              |                        |                   | —             | ●                    | ●     | ●     | ○          | ○                   |                 |    |            |
|                    |                  | 2-wire                  |                 | M9BW            |              |                        |                   | —             | ●                    | ●     | ●     | ○          | ○                   |                 | —  |            |
|                    |                  | 3-wire (NPN)            |                 | M9NA**          |              |                        |                   | —             | ○                    | ○     | ●     | ○          | ○                   | IC              |    |            |
|                    |                  | 3-wire (PNP)            |                 | M9PA**          |              |                        |                   | —             | ○                    | ○     | ●     | ○          | ○                   |                 |    |            |
|                    |                  | 2-wire                  |                 | M9BA**          |              |                        |                   | —             | ○                    | ○     | ●     | ○          | ○                   |                 | —  |            |
|                    |                  | 4-wire (NPN)            |                 | F59F            | —            | ●                      | —                 | ●             | ○                    | ○     | IC    |            |                     |                 |    |            |
|                    |                  | 2-wire (Non-polar type) |                 | P4DW            | —            | —                      | —                 | ●             | ●                    | ○     | —     |            |                     |                 |    |            |
|                    | Reed switch      | —                       |                 | Grommet         | Yes          | 3-wire (Equiv. to NPN) | —                 | 5 V           | —                    | A96   | —     | ●          | —                   | ●               | —  |            |
| 2-wire             |                  |                         | 24 V            |                 |              | 12 V                   | 100 V             | A93           | —                    | ●     | —     | ●          | —                   | —               | —  |            |
|                    |                  |                         |                 |                 |              |                        | 100 V or less     | A90           | —                    | ●     | —     | ●          | —                   | —               |    |            |
|                    |                  |                         |                 |                 |              |                        | 200 V or less     | A64           | —                    | ●     | —     | ●          | —                   | —               |    |            |
|                    |                  |                         |                 | —               | A33          |                        | —                 | —             | —                    | —     | —     | —          |                     |                 |    |            |
| Terminal conduit   |                  |                         | Yes             | 100 V, 200 V    | —            | A34                    | —                 | —             | —                    | —     | —     | Relay, PLC |                     |                 |    |            |
|                    |                  |                         |                 | —               | A44          | —                      | —                 | —             | —                    | —     |       |            |                     |                 |    |            |
|                    |                  |                         |                 | DIN             | Grommet      | —                      | —                 | A59W          | —                    | ●     | —     |            | ●                   | —               | —  |            |
|                    |                  |                         |                 |                 |              |                        |                   |               |                      |       |       |            |                     |                 |    |            |

\* Lead wire length symbols: 0.5 m ..... — (Example) M9NW  
1 m ..... M (Example) M9NWM  
3 m ..... L (Example) M9NWL  
5 m ..... Z (Example) M9NWX

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

\* Since there are other applicable auto switches than listed, refer to the auto switch guide.

\* For details about auto switches with pre-wired connector, refer to the auto switch guide.

\* D-A9□, M9□, M9□W, M9□AL are shipped together, (but not assembled).

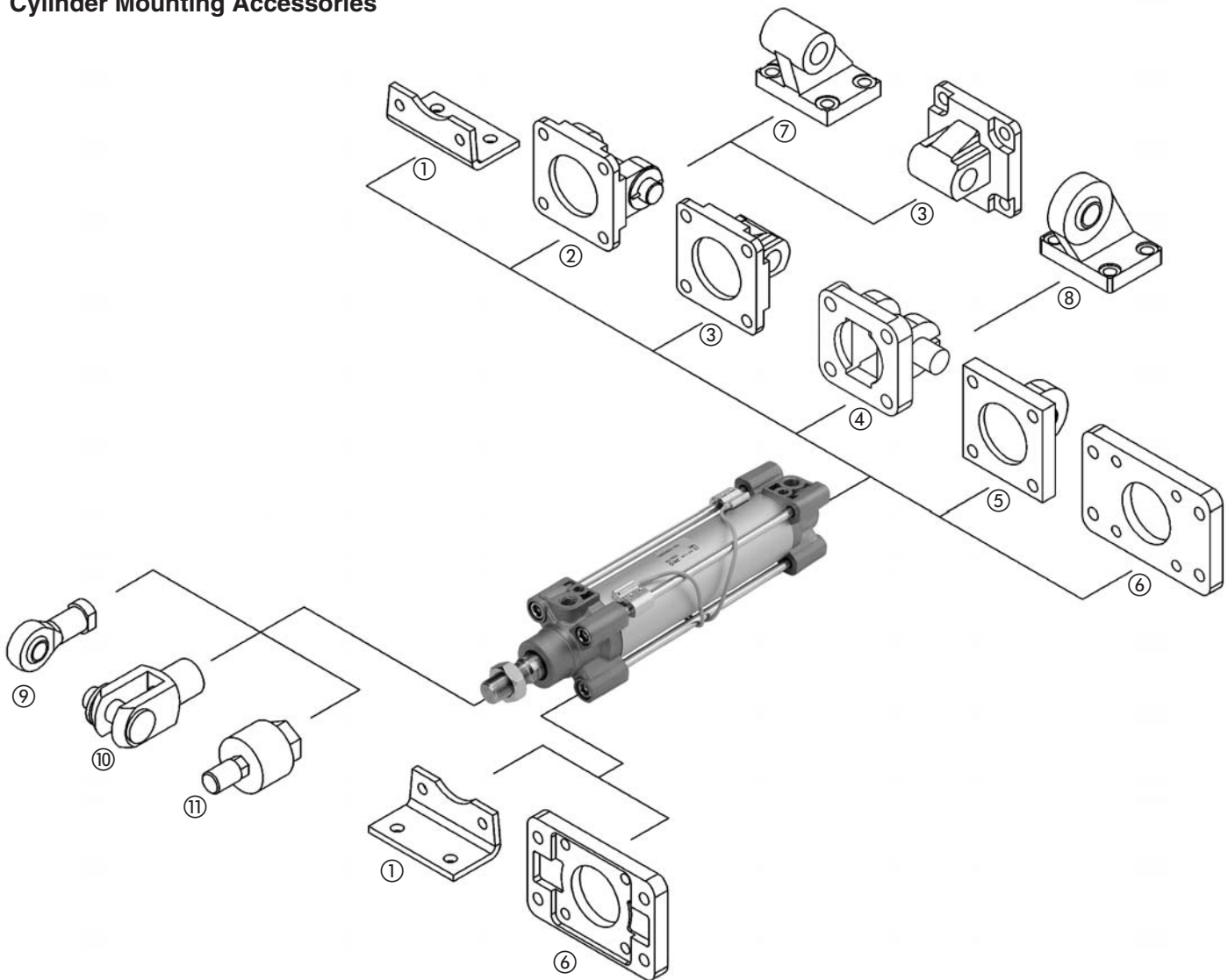
(Switch mounting bracket is only assembled at the time of shipment.)

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

Consult with SMC regarding water resistant types with the above model numbers.

## Accessories

### Cylinder Mounting Accessories



| Bore size (mm) | ①                                               | ②                                                                                                          | ③                                                | ④                                                                                             | ⑤                                                                | ⑥                                               | ⑦                      | ⑧                                      | ⑨                                | ⑩                                                               | ⑪              |
|----------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------|------------------------|----------------------------------------|----------------------------------|-----------------------------------------------------------------|----------------|
|                | Foot<br>(Supplied with two pieces and 4 screws) | Female head end clevis<br>(Corresponds to E accessory)<br>(Supplied with bolt, safety device and 4 screws) | Male head end clevis<br>(Supplied with 4 screws) | Female head end clevis (for ES accessory)<br>(Supplied with bolt, safety device and 4 screws) | Male head end clevis with ball joint<br>(Supplied with 4 screws) | Rod/Head end flange<br>(Supplied with 4 screws) | Angled head end clevis | Angled head end clevis with ball joint | Piston rod ball joint (ISO 8139) | Rod clevis (ISO 8140)<br>(Supplied with bolt and safety device) | Floating joint |
| 32             | L5032                                           | D5032                                                                                                      | C5032                                            | DS5032                                                                                        | CS5032                                                           | F5032                                           | E5032                  | ES5032                                 | KJ10D                            | GKM10-20                                                        | JA30-10-125    |
| 40             | L5040                                           | D5040                                                                                                      | C5040                                            | DS5040                                                                                        | CS5040                                                           | F5040                                           | E5040                  | ES5040                                 | KJ12D                            | GKM12-24                                                        | JA40-12-125    |
| 50             | L5050                                           | D5050                                                                                                      | C5050                                            | DS5050                                                                                        | CS5050                                                           | F5050                                           | E5050                  | ES5050                                 | KJ16D                            | GKM16-32                                                        | JA50-16-150    |
| 63             | L5063                                           | D5063                                                                                                      | C5063                                            | DS5063                                                                                        | CS5063                                                           | F5063                                           | E5063                  | ES5063                                 | KJ16D                            | GKM16-32                                                        | JA50-16-150    |
| 80             | L5080                                           | D5080                                                                                                      | C5080                                            | DS5080                                                                                        | CS5080                                                           | F5080                                           | E5080                  | ES5080                                 | KJ20D                            | GKM20-40                                                        | JA50-20-150    |
| 100            | L5100                                           | D5100                                                                                                      | C5100                                            | DS5100                                                                                        | CS5100                                                           | F5100                                           | E5100                  | ES5100                                 | KJ20D                            | GKM20-40                                                        | JA50-20-150    |
| 125            | L5125                                           | D5125                                                                                                      | C5125                                            | DS5125                                                                                        | CS5125                                                           | F5125                                           | E5125                  | ES5125                                 | KJ27D                            | GKM30-54                                                        | JA125-27-200   |

CP96

CP96K

55-CP96

C96

C96K

C96Y

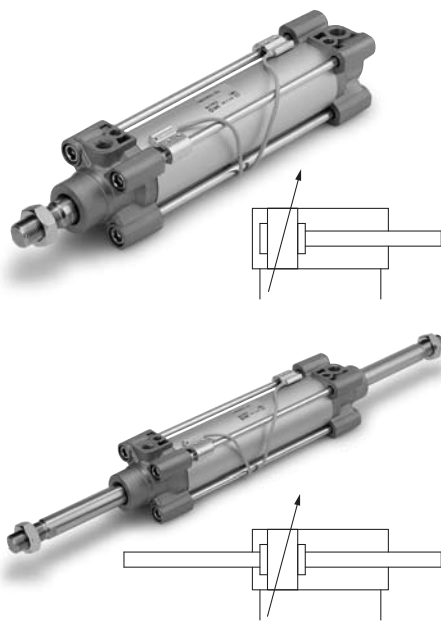
55-C96

Auto Switch

Simple Specials  
Made to Order

Precautions

# Series C96



## Minimum Stroke for Auto Switch Mounting

Refer to page 48 for "Minimum Stroke for Auto Switch Mounting".



## Made to Order Specifications (For details, refer to pages 59 to 64.)

| Symbol | Specifications                                                    |
|--------|-------------------------------------------------------------------|
| -XA□   | Change of rod end shape                                           |
| -XC14  | Change of trunnion bracket mounting position                      |
| -XB6   | Heat resistant cylinder (150°C)                                   |
| -XB7   | Cold resistant cylinder                                           |
| -XC4   | With heavy duty scraper                                           |
| -XC7   | Tie rod, cushion valve, tie rod nut, etc. made of stainless steel |
| -XC10  | Dual stroke cylinder/Double rod                                   |
| -XC11  | Dual stroke cylinder/Single rod                                   |
| -XC22  | Fluororubber seals                                                |
| -XC35  | With coil scraper                                                 |
| -XC68  | Made of stainless steel (With hard chromium plated piston rod)    |

## Specifications

| Bore size (mm)                | 32                                                                                                                    | 40    | 50    | 63    | 80    | 100   | 125            |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|----------------|
| Action                        | Double acting                                                                                                         |       |       |       |       |       |                |
| Fluid                         | Air                                                                                                                   |       |       |       |       |       |                |
| Proof pressure                | 1.5 MPa                                                                                                               |       |       |       |       |       |                |
| Max. operating pressure       | 1.0 MPa                                                                                                               |       |       |       |       |       |                |
| Min. operating pressure       | 0.05 MPa                                                                                                              |       |       |       |       |       |                |
| Ambient and fluid temperature | Without auto switch: −20 to 70°C*<br>With auto switch: −10 to 60°C*                                                   |       |       |       |       |       |                |
| Lubrication                   | Not required (Non-lube)                                                                                               |       |       |       |       |       |                |
| Operating piston speed        | 50 to 1000 mm/s                                                                                                       |       |       |       |       |       | 50 to 700 mm/s |
| Allowable stroke tolerance    | Up to 250 st: $^{+1.0}_0$ , 251 to 1000 st: $^{+1.4}_0$ , 1001 to 1500 st: $^{+1.8}_0$ , 1501 to 2000 st: $^{+2.2}_0$ |       |       |       |       |       |                |
| Cushion                       | Both ends (Air cushion)                                                                                               |       |       |       |       |       |                |
| Port size                     | G 1/8                                                                                                                 | G 1/4 | G 1/4 | G 3/8 | G 3/8 | G 1/2 | G 1/2          |
| Mounting                      | Basic, Axial foot, Rod end flange,<br>Head end flange, Single clevis, Double clevis,<br>Centre trunnion               |       |       |       |       |       |                |

\* No freezing

## Standard Stroke

| Bore size<br>(mm) | Standard stroke<br>(mm)                                           | Max. stroke* |            |
|-------------------|-------------------------------------------------------------------|--------------|------------|
|                   |                                                                   | Single rod   | Double rod |
| 32                | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500                | 1000         | 1000       |
| 40                | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500                | 1900         |            |
| 50                | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600           |              |            |
| 63                | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600           |              |            |
| 80                | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600, 700, 800 |              |            |
| 100               | 25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600, 700, 800 |              |            |
| 125               | —                                                                 | 2000         |            |

Intermediate strokes are available.

\* Please consult with SMC for longer strokes.

\*\* ø125 and Double rod are produced upon receipt of order.

## Accessories

| Mounting |                       | Basic | Foot | Rod end flange | Head end flange | Single clevis | Double clevis | Centre trunnion |
|----------|-----------------------|-------|------|----------------|-----------------|---------------|---------------|-----------------|
| Standard | Rod end nut           | ●     | ●    | ●              | ●               | ●             | ●             | ●               |
|          | Clevis pin            | —     | —    | —              | —               | —             | ●             | —               |
| Option   | Piston rod ball joint | ●     | ●    | ●              | ●               | ●             | ●             | ●               |
|          | Rod clevis            | ●     | ●    | ●              | ●               | ●             | ●             | ●               |
|          | Rod boot              | ●     | ●    | ●              | ●               | ●             | ●             | ●               |

\* Please do not use a piston rod ball joint (or floating joint) together with a head end clevis with a ball joint (or angled head end clevis with a ball joint).

## X option combinations available to order

| Symbol                  | -XA□ | -XC14                | -XB6 <sup>Note 1)</sup> | -XC7 | -XC22 |
|-------------------------|------|----------------------|-------------------------|------|-------|
| -XA□                    | ●    |                      |                         |      |       |
| -XC14                   | ●    | ●                    |                         |      |       |
| -XB6 <sup>Note 1)</sup> | ●    | ● <sup>Note 2)</sup> |                         |      |       |
| -XC7                    | ●    | X                    | ●                       |      |       |
| -XC22                   | ●    | ● <sup>Note 2)</sup> | —                       | ●    |       |
| -XC68                   | ●    | ● <sup>Note 2)</sup> | ●                       | ●    | ●     |

●: Combination possible to produce.

X: Combination possible to produce but contact with SMC.

—: Combination not produced.

Note 1) Only for without magnet type.

Note 2) If XC14A or XC14B are required, the X combination is considered as Standard.

If you want to order a combination of non Simple Special options, just add the X options by alphabetical order at the end of the part number, for example: XC7C22 or XC14AC68.

## Theoretical Output



(N)

| Bore size (mm) | Rod diameter (mm) | Operating direction | Piston area (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            | 25                | OUT                 | 7854                           | 1571                     | 2356 | 3142 | 3927 | 4712 | 5498 | 6283 | 7068  | 7854  |
|                |                   | IN                  | 7363                           | 1473                     | 2209 | 2945 | 3682 | 4418 | 5154 | 5890 | 6627  | 7363  |
| 125            | 32                | OUT                 | 12272                          | 2454                     | 3682 | 4909 | 6136 | 7363 | 8590 | 9817 | 11045 | 12272 |
|                |                   | IN                  | 11468                          | 2294                     | 3440 | 4587 | 5734 | 6881 | 8027 | 9174 | 10321 | 11468 |

Note) Theoretical out put (N) = Pressure (MPa) x Piston area (mm<sup>2</sup>)

## Weight (single rod)

(kg)

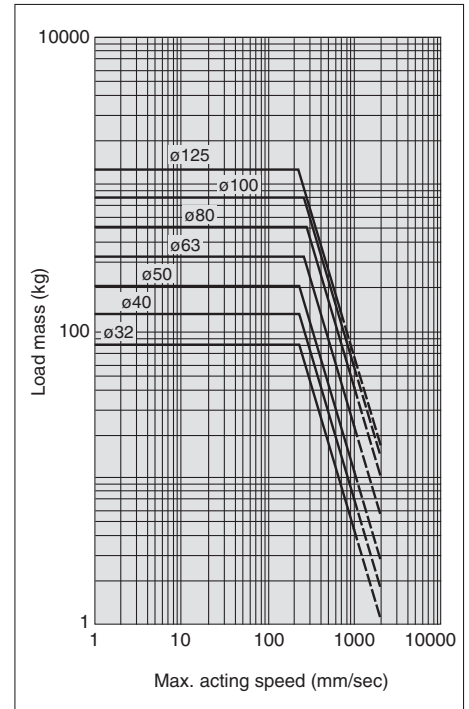
| Bore size (mm)                        |                       | 32   | 40   | 50   | 63   | 80   | 100  | 125  |
|---------------------------------------|-----------------------|------|------|------|------|------|------|------|
| Basic Weight                          | Basic                 | 0.53 | 0.83 | 1.33 | 1.74 | 2.77 | 3.69 | 6.70 |
|                                       | Foot                  | 0.16 | 0.20 | 0.38 | 0.46 | 0.89 | 1.09 | 2.60 |
|                                       | Flange                | 0.20 | 0.23 | 0.47 | 0.58 | 1.30 | 1.81 | 4.10 |
|                                       | Single clevis         | 0.16 | 0.23 | 0.37 | 0.60 | 1.07 | 1.73 | 4.15 |
|                                       | Double clevis         | 0.20 | 0.32 | 0.45 | 0.71 | 1.28 | 2.11 | 4.25 |
|                                       | Trunnion              | 0.71 | 1.10 | 1.73 | 2.48 | 4.25 | 5.95 | 2.98 |
| Additional mass per each 50 mm stroke |                       |      |      |      |      |      |      |      |
|                                       | All mounting brackets | 0.11 | 0.16 | 0.24 | 0.26 | 0.40 | 0.44 | 0.71 |
| Accessory                             | Single rod clevis     | 0.07 | 0.11 | 0.22 |      | 0.40 |      | 1.20 |
|                                       | Double rod clevis     | 0.09 | 0.15 | 0.34 |      | 0.69 |      | 1.84 |

Calculation: (Example) C96SD40-100

- Basic weight ..... 0.83 (kg) (Basic, ø40) • Mounting ..... 0.32 (kg) (Double clevis)
- Additional weight .... 0.16 (kg/50 st)
- Cylinder stroke ..... 100 (st)

$$0.83 + 0.16 \times 100 \div 50 + 0.32 = 1.47\text{kg}$$

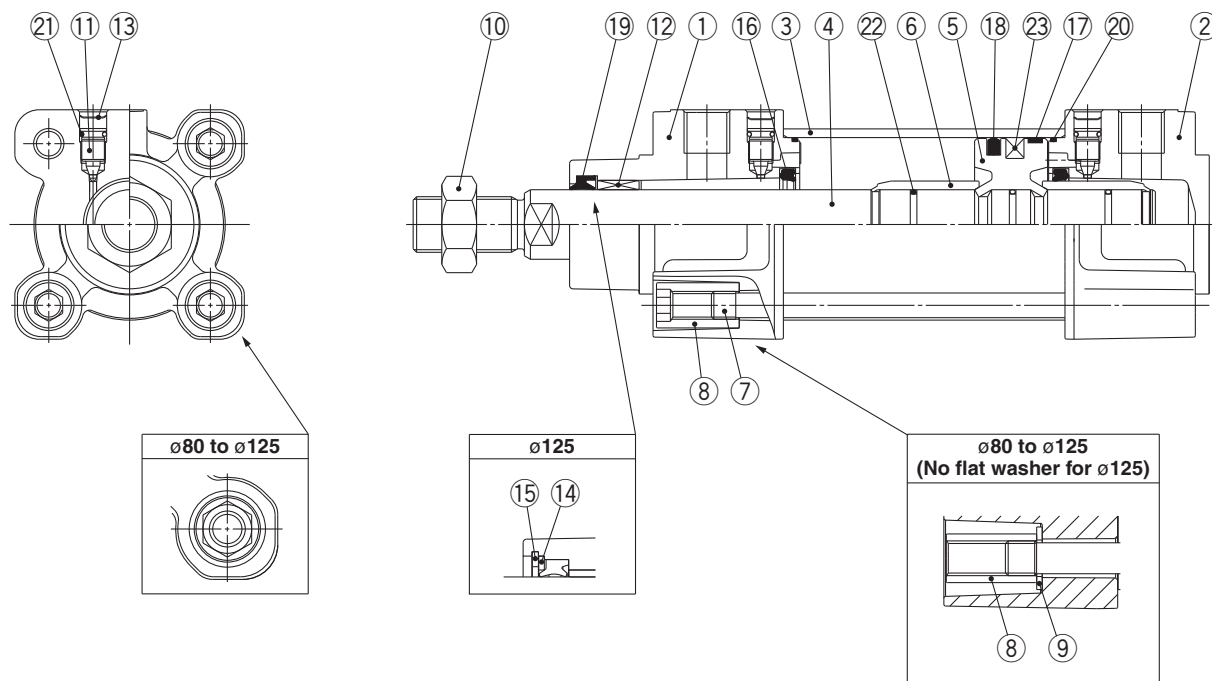
## Allowable Kinetic Energy



Example: Load limit at rod end when air cylinder ø63 is actuated with max. actuating speed 500 mm/s. See the intersection of lateral axis 500 mm/s and ø63 line, and extend the intersection to left. Thus, the allowable load is 80 kg.

## Construction

[First angle projection]



## Component Parts

| No. | Description          | Material             | Note                     |
|-----|----------------------|----------------------|--------------------------|
| 1   | Rod cover            | Aluminium die-casted |                          |
| 2   | Head cover           | Aluminium die-casted |                          |
| 3   | Cylinder tube        | Aluminium alloy      |                          |
| 4   | Piston rod           | Carbon steel         |                          |
| 5   | Piston               | Aluminium alloy      |                          |
| 6   | Cushion ring         | Aluminium alloy      |                          |
| 7   | Tie-rod              | Carbon steel         |                          |
| 8   | Tie-rod nut          | Steel                |                          |
| 9   | Flat washer          | Steel                | $\phi 80$ and $\phi 100$ |
| 10  | Rod end nut          | Steel                |                          |
| 11  | Cushion valve        | Steel wire           |                          |
| 12  | Bushing              | Bearing alloy        |                          |
| 13  | Snap ring            | Steel for spring     | $\phi 40$ to $\phi 125$  |
| 14  | Rod seal holder      | Stainless steel      | $\phi 125$               |
| 15  | Snap ring            | Steel for spring     | $\phi 125$               |
| 16  | Cushion seal         | Urethane rubber      |                          |
| 17  | Wearing              | Resin                |                          |
| 18  | Piston seal          | NBR                  |                          |
| 19  | Rod seal             | NBR                  |                          |
| 20  | Cylinder tube gasket | NBR                  |                          |
| 21  | Cushion valve seal   | NBR                  |                          |
| 22  | Piston gasket        | NBR                  |                          |
| 23  | Magnet               |                      |                          |

## Replacement Parts: Seal Kit/Single rod

| Bore size (mm) | Kit no.  | Contents                     |
|----------------|----------|------------------------------|
| 32             | CS95-32  | Kits include items 16 to 20. |
| 40             | CS95-40  |                              |
| 50             | CS95-50  |                              |
| 63             | CS95-63  |                              |
| 80             | CS95-80  |                              |
| 100            | CS96-100 |                              |
| 125            | CS96-125 |                              |

\* Seal kits consist of items 16 to 20 contained in one kit, and can be ordered using the number for each respective tube bore size.

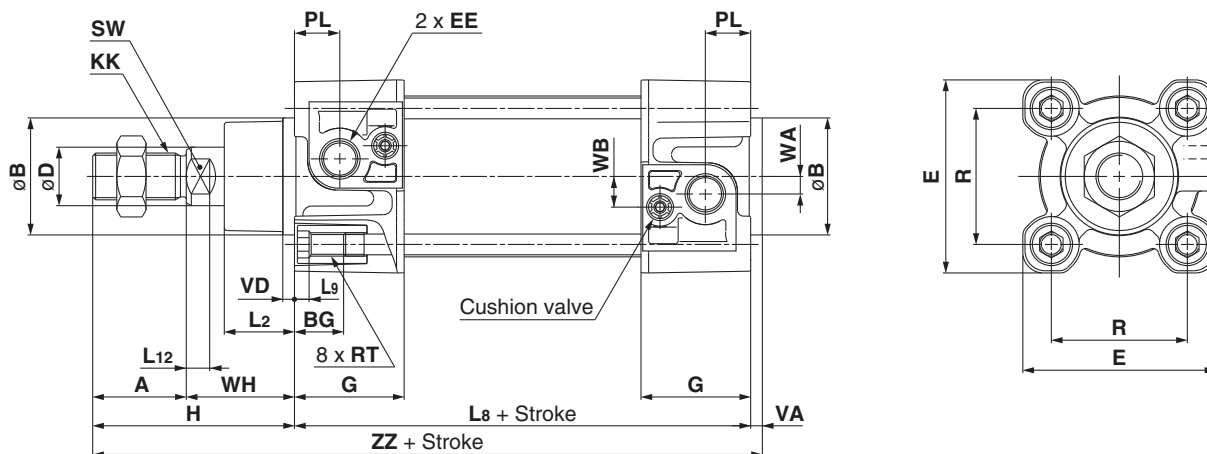
## Seal Kit/Double rod

| Bore size (mm) | Kit no.   | Contents                           |
|----------------|-----------|------------------------------------|
| 32             | CS95W-32  | Kits include items 16 and 18 to 20 |
| 40             | CS95W-40  |                                    |
| 50             | CS95W-50  |                                    |
| 63             | CS95W-63  |                                    |
| 80             | CS95W-80  |                                    |
| 100            | CS96W-100 |                                    |
| 125            | CS96W-125 |                                    |

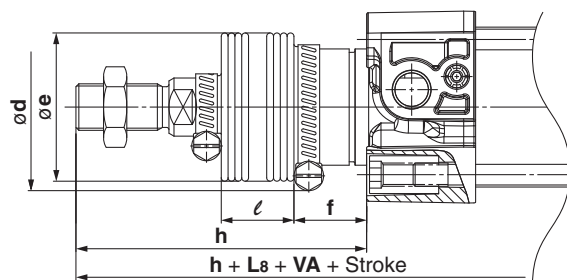
## Dimensions: Without Mounting Bracket

[First angle projection]

C96S(D)B Bore size – Stroke



## With rod boot



| Bore size<br>(mm) | Stroke Range(mm) |               | A  | øB<br>d11 | øD | EE    | PL   | RT         | L12 | KK         | SW | G    | BG | L8  | VD | VA | WA   | WB   | WH | ZZ  | E   | R    |
|-------------------|------------------|---------------|----|-----------|----|-------|------|------------|-----|------------|----|------|----|-----|----|----|------|------|----|-----|-----|------|
|                   | Without rod boot | With rod boot |    |           |    |       |      |            |     |            |    |      |    |     |    |    |      |      |    |     |     |      |
| 32                | to 1000          | to 1000       | 22 | 30        | 12 | G 1/8 | 13   | M6 x 1     | 6   | M10 x 1.25 | 10 | 32   | 16 | 94  | 4  | 4  | 4    | 7    | 26 | 146 | 47  | 32.5 |
| 40                | to 1900          | to 1000       | 24 | 35        | 16 | G 1/4 | 14   | M6 x 1     | 6.5 | M12 x 1.25 | 13 | 37.5 | 16 | 105 | 4  | 4  | 5    | 9    | 30 | 163 | 54  | 38   |
| 50                | to 1900          | to 1000       | 32 | 40        | 20 | G 1/4 | 15.5 | M8 x 1.25  | 8   | M16 x 1.5  | 17 | 37.5 | 16 | 106 | 4  | 4  | 6    | 10.5 | 37 | 179 | 66  | 46.5 |
| 63                | to 1900          | to 1000       | 32 | 45        | 20 | G 3/8 | 16.5 | M8 x 1.25  | 8   | M16 x 1.5  | 17 | 45   | 16 | 121 | 4  | 4  | 9    | 12   | 37 | 194 | 77  | 56.5 |
| 80                | to 1900          | to 1000       | 40 | 45        | 25 | G 3/8 | 19   | M10 x 1.5  | 10  | M20 x 1.5  | 22 | 45   | 17 | 128 | 4  | 4  | 11.5 | 14   | 46 | 218 | 99  | 72   |
| 100               | to 1900*         | to 1000*      | 40 | 55        | 25 | G 1/2 | 19   | M10 x 1.5  | 10  | M20 x 1.5  | 22 | 50   | 17 | 138 | 4  | 4  | 17   | 15   | 51 | 233 | 118 | 89   |
| 125               | to 2000*         | to 1000*      | 54 | 60        | 32 | G 1/2 | 19   | M12 x 1.75 | 13  | M27 x 2    | 27 | 58   | 20 | 160 | 6  | 6  | 17   | 15   | 65 | 285 | 144 | 110  |

\* Minimum stroke for trunnion mounting are below. Tube I.D. 32 to 80: 0mm, Tube I.D. 100: 5mm, Tube I.D. 125: 10mm

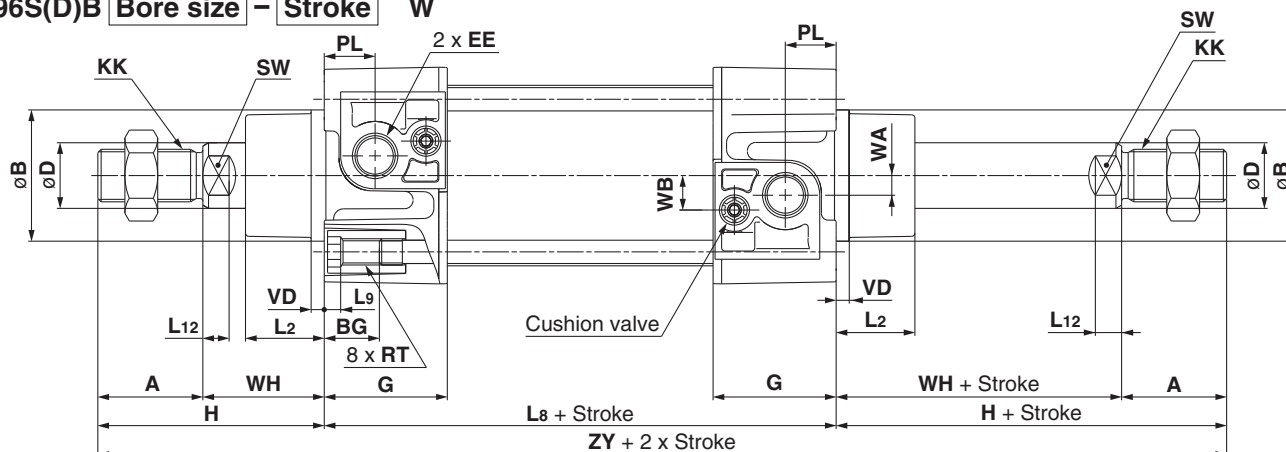
| Bore size<br>(mm) | L <sub>2</sub> | L <sub>9</sub> | H   | ød | øe | f  | ℓ       |           |            |            |            |            |            |            |            |            |            |             | h       |           |            |            |            |            |            |            |            |            |            |             |
|-------------------|----------------|----------------|-----|----|----|----|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
|                   |                |                |     |    |    |    | 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 | 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                | 15             | 4              | 48  | 54 | 36 | 23 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 75      | 88        | 100        | 113        | 138        | 163        | 188        | 213        | 238        | 263        | 288        | 313         |
| 40                | 17             | 4              | 54  | 54 | 36 | 23 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 75      | 88        | 100        | 113        | 138        | 163        | 188        | 213        | 238        | 263        | 288        | 313         |
| 50                | 24             | 5              | 69  | 64 | 51 | 25 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 87      | 100       | 112        | 125        | 150        | 175        | 200        | 225        | 250        | 275        | 300        | 325         |
| 63                | 24             | 5              | 69  | 64 | 51 | 25 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 87      | 100       | 112        | 125        | 150        | 175        | 200        | 225        | 250        | 275        | 300        | 325         |
| 80                | 30             | —              | 86  | 68 | 56 | 30 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 103     | 116       | 128        | 141        | 166        | 191        | 216        | 241        | 266        | 291        | 316        | 341         |
| 100               | 32             | —              | 91  | 76 | 56 | 32 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | 225        | 250         | 103     | 116       | 128        | 141        | 166        | 191        | 216        | 241        | 266        | 291        | 316        | 341         |
| 125               | 40             | —              | 119 | 82 | 75 | 40 | 10      | 20        | 30         | 40         | 60         | 80         | 100        | 120        | 140        | 160        | 180        | 200         | 130     | 140       | 150        | 160        | 180        | 200        | 220        | 240        | 260        | 280        | 300        | 320         |

# Series C96

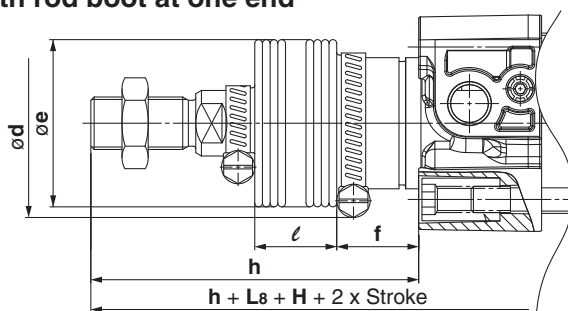
## Dimensions: Without Mounting Bracket

[First angle projection]

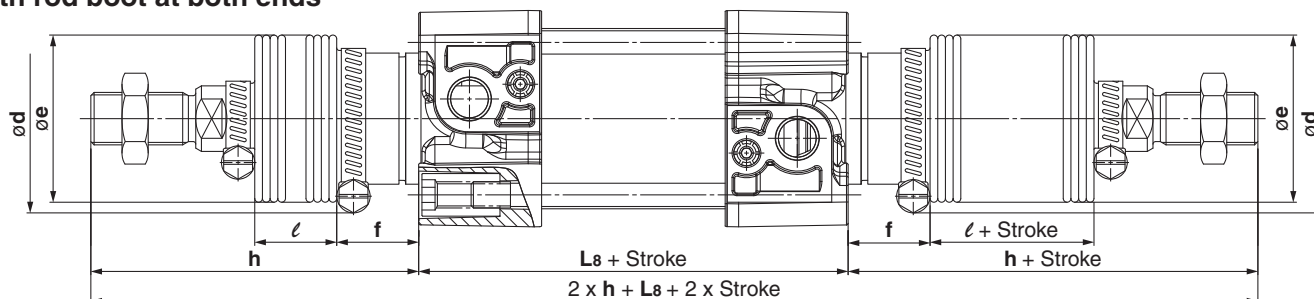
C96S(D)B Bore size – Stroke W



### With rod boot at one end



### With rod boot at both ends



| Bore size (mm) | Stroke Range (mm) | A  | øB d11 | øD | EE    | PL   | RT         | L12 | KK         | SW | G    | BG | L8  | VD | WA   | WB   | WH | ZY  | L2 | L9 |
|----------------|-------------------|----|--------|----|-------|------|------------|-----|------------|----|------|----|-----|----|------|------|----|-----|----|----|
| 32             | to 1000           | 22 | 30     | 12 | G 1/8 | 13   | M6 x 1     | 6   | M10 x 1.25 | 10 | 32   | 16 | 94  | 4  | 4    | 7    | 26 | 190 | 15 | 4  |
| 40             | to 1000           | 24 | 35     | 16 | G 1/4 | 14   | M6 x 1     | 6.5 | M12 x 1.25 | 13 | 37.5 | 16 | 105 | 4  | 5    | 9    | 30 | 213 | 17 | 4  |
| 50             | to 1000           | 32 | 40     | 20 | G 1/4 | 15.5 | M8 x 1.25  | 8   | M16 x 1.5  | 17 | 37.5 | 16 | 106 | 4  | 6    | 10.5 | 37 | 244 | 24 | 5  |
| 63             | to 1000           | 32 | 45     | 20 | G 3/8 | 16.5 | M8 x 1.25  | 8   | M16 x 1.5  | 17 | 45   | 16 | 121 | 4  | 9    | 12   | 37 | 259 | 24 | 5  |
| 80             | to 1000           | 40 | 45     | 25 | G 3/8 | 19   | M10 x 1.5  | 10  | M20 x 1.5  | 22 | 45   | 17 | 128 | 4  | 11.5 | 14   | 46 | 300 | 30 | —  |
| 100            | to 1000*          | 40 | 55     | 25 | G 1/2 | 19   | M10 x 1.5  | 10  | M20 x 1.5  | 22 | 50   | 17 | 138 | 4  | 17   | 15   | 51 | 320 | 32 | —  |
| 125            | to 1000*          | 54 | 60     | 32 | G 1/2 | 19   | M12 x 1.75 | 13  | M27 x 2    | 27 | 58   | 20 | 160 | 6  | 17   | 15   | 65 | 398 | 40 | —  |

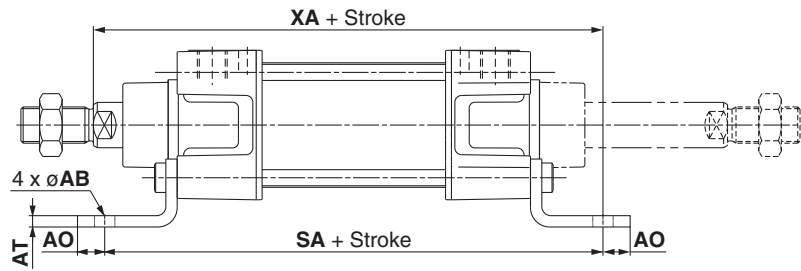
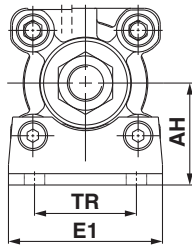
\* Minimum stroke for trunnion mounting are below. Tube I.D. 32 to 80:0mm, Tube I.D. 100:5mm, Tube I.D. 125:10mm

| Bore size<br>(mm) | H   | ød | øe | f  | ℓ             |                 |                  |                  |                  |                  |                  |                  |                  |                  |                  |                   | h             |                 |                  |                  |                  |                  |                  |                  |                  |                  |                  |                   |
|-------------------|-----|----|----|----|---------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|---------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|
|                   |     |    |    |    | 1<br>to<br>50 | 51<br>to<br>100 | 101<br>to<br>150 | 151<br>to<br>200 | 201<br>to<br>300 | 301<br>to<br>400 | 401<br>to<br>500 | 501<br>to<br>600 | 601<br>to<br>700 | 701<br>to<br>800 | 801<br>to<br>900 | 901<br>to<br>1000 | 1<br>to<br>50 | 51<br>to<br>100 | 101<br>to<br>150 | 151<br>to<br>200 | 201<br>to<br>300 | 301<br>to<br>400 | 401<br>to<br>500 | 501<br>to<br>600 | 601<br>to<br>700 | 701<br>to<br>800 | 801<br>to<br>900 | 901<br>to<br>1000 |
| 32                | 48  | 54 | 36 | 23 | 12.5          | 25              | 37.5             | 50               | 75               | 100              | 125              | 150              | 175              | 200              | 225              | 250               | 75            | 88              | 100              | 113              | 138              | 163              | 188              | 213              | 238              | 263              | 288              | 313               |
| 40                | 54  | 54 | 36 | 23 | 12.5          | 25              | 37.5             | 50               | 75               | 100              | 125              | 150              | 175              | 200              | 225              | 250               | 75            | 88              | 100              | 113              | 138              | 163              | 188              | 213              | 238              | 263              | 288              | 313               |
| 50                | 69  | 64 | 51 | 25 | 12.5          | 25              | 37.5             | 50               | 75               | 100              | 125              | 150              | 175              | 200              | 225              | 250               | 87            | 100             | 112              | 125              | 150              | 175              | 200              | 225              | 250              | 275              | 300              | 325               |
| 63                | 69  | 64 | 51 | 25 | 12.5          | 25              | 37.5             | 50               | 75               | 100              | 125              | 150              | 175              | 200              | 225              | 250               | 87            | 100             | 112              | 125              | 150              | 175              | 200              | 225              | 250              | 275              | 300              | 325               |
| 80                | 86  | 68 | 56 | 30 | 12.5          | 25              | 37.5             | 50               | 75               | 100              | 125              | 150              | 175              | 200              | 225              | 250               | 103           | 116             | 128              | 141              | 166              | 191              | 216              | 241              | 266              | 291              | 316              | 341               |
| 100               | 91  | 76 | 56 | 32 | 12.5          | 25              | 37.5             | 50               | 75               | 100              | 125              | 150              | 175              | 200              | 225              | 250               | 103           | 116             | 128              | 141              | 166              | 191              | 216              | 241              | 266              | 291              | 316              | 341               |
| 125               | 119 | 82 | 75 | 40 | 10            | 20              | 30               | 40               | 60               | 80               | 100              | 120              | 140              | 160              | 180              | 200               | 130           | 140             | 150              | 160              | 180              | 200              | 220              | 240              | 260              | 280              | 300              | 320               |

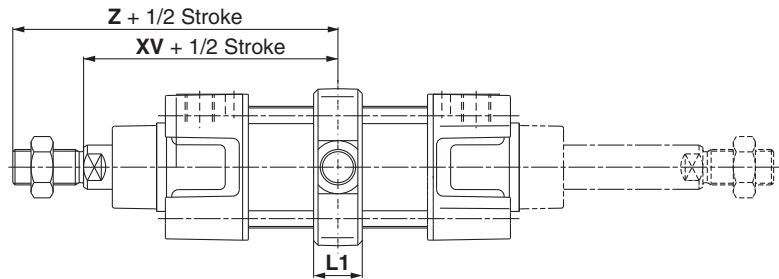
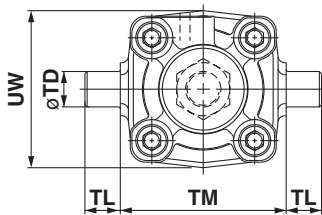
## Dimensions: Cylinder Mounting Accessories

[First angle projection]

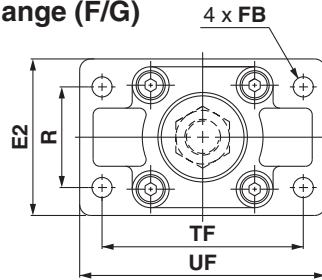
### Foot (L)



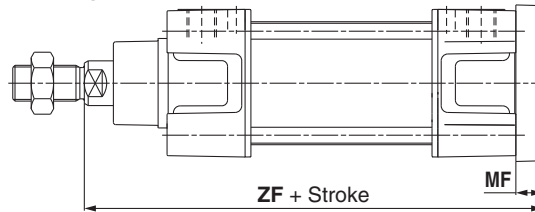
### Centre trunnion (T)



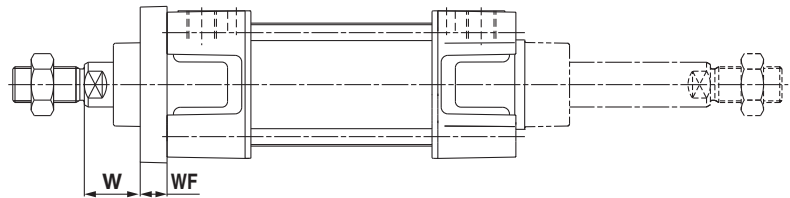
### Flange (F/G)



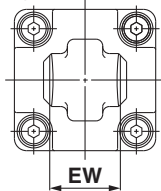
### Head end mounting (G)



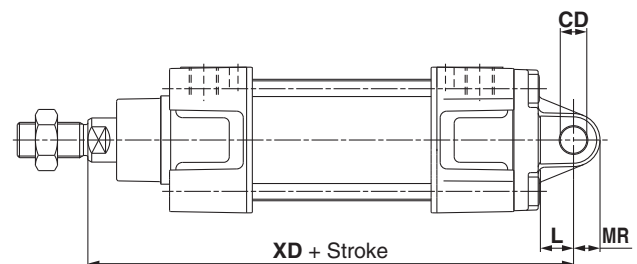
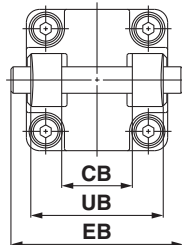
### Rod end mounting (F)



### Head end single clevis (C)



### Head end double clevis (D)

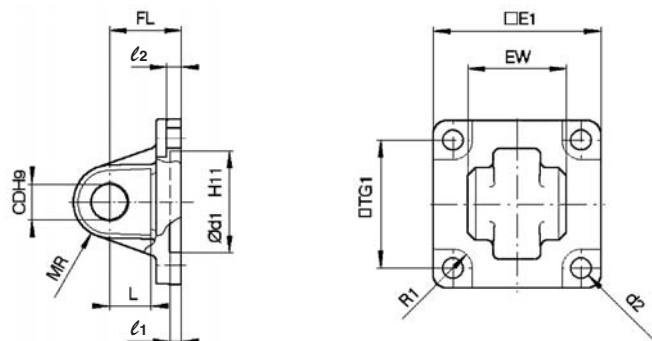


| Bore size<br>(mm) | E1          | TR | AH | AO         | AT  | øAB  | SA  | XA  | TM  | TL | øTD<br>e8 | UW          | L1 | XV   | Z     | R  | TF  | øFB | E2          | UF          | W  | MF | ZF  | UB<br>h14 | CB<br>H14 | EW          | øCD<br>H9 | L          | MR         | XD  | EB          |
|-------------------|-------------|----|----|------------|-----|------|-----|-----|-----|----|-----------|-------------|----|------|-------|----|-----|-----|-------------|-------------|----|----|-----|-----------|-----------|-------------|-----------|------------|------------|-----|-------------|
| 32                | 48          | 32 | 32 | 10         | 4.5 | 7    | 142 | 144 | 50  | 12 | 12        | 49          | 17 | 73   | 95    | 32 | 64  | 7   | 50          | 79          | 16 | 10 | 130 | 45        | 26        | 26-0.2/-0.6 | 10        | 12         | 9.5        | 142 | 65          |
| 40                | 55          | 36 | 36 | 11         | 4.5 | 10   | 161 | 163 | 63  | 16 | 16        | 58          | 22 | 82.5 | 106.5 | 36 | 72  | 9   | 55          | 90          | 20 | 10 | 145 | 52        | 28        | 28-0.2/-0.6 | 12        | 15         | 12         | 160 | 75          |
| 50                | 68          | 45 | 45 | 12         | 5.5 | 10   | 170 | 175 | 75  | 16 | 16        | 71          | 22 | 90   | 122   | 45 | 90  | 9   | 70          | 110         | 25 | 12 | 155 | 60        | 32        | 32-0.2/-0.6 | 12        | 15         | 12         | 170 | 80          |
| 63                | 80          | 50 | 50 | 12         | 5.5 | 10   | 185 | 190 | 90  | 20 | 20        | 87          | 28 | 97.5 | 129.5 | 50 | 100 | 9   | 80          | 120         | 25 | 12 | 170 | 70        | 40        | 40-0.2/-0.6 | 16        | 20         | 16         | 190 | 90          |
| 80                | 100         | 63 | 63 | 14         | 6.5 | 12   | 210 | 215 | 110 | 20 | 20        | 110         | 34 | 110  | 150   | 63 | 126 | 12  | 100         | 153         | 30 | 16 | 190 | 90        | 50        | 50-0.2/-0.6 | 16        | 20         | 16         | 210 | 110         |
| 100               | 120         | 75 | 71 | 16         | 6.5 | 14.5 | 220 | 230 | 132 | 25 | 25        | 136         | 40 | 120  | 160   | 75 | 150 | 14  | 120         | 178         | 35 | 16 | 205 | 110       | 60        | 60-0.2/-0.6 | 20        | 25         | 20         | 230 | 140         |
| 125               | Max.<br>157 | 90 | 90 | Max.<br>25 | 8   | 16   | 250 | 270 | 160 | 25 | 25        | Max.<br>160 | 50 | 145  | 199   | 90 | 180 | 16  | Max.<br>157 | Max.<br>224 | 45 | 20 | 245 | 130       | 70        | 70-0.5/-1.2 | 25        | Min.<br>30 | Max.<br>26 | 275 | Max.<br>157 |

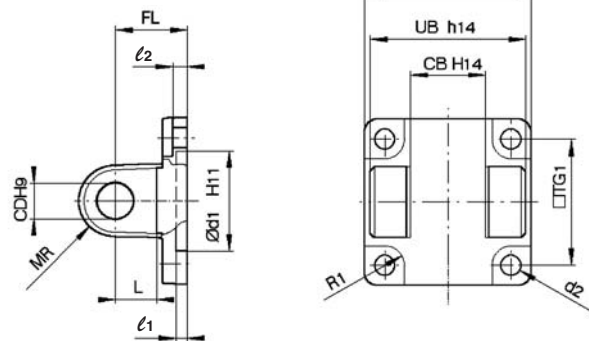
## Dimensions: Cylinder Mounting Accessories (C/D/E/CS)

[First angle projection]

### Mounting (C)

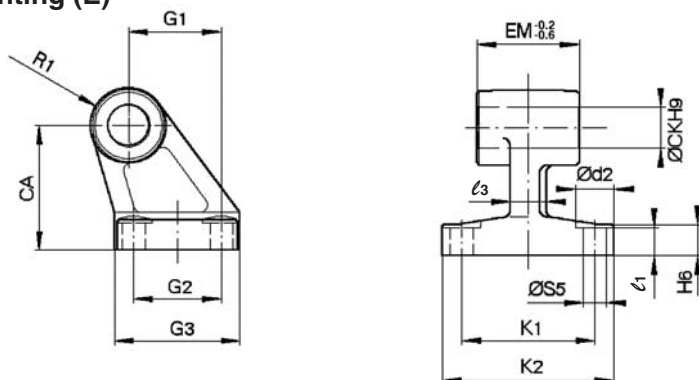


### Mounting (D)



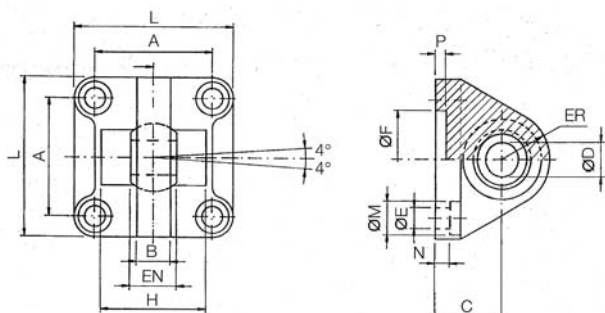
| Bore size (mm) | E1       | EW                                 | TG1  | FL | l1 | L  | l2  | Ød1 | ØCD | MR  | Ød2  | R1  | E2       | UB  | CB |
|----------------|----------|------------------------------------|------|----|----|----|-----|-----|-----|-----|------|-----|----------|-----|----|
| 32             | 45       | 26 <sup>-0.2</sup> <sub>-0.6</sub> | 32.5 | 22 | 5  | 12 | 5.5 | 30  | 10  | 9.5 | 6.6  | 6.5 | 48       | 45  | 26 |
| 40             | 51       | 28 <sup>-0.2</sup> <sub>-0.6</sub> | 38   | 25 | 5  | 15 | 5.5 | 35  | 12  | 12  | 6.6  | 6.5 | 56       | 52  | 28 |
| 50             | 64       | 32 <sup>-0.2</sup> <sub>-0.6</sub> | 46.5 | 27 | 5  | 15 | 6.5 | 40  | 12  | 12  | 9    | 8.5 | 64       | 60  | 32 |
| 63             | 74       | 40 <sup>-0.2</sup> <sub>-0.6</sub> | 56.5 | 32 | 5  | 20 | 6.5 | 45  | 16  | 16  | 9    | 8.5 | 75       | 70  | 40 |
| 80             | 94       | 50 <sup>-0.2</sup> <sub>-0.6</sub> | 72   | 36 | 5  | 20 | 10  | 45  | 16  | 16  | 11   | 11  | 95       | 90  | 50 |
| 100            | 113      | 60 <sup>-0.2</sup> <sub>-0.6</sub> | 89   | 41 | 5  | 25 | 10  | 55  | 20  | 20  | 11   | 12  | 115      | 110 | 60 |
| 125            | Max. 157 | 70 <sup>-0.5</sup> <sub>-1.2</sub> | 110  | 50 | 7  | 30 | 10  | 60  | 25  | 26  | 13.5 | 10  | Max. 157 | 130 | 70 |

### Mounting (E)



| Bore size (mm) | Ød2 | ØCK | ØS5 | K1 | K2 max. | l3 max. | G1 | l1   | G2 | EM                                 | G3 max. | CA | H6 | R1   |
|----------------|-----|-----|-----|----|---------|---------|----|------|----|------------------------------------|---------|----|----|------|
| 32             | 11  | 10  | 6.6 | 38 | 51      | 10      | 21 | 7    | 18 | 26 <sup>-0.2</sup> <sub>-0.6</sub> | 31      | 32 | 8  | 10   |
| 40             | 11  | 12  | 6.6 | 41 | 54      | 10      | 24 | 9    | 22 | 28 <sup>-0.2</sup> <sub>-0.6</sub> | 35      | 36 | 10 | 11   |
| 50             | 15  | 12  | 9   | 50 | 65      | 12      | 33 | 11   | 30 | 32 <sup>-0.2</sup> <sub>-0.6</sub> | 45      | 45 | 12 | 12   |
| 63             | 15  | 16  | 9   | 52 | 67      | 14      | 37 | 11   | 35 | 40 <sup>-0.2</sup> <sub>-0.6</sub> | 50      | 50 | 12 | 15   |
| 80             | 18  | 16  | 11  | 66 | 86      | 18      | 47 | 12.5 | 40 | 50 <sup>-0.2</sup> <sub>-0.6</sub> | 60      | 63 | 14 | 15   |
| 100            | 18  | 20  | 11  | 76 | 96      | 20      | 55 | 13.5 | 50 | 60 <sup>-0.2</sup> <sub>-0.6</sub> | 70      | 71 | 15 | 19   |
| 125            | 20  | 25  | 14  | 94 | 124     | 30      | 70 | 17   | 60 | 70 <sup>-0.5</sup> <sub>-1.5</sub> | 90      | 90 | 20 | 22.5 |

### Mounting (CS): Head end clevis with ball joint



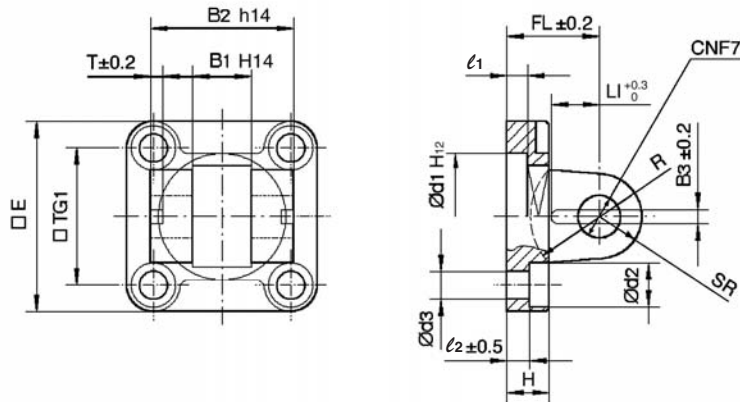
| Bore size (mm) | A    | B max. | C  | ØD H7 | EN 0-0.1 | ER max. | ØF H11 | ØE   | L   | ØM   | N   | P | H 0.5 |
|----------------|------|--------|----|-------|----------|---------|--------|------|-----|------|-----|---|-------|
| 32             | 32.5 | 10.5   | 22 | 10    | 14       | 15      | 30     | 6.6  | 45  | 10.5 | 5.5 | 5 | —     |
| 40             | 38   | 12     | 25 | 12    | 16       | 18      | 35     | 6.6  | 55  | 11   | 5.5 | 5 | —     |
| 50             | 46.5 | 15     | 27 | 16    | 21       | 20      | 40     | 9    | 65  | 15   | 6.5 | 5 | 51    |
| 63             | 56.5 | 15     | 32 | 16    | 21       | 23      | 45     | 9    | 75  | 15   | 6.5 | 5 | —     |
| 80             | 72   | 18     | 36 | 20    | 25       | 27      | 45     | 11   | 95  | 18   | 10  | 5 | 70    |
| 100            | 89   | 18     | 41 | 20    | 25       | 30      | 55     | 11   | 115 | 18   | 10  | 5 | —     |
| 125            | 110  | 25     | 50 | 30    | 37       | 40      | 60     | 13.5 | 140 | 20   | 10  | 7 | 100   |

\* Black colour

## Dimensions: Cylinder Mounting Accessories (DS/ES)

[First angle projection]

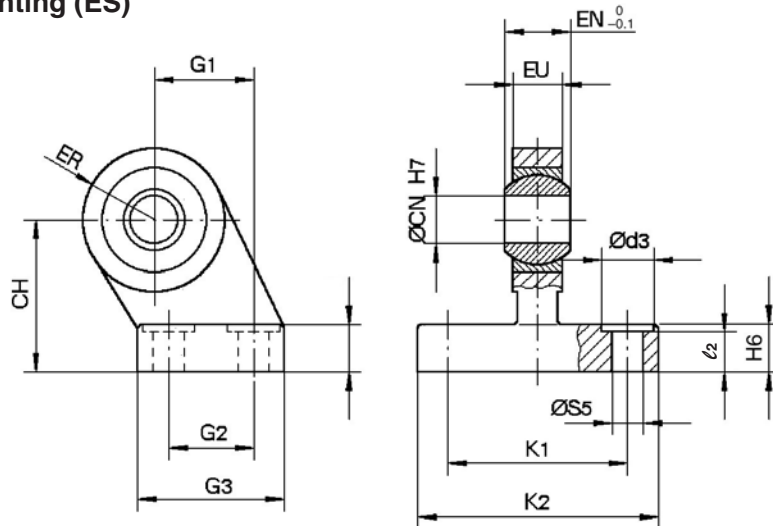
### Mounting (DS)



| Bore size (mm) | E   | B <sub>1</sub> | B <sub>2</sub> | B <sub>3</sub> | L <sub>1</sub> | TG <sub>1</sub> | T | ℓ <sub>1</sub> min. | ℓ <sub>2</sub> | FL | H max. | ∅d <sub>1</sub> | ∅d <sub>2</sub> | ∅d <sub>3</sub> | ∅CN | SR max. | R  |
|----------------|-----|----------------|----------------|----------------|----------------|-----------------|---|---------------------|----------------|----|--------|-----------------|-----------------|-----------------|-----|---------|----|
| 32             | 45  | 14             | 34             | 3.3            | 11.5           | 32.5            | 3 | 5                   | 5.5            | 22 | 10     | 30              | 10.5            | 6.6             | 10  | 11      | 17 |
| 40             | 55  | 16             | 40             | 4.3            | 12             | 38              | 4 | 5                   | 5.5            | 25 | 10     | 35              | 11              | 6.6             | 12  | 13      | 20 |
| 50             | 65  | 21             | 45             | 4.3            | 14             | 46.5            | 4 | 5                   | 6.5            | 27 | 12     | 40              | 15              | 9               | 16  | 18      | 22 |
| 63             | 75  | 21             | 51             | 4.3            | 14             | 56.5            | 4 | 5                   | 6.5            | 32 | 12     | 45              | 15              | 9               | 16  | 18      | 25 |
| 80             | 95  | 25             | 65             | 4.3            | 16             | 72              | 4 | 5                   | 10             | 36 | 16     | 45              | 18              | 11              | 20  | 22      | 30 |
| 100            | 115 | 25             | 75             | 6.3            | 16             | 89              | 4 | 5                   | 10             | 41 | 16     | 55              | 18              | 11              | 20  | 22      | 32 |
| 125            | 140 | 37             | 97             | 6.3            | 24             | 110             | 6 | 7                   | 10             | 50 | 20     | 60              | 20              | 13.5            | 30  | 30      | 42 |

\* Black colour

### Mounting (ES)



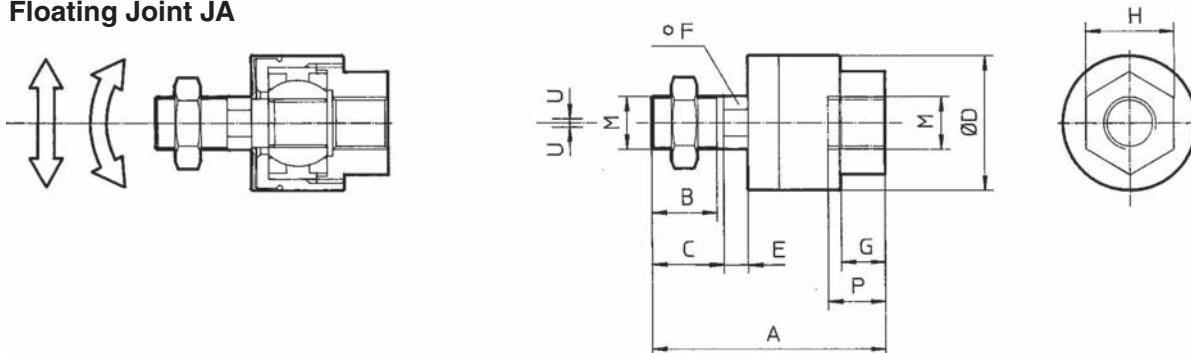
| Bore size (mm) | ∅d <sub>3</sub> | ∅CN | ∅S <sub>5</sub> | K <sub>1</sub> | K <sub>2</sub> max. | ℓ <sub>2</sub> | G <sub>1</sub> | G <sub>2</sub> | G <sub>3</sub> max. | EN | EU   | CH | H <sub>6</sub> | ER max. |
|----------------|-----------------|-----|-----------------|----------------|---------------------|----------------|----------------|----------------|---------------------|----|------|----|----------------|---------|
| 32             | 11              | 10  | 6.6             | 38             | 51                  | 8.5            | 21             | 18             | 31                  | 14 | 10.5 | 32 | 10             | 15      |
| 40             | 11              | 12  | 6.6             | 41             | 54                  | 8.5            | 24             | 22             | 35                  | 16 | 12   | 36 | 10             | 18      |
| 50             | 15              | 16  | 9               | 50             | 65                  | 10.5           | 33             | 30             | 45                  | 21 | 15   | 45 | 12             | 20      |
| 63             | 15              | 16  | 9               | 52             | 67                  | 10.5           | 37             | 35             | 50                  | 21 | 15   | 50 | 12             | 23      |
| 80             | 18              | 20  | 11              | 66             | 86                  | 11.5           | 47             | 40             | 60                  | 25 | 18   | 63 | 14             | 27      |
| 100            | 18              | 20  | 11              | 76             | 96                  | 12.5           | 55             | 50             | 70                  | 25 | 18   | 71 | 15             | 30      |
| 125            | 20              | 30  | 13.5            | 94             | 124                 | 17             | 70             | 60             | 90                  | 37 | 25   | 90 | 20             | 40      |

\* Black colour

## Dimensions: Piston Rod Mounting Accessories

[First angle projection]

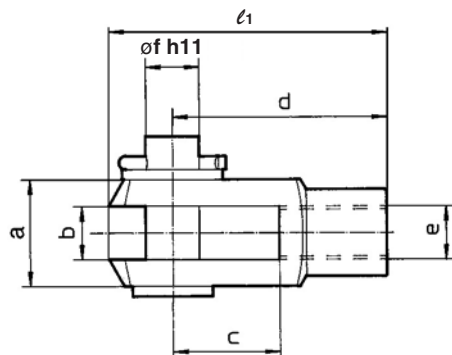
### Floating Joint JA



| Bore size (mm) | M          | Part no.     | A    | B    | C  | ØD   | E    | F  | G    | H  | P  | U    | Load (kN) | Weight (g) | Angle |
|----------------|------------|--------------|------|------|----|------|------|----|------|----|----|------|-----------|------------|-------|
| 32             | M10 x 1.25 | JA30-10-125  | 49.5 | 19.5 | —  | 24   | 5    | 8  | 8    | 17 | 9  | 0.5  | 2.5       | 70         | ±5°   |
| 40             | M12 x 1.25 | JA40-12-125  | 60   | 20   | —  | 31   | 6    | 11 | 11   | 22 | 13 | 0.75 | 4.4       | 160        |       |
| 50, 63         | M16 x 1.5  | JA50-16-150  | 71.5 | 22   | —  | 41   | 7.5  | 14 | 13.5 | 27 | 15 | 1    | 11        | 300        |       |
| 80, 100        | M20 x 1.5  | JAH50-20-150 | 101  | 28   | 31 | 59.5 | 11.5 | 24 | 16   | 32 | 18 | 2    | 18        | 1080       |       |
| 125            | M27 x 2    | JA125-27-200 | 123  | 34   | 38 | 66   | 13   | 27 | 20   | 41 | 24 | 2    | 28        | 1500       |       |

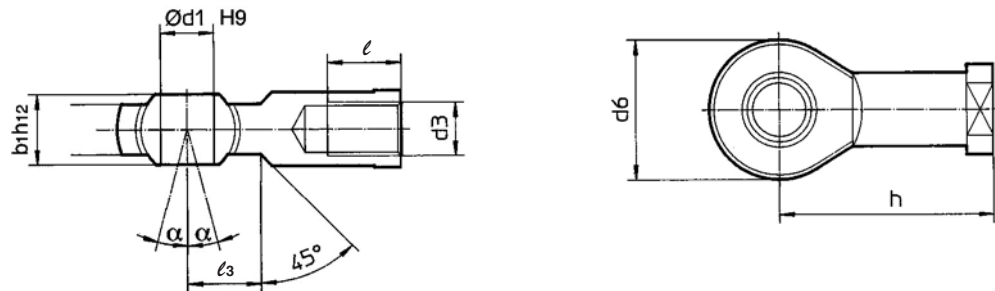
\* Black colour

### Rod Clevis GKM (ISO 8140), Supplied with Bolt and Safety Device



| Bore size (mm) | e          | Part no. | b                        | d   | Øf h11 (Shaft) | Øf H9 (Hole) | l1  | c min. | a max. |
|----------------|------------|----------|--------------------------|-----|----------------|--------------|-----|--------|--------|
| 32             | M10 x 1.25 | GKM10-20 | 10 <sup>+0.5/+0.15</sup> | 40  | 10             | 10           | 52  | 20     | 20     |
| 40             | M12 x 1.25 | GKM12-24 | 12 <sup>+0.5/+0.15</sup> | 48  | 12             | 12           | 62  | 24     | 24     |
| 50, 63         | M16 x 1.5  | GKM16-32 | 16 <sup>+0.5/+0.15</sup> | 64  | 16             | 16           | 83  | 32     | 32     |
| 80, 100        | M20 x 1.5  | GKM20-40 | 20 <sup>+0.5/+0.15</sup> | 80  | 20             | 20           | 105 | 40     | 40     |
| 125            | M27 x 2    | GKM30-54 | 30 <sup>+0.5/+0.15</sup> | 110 | 30             | 30           | 148 | 54     | 55     |

### Piston Rod Ball Joint KJ (ISO 8139)



| Bore size (mm) | d3         | Part no. | Ød1 H9 | h   | d6 max. | b1 h12 | l min. | α  | l3 |
|----------------|------------|----------|--------|-----|---------|--------|--------|----|----|
| 32             | M10 x 1.25 | KJ10D    | 10     | 43  | 28      | 14     | 20     | 4° | 15 |
| 40             | M12 x 1.25 | KJ12D    | 12     | 50  | 32      | 16     | 22     | 4° | 17 |
| 50, 63         | M16 x 1.5  | KJ16D    | 16     | 64  | 42      | 21     | 28     | 4° | 23 |
| 80, 100        | M20 x 1.5  | KJ20D    | 20     | 77  | 50      | 25     | 33     | 4° | 27 |
| 125            | M27 x 2    | KJ27D    | 30     | 110 | 70      | 37     | 51     | 4° | 36 |

# ISO Cylinder: Non-rotating Rod Type Double Acting, Single/Double Rod Series **C96K** ø32, ø40, ø50, ø63, ø80, ø100

## How to Order

**With auto switch** **C96KD B 32 - 100 W - M9BW S**

**Built-in magnet** •

**Mounting** •

|          |                       |
|----------|-----------------------|
| <b>B</b> | Basic/Without bracket |
| <b>L</b> | Axial foot            |
| <b>F</b> | Rod end flange        |
| <b>G</b> | Head end flange       |
| <b>C</b> | Single clevis         |
| <b>D</b> | Double clevis         |
| <b>T</b> | Centre trunnion       |

**Bore size** •

|            |        |
|------------|--------|
| <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 |

**Stroke (mm)** •  
Refer to "Maximum Stroke" on page 38.

**Rod** •

|          |            |
|----------|------------|
| <b>—</b> | Single rod |
| <b>W</b> | Double rod |

**Number of auto switches**

|          |          |
|----------|----------|
| <b>—</b> | 2 pcs.   |
| <b>S</b> | 1 pc.    |
| <b>3</b> | 3 pcs.   |
| <b>n</b> | "n" pcs. |

**Auto switch**

|          |                     |
|----------|---------------------|
| <b>—</b> | Without auto switch |
|----------|---------------------|

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

## Applicable Auto Switches/Tie-rod Mounting

| 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 (—)              | 1 (M) | 3 (L) | 5 (Z) |                     |                 |            |            |
| Solid state switch              | —                                          | Grommet                 | Yes             | 3-wire (NPN)    | 24 V         | 5 V, 12 V              | —                 | M9N           | —                    | ●     | ●     | ●     | ○                   | ○               | IC         | Relay, PLC |
|                                 |                                            |                         |                 | 3-wire (PNP)    |              |                        |                   | M9P           | —                    | ●     | ●     | ●     | ○                   | ○               |            |            |
|                                 |                                            | 2-wire                  |                 | —               |              |                        |                   | —             | 100 V, 200 V         | M9B   | —     | ●     | ●                   | ●               |            |            |
|                                 |                                            | Terminal conduit        |                 | 3-wire (NPN)    | 24 V         | 5 V, 12 V              | —                 | G39           | —                    | —     | —     | —     | —                   | IC              |            |            |
|                                 | 2-wire                                     |                         |                 | —               |              |                        |                   | K39           | —                    | —     | —     | —     | —                   |                 |            |            |
|                                 | Diagnosis indication (2-colour)            | Grommet                 |                 | 3-wire (NPN)    |              |                        |                   | 24 V          | 5 V, 12 V            | —     | M9NW  | —     | ●                   | ●               | ●          |            |
|                                 |                                            |                         |                 | 3-wire (PNP)    | M9PW         | —                      | ●                 |               |                      |       | ●     | ●     | ○                   | ○               |            |            |
|                                 |                                            |                         |                 | 2-wire          | M9BW         | —                      | ●                 |               |                      |       | ●     | ●     | ○                   | ○               | —          |            |
|                                 |                                            |                         |                 | 3-wire (NPN)    | M9NA**       | —                      | ○                 |               |                      |       | ○     | ●     | ○                   | ○               | IC         |            |
|                                 |                                            |                         |                 | 3-wire (PNP)    | M9PA**       | —                      | ○                 |               |                      |       | ○     | ●     | ○                   | ○               |            |            |
|                                 |                                            |                         |                 | 2-wire          | M9BA**       | —                      | ○                 |               |                      |       | ○     | ●     | ○                   | ○               |            |            |
|                                 | Diagnosis output (2-colour)                | 4-wire (NPN)            |                 | 5 V, 12 V       | F59F         | —                      | ●                 | —             | ●                    | ○     | ○     | IC    |                     |                 |            |            |
|                                 | Strong magnetic field resistant (2-colour) | 2-wire (Non-polar type) |                 | —               | P4DW         | —                      | —                 | —             | ●                    | ●     | ○     | —     |                     |                 |            |            |
|                                 | Reed switch                                | —                       |                 | Grommet         | Yes          | 3-wire (Equiv. to NPN) | —                 | 5 V           | —                    | A96   | —     | ●     | —                   | ●               | —          |            |
| None                            |                                            |                         | 2-wire          |                 | 24 V         | 12 V                   | 100 V             | A93           | —                    | ●     | —     | ●     | —                   | —               | IC         |            |
| 100 V or less                   |                                            |                         |                 |                 |              |                        | A90               | —             | ●                    | —     | ●     | —     | —                   | —               |            |            |
| 200 V or less                   |                                            |                         |                 | A64             |              |                        | —                 | ●             | —                    | ●     | —     | —     | —                   |                 |            |            |
| Terminal conduit                |                                            |                         |                 | —               |              |                        | —                 | A33           | —                    | —     | —     | —     |                     | —               | Relay, PLC |            |
|                                 |                                            |                         |                 | DIN             |              |                        | 100 V, 200 V      | —             | A34                  | —     | —     | —     |                     | —               |            | —          |
|                                 |                                            | —                       |                 |                 |              |                        | —                 | A44           | —                    | —     | —     | —     | —                   |                 |            |            |
| Diagnosis indication (2-colour) |                                            | Grommet                 | —               | —               | A59W         | —                      | ●                 | —             | ●                    | —     | —     |       |                     |                 |            |            |

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

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

\* Since there are other applicable auto switches than listed, refer to the auto switch guide.

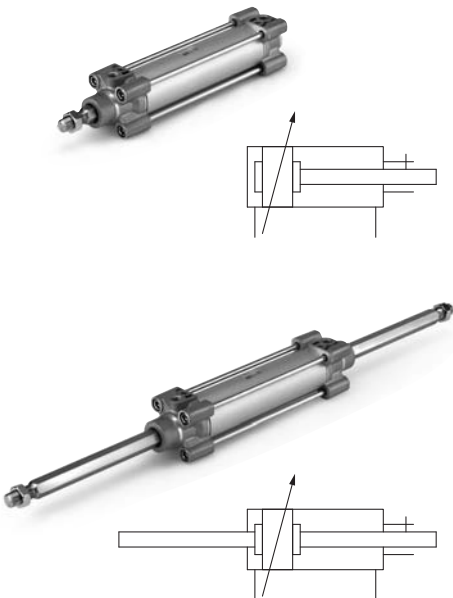
\* For details about auto switches with pre-wired connector, refer to the auto switch guide.

\* D-A9□, M9□, M9□W, M9□AL are shipped together, (but not assembled).

(Switch mounting bracket is only assembled at the time of shipment.)

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

# Series C96K



## Minimum Stroke for Auto Switch Mounting

Refer to page 48 for "Minimum Stroke for Auto Switch Mounting".

## Specifications

| Bore size (mm)                           | 32                                                                                                | 40    | 50              | 63    | 80              | 100   |
|------------------------------------------|---------------------------------------------------------------------------------------------------|-------|-----------------|-------|-----------------|-------|
| <b>Action</b>                            | Double acting                                                                                     |       |                 |       |                 |       |
| <b>Fluid</b>                             | Air                                                                                               |       |                 |       |                 |       |
| <b>Proof pressure</b>                    | 1.5 MPa                                                                                           |       |                 |       |                 |       |
| <b>Max. operating pressure</b>           | 1.0 MPa                                                                                           |       |                 |       |                 |       |
| <b>Min. operating pressure</b>           | 0.05 MPa                                                                                          |       |                 |       |                 |       |
| <b>Ambient and fluid temperature</b>     | Without auto switch: -20 to 70°C*<br>With auto switch: -10 to 60°C*                               |       |                 |       |                 |       |
| <b>Lubrication</b>                       | Not required (Non-lube)                                                                           |       |                 |       |                 |       |
| <b>Operating piston speed</b>            | 50 to 1000 mm/s                                                                                   |       |                 |       |                 |       |
| <b>Allowable stroke tolerance</b>        | Up to 250 st: $+1.0_0$ , 251 to 1000 st: $+1.4_0$                                                 |       |                 |       |                 |       |
| <b>Cushion</b>                           | Both ends (Air cushion)                                                                           |       |                 |       |                 |       |
| <b>Port size</b>                         | G 1/8                                                                                             | G 1/4 | G 1/4           | G 3/8 | G 3/8           | G 1/2 |
| <b>Mounting</b>                          | Basic, Axial foot, Rod end flange, Head end flange, Single clevis, Double clevis, Centre trunnion |       |                 |       |                 |       |
| <b>Non-rotating accuracy</b>             | $\pm 0.5^\circ$                                                                                   |       | $\pm 0.5^\circ$ |       | $\pm 0.3^\circ$ |       |
| <b>Allowable rotating torque Nm max.</b> | 0.25                                                                                              | 0.45  | 0.64            |       | 0.79            |       |

\* No freezing

## Maximum stroke

| Bore size (mm) | Max. stroke* |
|----------------|--------------|
| 32             | 500          |
| 40             | 500          |
| 50             | 600          |
| 63             | 600          |
| 80             | 800          |
| 100            | 800          |

Intermediate strokes are available.

\* Please consult with SMC for longer strokes.

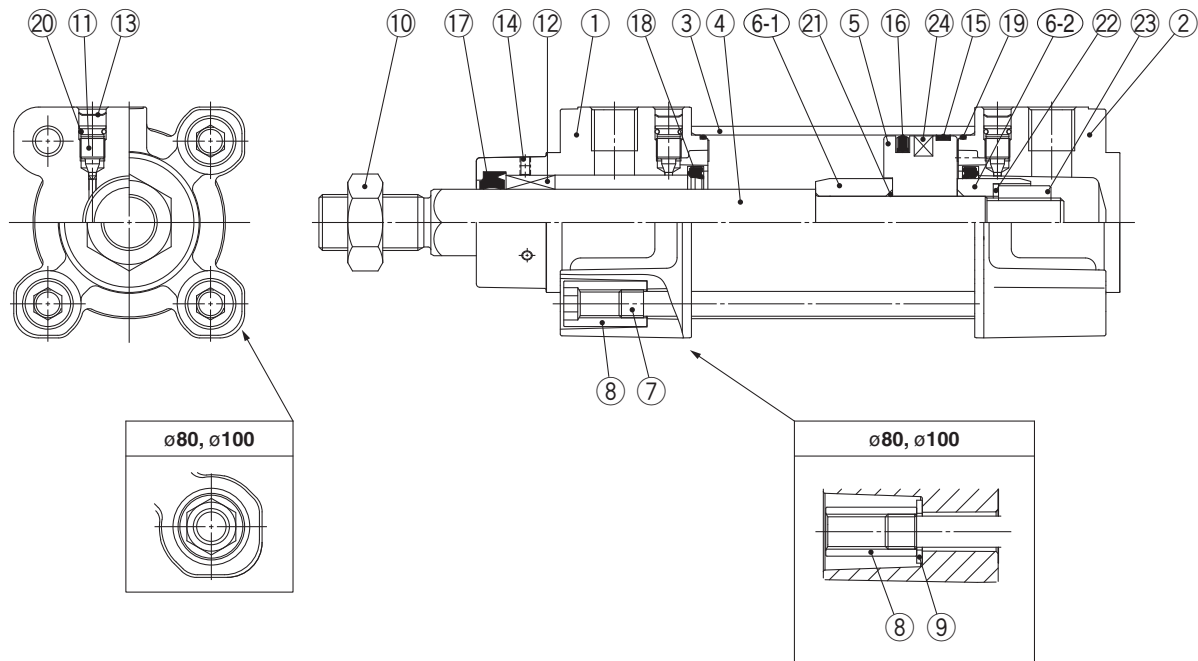
## Accessories

|          | Mounting              | Basic | Foot | Rod end flange | Head end flange | Single clevis | Double clevis | Centre trunnion |
|----------|-----------------------|-------|------|----------------|-----------------|---------------|---------------|-----------------|
| Standard | Rod end nut           | ●     | ●    | ●              | ●               | ●             | ●             | ●               |
|          | Clevis pin            | —     | —    | —              | —               | —             | ●             | —               |
| Option   | Piston rod ball joint | ●     | ●    | ●              | ●               | ●             | ●             | ●               |
|          | Rod clevis            | ●     | ●    | ●              | ●               | ●             | ●             | ●               |
|          | Rod boot              | —     | —    | —              | —               | —             | —             | —               |

\* Please do not use a piston rod ball joint (or floating joint) together with a head end clevis with a ball joint (or angled head end clevis with a ball joint).

## Construction

[First angle projection]



## Component Parts

| No. | Description          | Material             | Note         |
|-----|----------------------|----------------------|--------------|
| 1   | Rod cover            | Aluminium die-casted |              |
| 2   | Head cover           | Aluminium die-casted |              |
| 3   | Cylinder tube        | Aluminium alloy      |              |
| 4   | Piston rod           | Stainless steel      |              |
| 5   | Piston               | Aluminium alloy      |              |
| 6-1 | Cushion ring         | Steel                |              |
| 6-2 | Cushion ring         | Steel                |              |
| 7   | Tie-rod              | Carbon steel         |              |
| 8   | Tie-rod nut          | Steel                |              |
| 9   | Flat washer          | Steel                | ø80 and ø100 |
| 10  | Rod end nut          | Steel                |              |
| 11  | Cushion valve        | Steel wire           |              |
| 12  | Non-rotating guide   | Bearing alloy        |              |
| 13  | Snap ring            | Steel for spring     | ø40 to ø100  |
| 14  | Set screw            | steel                |              |
| 15  | Wearing              | Resin                |              |
| 16  | Piston seal          | NBR                  |              |
| 17  | Rod seal             | NBR                  |              |
| 18  | Cushion seal         | Urethane rubber      |              |
| 19  | Cylinder tube gasket | NBR                  |              |
| 20  | Cushion valve seal   | NBR                  |              |
| 21  | Piston gasket        | NBR                  |              |
| 22  | Spring washer        | steel                |              |
| 23  | Piston nut           | steel                |              |
| 24  | Magnet               |                      |              |

## Replacement Parts: Seal Kit/Single rod

| Bore size (mm) | Kit no.  | Contents                     |
|----------------|----------|------------------------------|
| 32             | CK95-32  | Kits include items 15 to 19. |
| 40             | CK95-40  |                              |
| 50             | CK95-50  |                              |
| 63             | CK95-63  |                              |
| 80             | CK95-80  |                              |
| 100            | CK96-100 |                              |

\* Seal kits consist of items 15 to 19 contained in one kit, and can be ordered using the number for each respective tube bore size.

## Seal Kit/Double rod

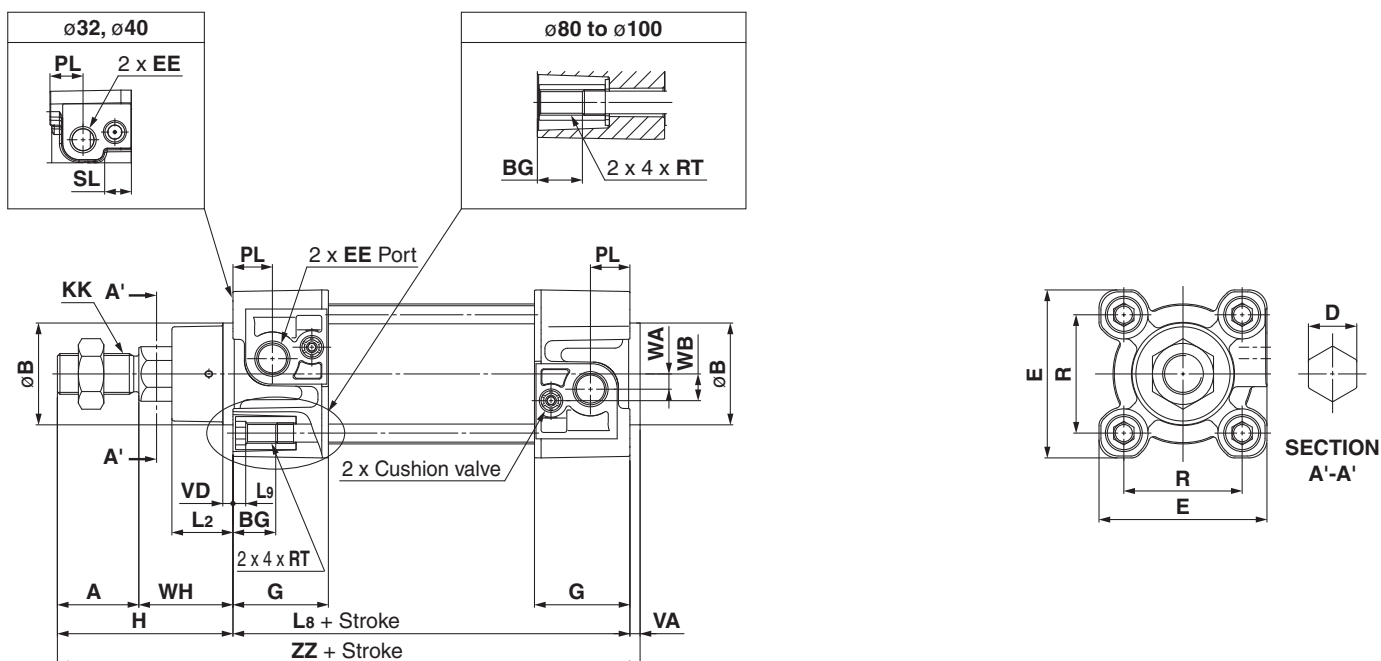
| Bore size (mm) | Kit no.   | Contents                     |
|----------------|-----------|------------------------------|
| 32             | CK95W-32  | Kits include items 16 to 19. |
| 40             | CK95W-40  |                              |
| 50             | CK95W-50  |                              |
| 63             | CK95W-63  |                              |
| 80             | CK95W-80  |                              |
| 100            | CK96W-100 |                              |

# Series C96K

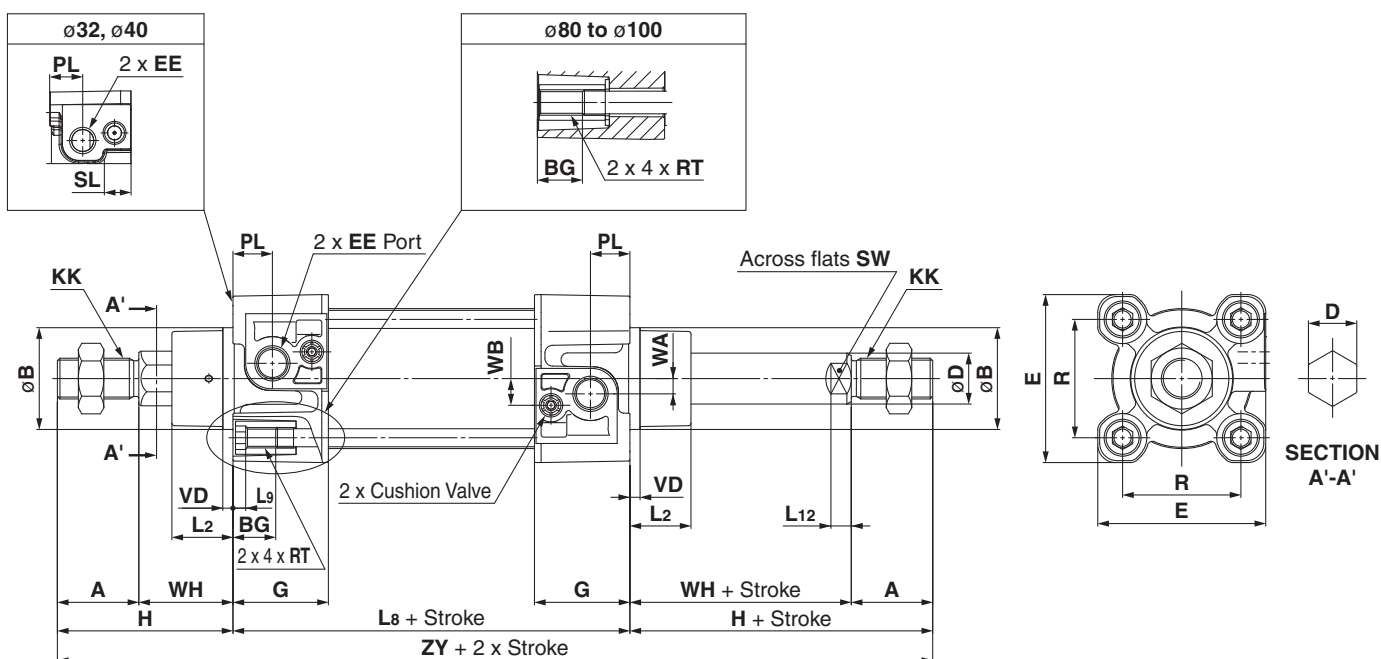
## Dimensions: Without Mounting Bracket

[First angle projection]

C96K(D)B Bore size – Stroke



C96K(D)B Bore size – Stroke W



\* Mounting bracket are the same as standard type.  
Refer to page 33 for details.

| Bore size (mm) | Stroke Range (mm) | A  | øB d11 | D    | øD | EE    | PL   | RT        | L12 | KK         | SW | G    | BG | L8  | VD | VA | WA   | WB   | WH | ZZ  | ZY  | E   | R    | L2 | L9 | H  | SL |
|----------------|-------------------|----|--------|------|----|-------|------|-----------|-----|------------|----|------|----|-----|----|----|------|------|----|-----|-----|-----|------|----|----|----|----|
| 32             | to 500            | 22 | 30     | 12.2 | 12 | G 1/8 | 13   | M6 x 1    | 6   | M10 x 1.25 | 10 | 32   | 16 | 94  | 4  | 4  | 4    | 7    | 26 | 146 | 190 | 47  | 32.5 | 15 | 4  | 48 | 10 |
| 40             | to 500            | 24 | 35     | 14.2 | 16 | G 1/4 | 14   | M6 x 1    | 6.5 | M12 x 1.25 | 13 | 37.5 | 16 | 105 | 4  | 4  | 5    | 9    | 30 | 163 | 213 | 54  | 38   | 17 | 4  | 54 | 12 |
| 50             | to 600            | 32 | 40     | 19   | 20 | G 1/4 | 15.5 | M8 x 1.25 | 8   | M16 x 1.5  | 17 | 37.5 | 16 | 106 | 4  | 4  | 6    | 10.5 | 37 | 179 | 244 | 66  | 46.5 | 24 | 5  | 69 | —  |
| 63             | to 600            | 32 | 45     | 19   | 20 | G 3/8 | 16.5 | M8 x 1.25 | 8   | M16 x 1.5  | 17 | 45   | 16 | 121 | 4  | 4  | 9    | 12   | 37 | 194 | 259 | 77  | 56.5 | 24 | 5  | 69 | —  |
| 80             | to 800            | 40 | 45     | 23   | 25 | G 3/8 | 19   | M10 x 1.5 | 10  | M20 x 1.5  | 22 | 45   | 17 | 128 | 4  | 4  | 11.5 | 14   | 46 | 218 | 300 | 99  | 72   | 30 | —  | 86 | —  |
| 100            | to 800            | 40 | 55     | 23   | 25 | G 1/2 | 19   | M10 x 1.5 | 10  | M20 x 1.5  | 22 | 50   | 17 | 138 | 4  | 4  | 17   | 15   | 51 | 233 | 320 | 118 | 89   | 32 | —  | 91 | —  |

# ISO Cylinder: Smooth cylinder Double Acting, Single Rod

## Series C96Y

Ø32, Ø40, Ø50, Ø63, Ø80, Ø100, Ø125

### How to Order

**With auto switch** **C96YD B 32 - 100 - M9BW S**

**Built-in magnet** •

**Mounting** •

|          |                       |
|----------|-----------------------|
| <b>B</b> | Basic/Without bracket |
| <b>L</b> | Axial foot            |
| <b>F</b> | Rod end flange        |
| <b>G</b> | Head end flange       |
| <b>C</b> | Single clevis         |
| <b>D</b> | Double clevis         |
| <b>T</b> | Centre trunnion       |

**Bore size** •

|            |        |
|------------|--------|
| <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 |
| <b>125</b> | 125 mm |

**Stroke (mm)** •

Refer to "Maximum Stroke" on page 42.

**Number of auto switches**

|          |          |
|----------|----------|
| —        | 2 pcs.   |
| <b>S</b> | 1 pc.    |
| <b>3</b> | 3 pcs.   |
| <b>n</b> | "n" pcs. |

**Auto switch**

|   |                     |
|---|---------------------|
| — | Without auto switch |
|---|---------------------|

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

### Applicable Auto Switches/Tie-rod Mounting

| 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 (—)              | 1 (M) | 3 (L) | 5 (Z) |                     |                 |    |            |
| Solid state switch | —                               | Grommet                 | Yes             | 3-wire (NPN)           | 24 V         | 5 V, 12 V    | —                 | M9N           | —                    | ●     | ●     | ●     | ○                   | ○               | IC | Relay, PLC |
|                    |                                 |                         |                 | 3-wire (PNP)           |              |              |                   | M9P           | —                    | ●     | ●     | ●     | ○                   | ○               |    |            |
|                    |                                 |                         |                 | 2-wire                 |              |              |                   | M9B           | —                    | ●     | ●     | ●     | ○                   | ○               |    |            |
|                    |                                 | Terminal conduit        |                 | 2-wire                 | —            | —            | 100 V, 200 V      | J51           | —                    | ●     | —     | ●     | ○                   | —               | —  |            |
|                    | 3-wire (NPN)                    |                         |                 | 24 V                   | 5 V, 12 V    | —            | —                 | G39           | —                    | —     | —     | —     | —                   | IC              |    |            |
|                    | 2-wire                          | —                       |                 |                        |              |              | K39               | —             | —                    | —     | —     | —     | —                   |                 |    |            |
|                    | 3-wire (NPN)                    | M9NW                    |                 |                        |              |              | —                 | ●             | ●                    | ●     | ○     | ○     | IC                  |                 |    |            |
|                    | 3-wire (PNP)                    | M9PW                    |                 |                        |              |              | —                 | ●             | ●                    | ●     | ○     | ○     |                     |                 |    |            |
|                    | 2-wire                          | M9BW                    |                 |                        |              |              | —                 | ●             | ●                    | ●     | ○     | ○     | —                   |                 |    |            |
|                    | 3-wire (NPN)                    | M9NA**                  |                 |                        |              |              | —                 | ○             | ○                    | ●     | ○     | ○     | IC                  |                 |    |            |
|                    | 3-wire (PNP)                    | M9PA**                  |                 |                        |              |              | —                 | ○             | ○                    | ●     | ○     | ○     |                     |                 |    |            |
|                    | 2-wire                          | M9BA**                  |                 |                        |              |              | —                 | ○             | ○                    | ●     | ○     | ○     | —                   |                 |    |            |
|                    | Grommet                         | 4-wire (NPN)            | 5 V, 12 V       | F59F                   | —            | ●            | —                 | ●             | ○                    | ○     | IC    |       |                     |                 |    |            |
|                    |                                 | 2-wire (Non-polar type) | —               | P4DW                   | —            | —            | —                 | ●             | ●                    | ○     | —     |       |                     |                 |    |            |
| Reed switch        | —                               | Grommet                 | Yes             | 3-wire (Equiv. to NPN) | —            | 5 V          | —                 | A96           | —                    | ●     | —     | ●     | —                   | —               | IC | Relay, PLC |
|                    |                                 |                         | None            | 24 V                   | 12 V         | 100 V        | A93               | —             | ●                    | —     | ●     | —     | —                   | IC              |    |            |
|                    |                                 |                         | None            |                        |              | 100 V, 200 V | A90               | —             | ●                    | —     | ●     | —     | —                   |                 | —  |            |
|                    |                                 | None                    | 200 V or less   |                        |              | A64          | —                 | ●             | —                    | ●     | —     | —     |                     |                 |    |            |
|                    | Terminal conduit                | Yes                     | 2-wire          | —                      | —            | A33          | —                 | —             | —                    | —     | —     | —     | Relay, PLC          |                 |    |            |
|                    |                                 |                         |                 | 100 V, 200 V           | —            | A34          | —                 | —             | —                    | —     |       |       |                     |                 |    |            |
|                    |                                 |                         |                 | —                      | —            | A44          | —                 | —             | —                    | —     | —     |       |                     |                 |    |            |
|                    | Diagnosis indication (2-colour) | Grommet                 | —               | —                      | A59W         | —            | ●                 | —             | ●                    | —     | —     |       |                     |                 |    |            |

\* Lead wire length symbols: 0.5 m ..... — (Example) M9NW  
1 m ..... M (Example) M9NWM  
3 m ..... L (Example) M9NWL  
5 m ..... Z (Example) M9NWX

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

\* Since there are other applicable auto switches than listed, refer to the auto switch guide.

\* For details about auto switches with pre-wired connector, refer to the auto switch guide.

\* D-A9□, M9□, M9□W, M9□AL are shipped together, (but not assembled).

(Switch mounting bracket is only assembled at the time of shipment.)

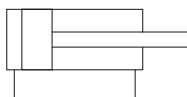
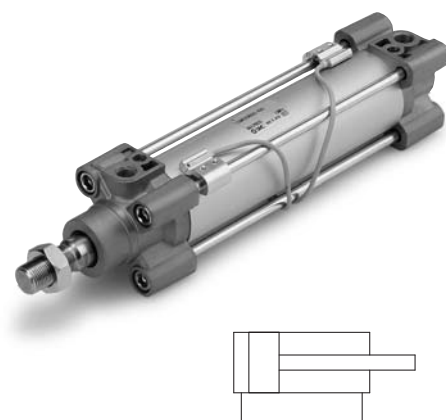
\*\* Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

# Series C96Y

Designed with a low sliding resistance of the piston, this air cylinder is ideal for applications such as contact pressure control, which requires smooth movements at low pressure.

## Low sliding resistance

Min. operating pressure -0.01MPa



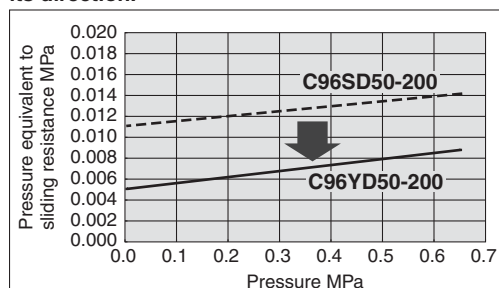
## Minimum Stroke for Auto Switch Mounting

Refer to page 48 for "Minimum Stroke for Auto Switch Mounting".

## Sliding resistance

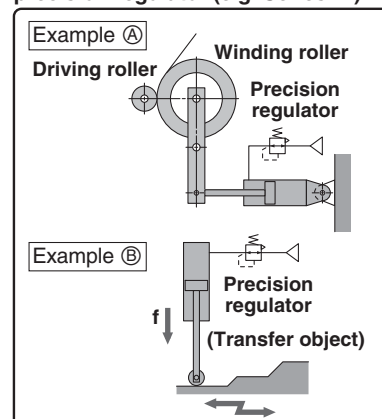
Bi-directional low-friction operation possible.

Pressure can be controlled regardless of its direction.



## Application Example

Smooth cylinder combined with precision regulator (e.g. Series IR)



## Specifications

| Bore size (mm)                | 32                                                                                                      | 40    | 50       | 63    | 80    | 100   | 125   |
|-------------------------------|---------------------------------------------------------------------------------------------------------|-------|----------|-------|-------|-------|-------|
| Action                        | Double acting                                                                                           |       |          |       |       |       |       |
| Fluid                         | Air                                                                                                     |       |          |       |       |       |       |
| Proof pressure                | 1.05 MPa                                                                                                |       |          |       |       |       |       |
| Max. operating pressure       | 0.7 MPa                                                                                                 |       |          |       |       |       |       |
| Min. operating pressure       | 0.02 MPa                                                                                                |       | 0.01 MPa |       |       |       |       |
| Ambient and fluid temperature | Without auto switch: −10 to 70°C*<br>With auto switch: −10 to 60°C*                                     |       |          |       |       |       |       |
| Lubrication                   | Not required (Non-lube)                                                                                 |       |          |       |       |       |       |
| Operating piston speed        | 5 to 500 mm/s                                                                                           |       |          |       |       |       |       |
| Allowable stroke tolerance    | Up to 250 st: $^{+1.0}_0$ , 251 to 1000 st: $^{+1.4}_0$                                                 |       |          |       |       |       |       |
| Cushion                       | Non                                                                                                     |       |          |       |       |       |       |
| Port size                     | G 1/8                                                                                                   | G 1/4 | G 1/4    | G 3/8 | G 3/8 | G 1/2 | G 1/2 |
| Mounting                      | Basic, Axial foot, Rod end flange,<br>Head end flange, Single clevis, Double clevis,<br>Centre trunnion |       |          |       |       |       |       |
| Allowable air leak            | 0.5 l/min (ANR)                                                                                         |       |          |       |       |       |       |

\* No freezing

Dimensions are the same as standard type. Refer to page 31 for details.

## Maximum stroke

| Bore size (mm) | Max. stroke* |
|----------------|--------------|
| 32             | 800          |
| 40             | 800          |
| 50             | 1000         |
| 63             | 1000         |
| 80             | 1000         |
| 100            | 1000         |
| 125            | 1000         |

Intermediate strokes are available.

\* Please consult with SMC for longer strokes.

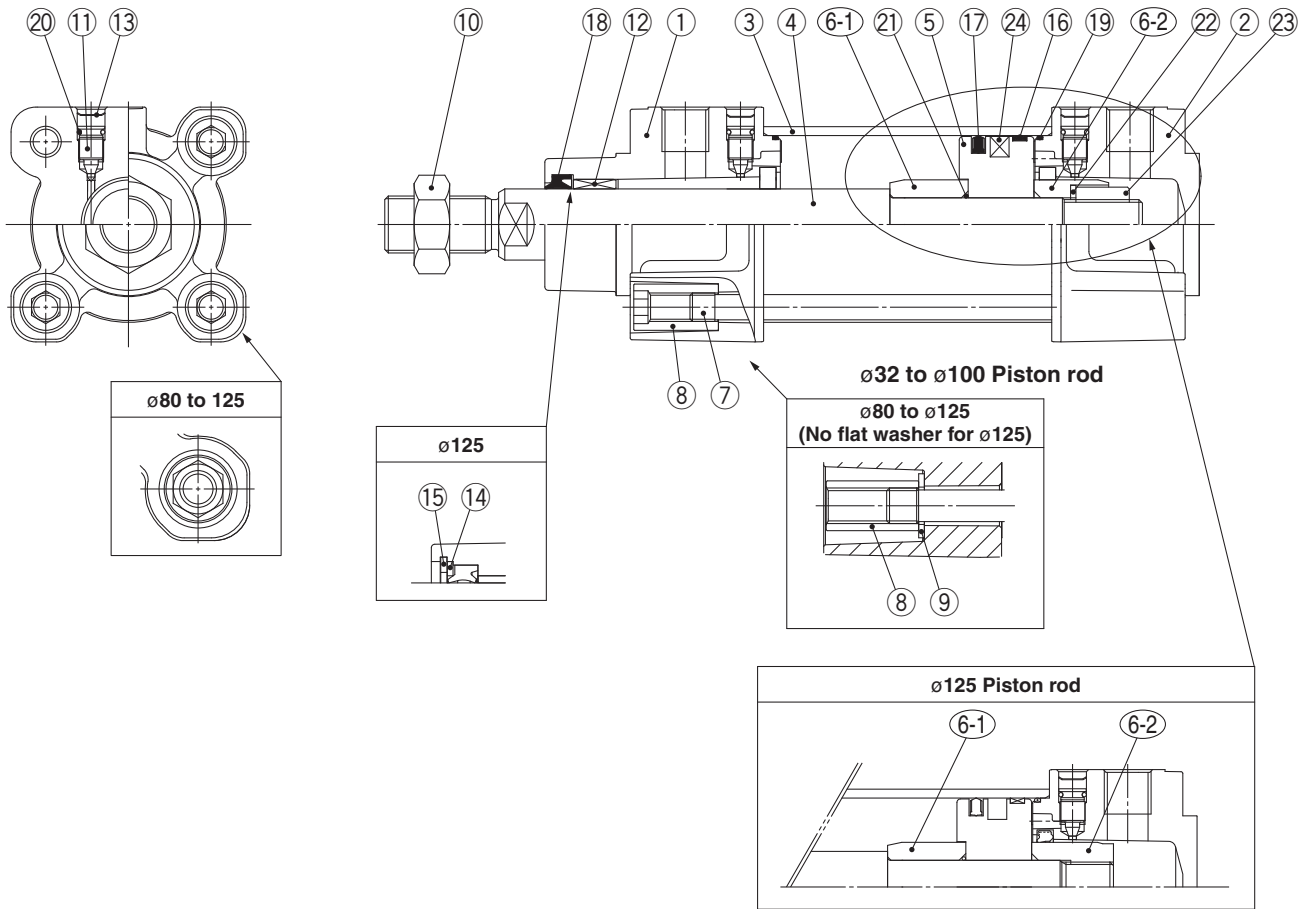
## Accessories

|          | Mounting              | Basic | Foot | Rod end flange | Head end flange | Single clevis | Double clevis | Centre trunnion |
|----------|-----------------------|-------|------|----------------|-----------------|---------------|---------------|-----------------|
| Standard | Rod end nut           | ●     | ●    | ●              | ●               | ●             | ●             | ●               |
|          | Clevis pin            | —     | —    | —              | —               | —             | ●             | —               |
| Option   | Piston rod ball joint | ●     | ●    | ●              | ●               | ●             | ●             | ●               |
|          | Rod clevis            | ●     | ●    | ●              | ●               | ●             | ●             | ●               |
|          | Rod boot              | —     | —    | —              | —               | —             | —             | —               |

\* Please do not use a piston rod ball joint (or floating joint) together with a head end clevis with a ball joint (or angled head end clevis with a ball joint).

## Construction

[First angle projection]



## Component Parts

| No. | Description          | Material             | Note         |
|-----|----------------------|----------------------|--------------|
| 1   | Rod cover            | Aluminium die-casted |              |
| 2   | Head cover           | Aluminium die-casted |              |
| 3   | Cylinder tube        | Aluminium alloy      |              |
| 4   | Piston rod           | Carbon steel         |              |
| 5   | Piston               | Aluminium alloy      |              |
| 6-1 | Cushion ring         | Steel                |              |
| 6-2 | Cushion ring         | Steel                |              |
| 7   | Tie-rod              | Carbon steel         |              |
| 8   | Tie-rod nut          | Steel                |              |
| 9   | Flat washer          | Steel                | ø80 and ø100 |
| 10  | Rod end nut          | Steel                |              |
| 11  | Cushion valve        | Steel wire           |              |
| 12  | Bushing              | Bearing alloy        |              |
| 13  | Snap ring            | Steel for spring     | ø40 to ø125  |
| 14  | Rod seal holder      | Stainless steel      | ø125         |
| 15  | Snap ring            | Steel for spring     | ø125         |
| 16  | Wearing              | Resin                |              |
| 17  | Piston seal          | NBR                  |              |
| 18  | Rod seal             | NBR                  |              |
| 19  | Cylinder tube gasket | NBR                  |              |
| 20  | Cushion valve seal   | NBR                  |              |
| 21  | Piston gasket        | NBR                  |              |
| 22  | Spring washer        | Steel                |              |
| 23  | Piston nut           | Steel                |              |
| 24  | Magnet               |                      |              |

## Replacement Parts: Seal Kit

| Bore size (mm) | Kit no.    | Contents                     |
|----------------|------------|------------------------------|
| 32             | C96Y32-PS  | Kits include items 16 to 19. |
| 40             | C96Y40-PS  |                              |
| 50             | C96Y50-PS  |                              |
| 63             | C96Y63-PS  |                              |
| 80             | C96Y80-PS  |                              |
| 100            | C96Y100-PS |                              |
| 125            | C96Y125-PS |                              |

\* Seal kits consist of items 16 to 19 contained in one kit, and can be orderd using the number for each respective tube bore size.

\* Do not use grease not specified.

Order using the following part numbers when only maintenance grease is needed.

| Volume | Part no. |
|--------|----------|
| 5g     | GR-L-005 |
| 10g    | GR-L-010 |
| 150g   | GR-L-150 |



# Smooth Cylinder Specific Product Precautions 1

Be sure to read before handling.

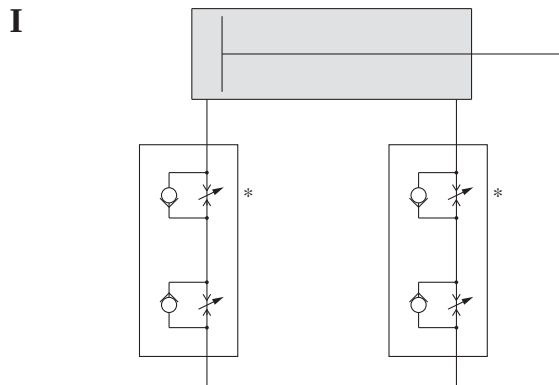
Refer to Back cover for Safety Instructions and pages 65 to 70 for Actuator and Auto Switch Precautions.

## Recommended Pneumatic Circuit

Refer to the diagrams below when controlling speed with the smooth cylinder.

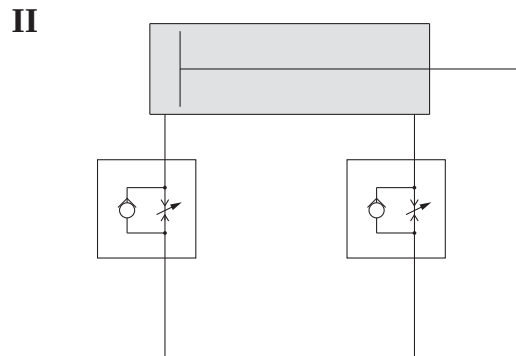
### Warning

#### Horizontal operation (Speed control)



##### Dual speed controller

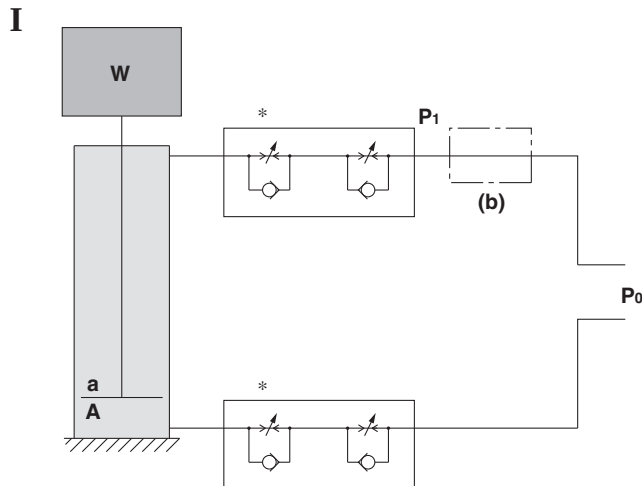
Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip. More stable low speed operation can be achieved than meter-in circuit alone.



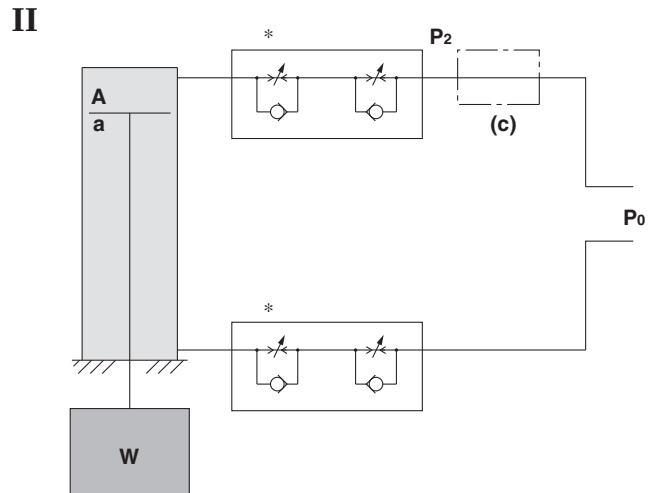
##### Meter-in speed controller

Meter-in speed controllers can reduce lurching while controlling the speed. The two adjustment needles facilitate adjustment.

#### Vertical operation (Speed control)



- (1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.\*
- (2) Depending on the size of the load, installing a regulator with check valve at position (b) can reduce lurching during descent and operation delay during ascent.  
As a guide,  
when  $W + P_0a > P_0A$ ,  
adjust  $P_1$  to make  $W + P_1a = P_0A$ .



- (1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.\*
- (2) Installing a regulator with check valve at position (c) can reduce lurching during descent and operation delay during ascent.  
As a guide,  
adjust  $P_2$  to make  $W + P_2A = P_0a$ .

W: Load (N)  $P_0$ : Operating pressure (MPa)  $P_1, P_2$ : Reduced pressure (MPa)  $a$ : Rod side piston area (mm<sup>2</sup>)  $A$ : Head side piston area (mm<sup>2</sup>)



# Smooth Cylinder Specific Product Precautions 2

Be sure to read before handling.

Refer to Back cover for Safety Instructions and pages 65 to 70 for Actuator and Auto Switch Precautions.

## Lubricant

### Caution

#### 1. Operate without lubrication.

Lubrication may cause malfunction.

#### 2. Do not use grease not specified by SMC.

Using grease other than that specified may cause malfunction.

- Order using the following part numbers when only maintenance grease is needed.

Grease

| Volume | Part no. |
|--------|----------|
| 5 g    | GR-L-005 |
| 10 g   | GR-L-010 |
| 150 g  | GR-L-150 |

#### 3. Do not wipe off grease from the sliding part of the air cylinder.

Wiping grease from the sliding part of the air cylinder forcefully may cause malfunction.

## Air Source

### Caution

#### 1. Take measure to prevent pressure fluctuations.

Pressure fluctuations may cause malfunction.

CP96

CP96K

55-CP96

C96

C96K

C96Y

55-C96

Auto Switch

Simple Specials  
Made to Order

Precautions



# ISO Cylinder: Double Acting

## Series 55-C96

ø32, ø40, ø50, ø63, ø80, ø100, ø125

### How to Order



**55-C96SD B 32 - 100 W**

**ATEX category 2**

**Piston rod type**

|          |                                |
|----------|--------------------------------|
| <b>S</b> | Standard                       |
| <b>K</b> | Non-rotating rod (32~100 only) |
| <b>Y</b> | Smooth cylinder                |

**Built-in magnet**

**Mounting**

|          |                       |
|----------|-----------------------|
| <b>B</b> | Basic/Without bracket |
| <b>L</b> | Axial foot            |
| <b>F</b> | Rod end flange        |
| <b>G</b> | Head end flange       |
| <b>C</b> | Single clevis         |
| <b>D</b> | Double clevis         |
| <b>T</b> | Centre trunnion       |

**Bore size**

|            |        |
|------------|--------|
| <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 |
| <b>125</b> | 125 mm |

**Stroke (mm)**  
Refer to standard stroke table

**Made to order\***

|              |                                                                   |
|--------------|-------------------------------------------------------------------|
| —            | Standard                                                          |
| <b>-XA□</b>  | Special rod end change                                            |
| <b>-XC4</b>  | With heavy duty scraper (32 ~ 100 only)                           |
| <b>-XC7</b>  | Tie rod, cushion valve, tie-rod nut, etc, made of stainless steel |
| <b>-XC14</b> | Trunnion position change                                          |
| <b>-XC22</b> | Fluororubber seals                                                |
| <b>-XC68</b> | Stainless steel rod and nut                                       |

\* Only for Standard type

**Rod Specifications**

|           |            |
|-----------|------------|
| —         | Single rod |
| <b>W*</b> | Double rod |

\* Not available in smooth cylinder

| Classification | Without magnet type                                          | With magnet type D                                           |
|----------------|--------------------------------------------------------------|--------------------------------------------------------------|
| 2 GD c         | T 85°C (T5) Ta -20°C to 40°C<br>T 105°C (T4) Ta 40°C to 60°C | T 85°C (T5) Ta -10°C to 40°C<br>T 105°C (T4) Ta 40°C to 60°C |

[For 55-C96]

When using an Auto switch, select the appropriate switch from the following table and order it separately.

#### Applicable auto switch specifications

Auto switch only conforms to Category 3. (II 3GD EEx nA II T5x -10°C ≤ Ta ≤ +60°C IP67.)

For detailed specifications on the D-M9□, D-M9□W, D-A93 and D-A90, please refer to the auto switch guide.

(Note: Reed auto switches for AC 100V and DC 100V are not within the specification.)

| Type               | Special function                | Model No.   | Electrical entry | Indicator     | Wiring (Output) | Load voltage |           | Lead wire (m) |         |       |       | Applicable load |    |           |
|--------------------|---------------------------------|-------------|------------------|---------------|-----------------|--------------|-----------|---------------|---------|-------|-------|-----------------|----|-----------|
|                    |                                 |             |                  |               |                 | DC           |           | AC            | 0.5 (—) | 1 (M) | 3 (L) |                 |    | 5 (Z)     |
| Solid state switch | —                               | D-M9N□-588  | Grommet          | Yes           | 3-wire (NPN)    | 24 V         | 5 V, 12 V | —             | ●       | —     | ●     | ○               | IC | Relay PLC |
|                    |                                 | D-M9P□-588  |                  |               | 3-wire (PNP)    |              | 12 V      |               | ●       | —     | ●     | ○               |    |           |
|                    |                                 | D-M9B□-588  |                  |               | 2-wire          |              | 12 V      |               | ●       | —     | ●     | ○               |    |           |
|                    | Diagnosis indication (2-colour) | D-M9NW□-588 |                  |               | 3-wire (NPN)    | 24 V         | 5 V, 12 V | ●             | ●       | ●     | ○     | IC              |    |           |
|                    |                                 | D-M9PW□-588 |                  |               | 3-wire (PNP)    |              | 12 V      | ●             | ●       | ●     | ○     |                 |    |           |
|                    |                                 | D-M9BW□-588 |                  |               | 2-wire          |              | 12 V      | ●             | ●       | ●     | ○     |                 | —  |           |
|                    |                                 |             |                  |               |                 |              |           |               |         |       |       |                 |    |           |
| Reed switch        | —                               | D-A93□-588  | Grommet          | Yes           | 2-wire          | 24 V         | 12 V      | 100 V         | ●       | —     | ●     | —               | —  | Relay PLC |
|                    |                                 | None        |                  | 100 V or less |                 |              | ●         | —             | ●       | —     | IC    |                 |    |           |

\* Lead wire length symbols: 0.5 m ..... — (Example) D-M9BW-588  
1 m ..... M (Example) D-M9BWM-588  
3 m ..... L (Example) D-M9BWL-588  
5 m ..... Z (Example) D-M9BWZ-588

Note 1) ○ solid state auto switch is available after receiving an order.

Note 2) When mounting an auto switch on a 55- series (Category 2) Model, the ATEX category of the auto switch cylinder changes to Category 3, which is the same category as the auto switch.

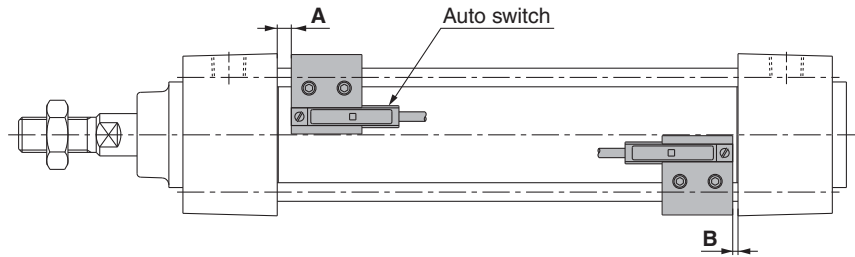
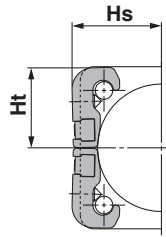
**When ordering a tie rod mounting type auto switch, also order a mounting bracket from the following list at the same time.**  
Auto switch mounting bracket/ Part no. (Tie rod mounting)

| Auto switch Model | Tube I.D. (mm) |         |         |         |
|-------------------|----------------|---------|---------|---------|
|                   | 32, 40         | 50, 63  | 80, 10  | 125     |
| D-M9N□-588        | BMB5-032       | BA7-040 | BA7-063 | BA7-080 |
| D-M9P□-588        |                |         |         |         |
| D-M9B□-588        |                |         |         |         |
| D-M9NW□-588       |                |         |         |         |
| D-M9PW□-588       |                |         |         |         |
| D-M9BW□-588       |                |         |         |         |
| D-A93□-588        |                |         |         |         |
| D-A90□-588        |                |         |         |         |

## Minimum Stroke for Auto Switch Mounting

| Auto switch model                                       | Number of auto switch mounted                    | Centre trunnion                           |                                           |                                           |                                           |                                           |                                           | Support bracket other than Centre trunnion |                                        |                                        |
|---------------------------------------------------------|--------------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|--------------------------------------------|----------------------------------------|----------------------------------------|
|                                                         |                                                  | ø32                                       | ø40                                       | ø50                                       | ø63                                       | ø80                                       | ø100                                      | ø125                                       | ø32, ø40, ø50, ø63                     | ø80, ø100, ø125                        |
| D-A9□                                                   | 1 switch, 2 switches (Different side, Same side) | 70                                        | 75                                        |                                           | 80                                        | 85                                        | 95                                        | 100                                        |                                        | 15                                     |
|                                                         | Other qty.                                       | 70 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  | 75 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  |                                           | 80 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  | 85 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  | 95 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  | 100 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  |                                        | 15 + 40 (n - 2)/2<br>n = 2, 4, 6, 8... |
| D-A9□V                                                  | 1 switch, 2 switches (Different side, Same side) | 45                                        | 50                                        |                                           | 55                                        | 60                                        | 70                                        | 75                                         |                                        | 10                                     |
|                                                         | Other qty.                                       | 45 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  | 50 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  |                                           | 55 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  | 60 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  | 70 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  | 75 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...   |                                        | 10 + 30 (n - 2)/2<br>n = 2, 4, 6, 8... |
| D-M9□<br>D-M9□W                                         | 1 switch, 2 switches (Different side, Same side) | 75                                        | 80                                        |                                           | 85                                        | 90                                        | 95                                        | 105                                        |                                        | 15                                     |
|                                                         | Other qty.                                       | 75 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  | 80 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  |                                           | 85 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  | 90 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  | 95 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  | 105 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  |                                        | 15 + 40 (n - 2)/2<br>n = 2, 4, 6, 8... |
| D-M9□V<br>D-M9□WV                                       | 1 switch, 2 switches (Different side, Same side) | 50                                        | 55                                        |                                           | 60                                        | 65                                        | 70                                        | 80                                         |                                        | 10                                     |
|                                                         | Other qty.                                       | 50 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  | 55 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  |                                           | 60 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  | 65 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  | 70 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  | 80 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...   |                                        | 10 + 30 (n - 2)/2<br>n = 2, 4, 6, 8... |
| D-M9□AL                                                 | 1 switch, 2 switches (Different side, Same side) | 80                                        | 85                                        |                                           | 90                                        | 95                                        | 100                                       | 110                                        |                                        | 15                                     |
|                                                         | Other qty.                                       | 80 + 40 (n - 2)/2<br>n = 4, 8, 12, 16...  | 85 + 40 (n - 2)/2<br>n = 4, 8, 12, 16...  |                                           | 90 + 40 (n - 2)/2<br>n = 4, 8, 12, 16...  | 95 + 40 (n - 2)/2<br>n = 4, 8, 12, 16...  | 100 + 40 (n - 2)/2<br>n = 4, 8, 12, 16... | 110 + 40 (n - 2)/2<br>n = 4, 8, 12, 16...  |                                        | 15 + 40 (n - 2)/2<br>n = 2, 4, 6, 8... |
| D-M9□AVL                                                | 1 switch, 2 switches (Different side, Same side) | 55                                        | 60                                        |                                           | 65                                        | 70                                        | 75                                        | 85                                         |                                        | 15                                     |
|                                                         | Other qty.                                       | 55 + 30 (n - 2)/2<br>n = 4, 8, 12, 16...  | 60 + 30 (n - 2)/2<br>n = 4, 8, 12, 16...  |                                           | 65 + 30 (n - 2)/2<br>n = 4, 8, 12, 16...  | 70 + 30 (n - 2)/2<br>n = 4, 8, 12, 16...  | 75 + 30 (n - 2)/2<br>n = 4, 8, 12, 16...  | 85 + 30 (n - 2)/2<br>n = 4, 8, 12, 16...   |                                        | 15 + 30 (n - 2)/2<br>n = 2, 4, 6, 8... |
| D-A3□<br>D-G39<br>D-K39                                 | 2 switches (Different side)                      | 60                                        | 65                                        |                                           | 75                                        | 80                                        | 85                                        | 90                                         |                                        | 35                                     |
|                                                         | 2 switches (Same side)                           | 90                                        | 95                                        |                                           | 100                                       | 105                                       | 110                                       | 125                                        |                                        | 100                                    |
|                                                         | Other qty. (Different side)                      | 60 + 30 (n - 2)<br>n = 2, 4, 6, 8...      | 65 + 30 (n - 2)<br>n = 2, 4, 6, 8...      |                                           | 75 + 30 (n - 2)<br>n = 2, 4, 6, 8...      | 80 + 30 (n - 2)<br>n = 2, 4, 6, 8...      | 85 + 30 (n - 2)<br>n = 2, 4, 6, 8...      | 90 + 30 (n - 2)<br>n = 2, 4, 6, 8...       |                                        | 35 + 30 (n - 2)<br>n = 2, 3, 4...      |
|                                                         | Other qty. (Same side)                           | 90 + 100 (n - 2)<br>n = 2, 4, 6, 8...     | 95 + 100 (n - 2)<br>n = 2, 4, 6, 8...     |                                           | 100 + 100 (n - 2)<br>n = 2, 4, 6, 8...    | 105 + 100 (n - 2)<br>n = 2, 4, 6, 8...    | 110 + 100 (n - 2)<br>n = 2, 4, 6, 8...    | 125 + 100 (n - 2)<br>n = 2, 4, 6, 8...     |                                        | 100 + 100 (n - 2)<br>n = 2, 3, 4...    |
|                                                         | 1 switch                                         | 60                                        | 65                                        |                                           | 75                                        | 80                                        | 85                                        | 90                                         |                                        | 10                                     |
| D-A44                                                   | 2 switches (Different side)                      | 70                                        | 75                                        |                                           | 80                                        |                                           | 85                                        | 90                                         |                                        | 35                                     |
|                                                         | 2 switches (Same side)                           | 70                                        | 75                                        |                                           | 80                                        |                                           | 85                                        | 90                                         |                                        | 55                                     |
|                                                         | Other qty. (Different side)                      | 70 + 30 (n - 2)<br>n = 2, 4, 6, 8...      | 75 + 30 (n - 2)<br>n = 2, 4, 6, 8...      |                                           | 80 + 30 (n - 2)<br>n = 2, 4, 6, 8...      |                                           | 85 + 30 (n - 2)<br>n = 2, 4, 6, 8...      | 90 + 30 (n - 2)<br>n = 2, 4, 6, 8...       |                                        | 35 + 30 (n - 2)<br>n = 2, 3, 4...      |
|                                                         | Other qty. (Same side)                           | 70 + 50 (n - 2)<br>n = 2, 4, 6, 8...      | 75 + 50 (n - 2)<br>n = 2, 4, 6, 8...      |                                           | 80 + 50 (n - 2)<br>n = 2, 4, 6, 8...      |                                           | 85 + 50 (n - 2)<br>n = 2, 4, 6, 8...      | 90 + 50 (n - 2)<br>n = 2, 4, 6, 8...       |                                        | 55 + 50 (n - 2)<br>n = 2, 3, 4...      |
|                                                         | 1 switch                                         | 70                                        | 75                                        |                                           | 80                                        |                                           | 85                                        | 90                                         |                                        | 10                                     |
| D-A5□<br>D-A6□                                          | 1 switch, 2 switches (Different side, Same side) | 60                                        | 80                                        |                                           | 105                                       | 110                                       | 115                                       |                                            | 15                                     | 20                                     |
|                                                         | Other qty. (Same side)                           | 60 + 55 (n - 4)/2<br>n = 4, 8, 12, 16...  | 80 + 55 (n - 4)/2<br>n = 4, 8, 12, 16...  |                                           | 105 + 55 (n - 4)/2<br>n = 4, 8, 12, 16... | 110 + 55 (n - 4)/2<br>n = 4, 8, 12, 16... | 115 + 55 (n - 4)/2<br>n = 4, 8, 12, 16... |                                            | 15 + 55 (n - 2)/2<br>n = 2, 4, 6, 8... | 20 + 55 (n - 2)/2<br>n = 2, 4, 6, 8... |
| D-A59W                                                  | 2 switches (Different side, Same side)           | 60                                        | 70                                        | 85                                        | 110                                       | 115                                       | 120                                       |                                            | 20                                     | 25                                     |
|                                                         | Other qty. (Same side)                           | 60 + 55 (n - 4)/2<br>n = 4, 8, 12, 16...  | 70 + 55 (n - 4)/2<br>n = 4, 8, 12, 16...  | 85 + 55 (n - 4)/2<br>n = 4, 8, 12, 16...  | 110 + 55 (n - 4)/2<br>n = 4, 8, 12, 16... | 115 + 55 (n - 4)/2<br>n = 4, 8, 12, 16... | 120 + 55 (n - 4)/2<br>n = 4, 8, 12, 16... |                                            | 20 + 55 (n - 2)/2<br>n = 2, 4, 6, 8... | 25 + 55 (n - 2)/2<br>n = 2, 4, 6, 8... |
|                                                         | 1 switch                                         | 60                                        | 70                                        | 85                                        | 110                                       | 115                                       | 120                                       |                                            | 15                                     | 25                                     |
| D-F5□<br>D-J5□<br>D-F5□W<br>D-J59W<br>D-F5BAL<br>D-F59F | 2 switches (Different side, Same side)           | 90                                        | 95                                        |                                           | 110                                       | 115                                       | 120                                       | 130                                        | 15                                     | 25                                     |
|                                                         | Other qty. (Same side)                           | 90 + 55 (n - 4)/2<br>n = 4, 8, 12, 16...  | 95 + 55 (n - 4)/2<br>n = 4, 8, 12, 16...  |                                           | 110 + 55 (n - 4)/2<br>n = 4, 8, 12, 16... | 115 + 55 (n - 4)/2<br>n = 4, 8, 12, 16... | 120 + 55 (n - 4)/2<br>n = 4, 8, 12, 16... | 130 + 55 (n - 4)/2<br>n = 4, 8, 12, 16...  | 15 + 55 (n - 2)/2<br>n = 2, 4, 6, 8... | 25 + 55 (n - 2)/2<br>n = 2, 4, 6, 8... |
|                                                         | 1 switch                                         | 90                                        | 95                                        |                                           | 110                                       | 115                                       | 120                                       | 130                                        | 10                                     | 25                                     |
| D-F5NTL                                                 | 2 switches (Different side, Same side)           | 100                                       | 105                                       |                                           | 120                                       | 125                                       | 130                                       | 140                                        | 15                                     | 25                                     |
|                                                         | Other qty. (Same side)                           | 100 + 55 (n - 4)/2<br>n = 4, 8, 12, 16... | 105 + 55 (n - 4)/2<br>n = 4, 8, 12, 16... |                                           | 120 + 55 (n - 4)/2<br>n = 4, 8, 12, 16... | 125 + 55 (n - 4)/2<br>n = 4, 8, 12, 16... | 130 + 55 (n - 4)/2<br>n = 4, 8, 12, 16... | 140 + 55 (n - 4)/2<br>n = 4, 8, 12, 16...  | 15 + 55 (n - 2)/2<br>n = 2, 4, 6, 8... | 25 + 55 (n - 2)/2<br>n = 2, 4, 6, 8... |
|                                                         | 1 switch                                         | 100                                       | 105                                       |                                           | 120                                       | 125                                       | 130                                       | 140                                        | 10                                     | 25                                     |
| D-Z7□<br>D-Z80<br>D-Y59□<br>D-Y7P<br>D-Y7□W             | 1 switch, 2 switches (Different side, Same side) | 80                                        | 85                                        | 90                                        |                                           | 95                                        | 100                                       | 105                                        |                                        | 15                                     |
|                                                         | Other qty.                                       | 80 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  | 85 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  | 90 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  |                                           | 95 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  | 100 + 40 (n - 4)/2<br>n = 4, 8, 12, 16... | 105 + 40 (n - 4)/2<br>n = 4, 8, 12, 16...  |                                        | 15 + 40 (n - 2)/2<br>n = 2, 4, 6, 8... |
| D-Y69□<br>D-Y7PV<br>D-Y7□WV                             | 1 switch, 2 switches (Different side, Same side) | 60                                        | 65                                        | 70                                        | 75                                        |                                           | 85                                        |                                            |                                        | 10                                     |
|                                                         | Other qty.                                       | 60 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  | 65 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  | 70 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  | 75 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  |                                           | 85 + 30 (n - 4)/2<br>n = 4, 8, 12, 16...  |                                            |                                        | 10 + 30 (n - 2)/2<br>n = 2, 4, 6, 8... |
| D-Y7BAL                                                 | 1 switch, 2 switches (Different side, Same side) | 85                                        | 90                                        | 100                                       | 105                                       | 110                                       | 115                                       |                                            |                                        | 20                                     |
|                                                         | Other qty.                                       | 85 + 45 (n - 4)/2<br>n = 4, 8, 12, 16...  | 90 + 45 (n - 4)/2<br>n = 4, 8, 12, 16...  | 100 + 45 (n - 4)/2<br>n = 4, 8, 12, 16... | 105 + 45 (n - 4)/2<br>n = 4, 8, 12, 16... | 110 + 45 (n - 4)/2<br>n = 4, 8, 12, 16... | 115 + 45 (n - 4)/2<br>n = 4, 8, 12, 16... |                                            |                                        | 20 + 45 (n - 2)/2<br>n = 2, 4, 6, 8... |
| D-P4DWL                                                 | 1 switch, 2 switches (Different side, Same side) | 120                                       | 130                                       | 140                                       | 150                                       |                                           |                                           |                                            | 15                                     | 20                                     |
|                                                         | Other qty.                                       | 120 + 65 (n - 4)/2<br>n = 4, 8, 12, 16... | 130 + 65 (n - 4)/2<br>n = 4, 8, 12, 16... | 140 + 65 (n - 4)/2<br>n = 4, 8, 12, 16... | 150 + 65 (n - 4)/2<br>n = 4, 8, 12, 16... |                                           |                                           |                                            | 15 + 65 (n - 2)/2<br>n = 2, 4, 6, 8... | 20 + 65 (n - 2)/2<br>n = 2, 4, 6, 8... |

# Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height [First angle projection]



## Auto Switch Proper Mounting Position

(mm)

| Auto switch model | D-A9□<br>D-A9□V |     | D-M9□<br>D-M9□V<br>D-M9□W<br>D-M9□WV<br>D-M9□AL<br>D-M9□AVL |      | D-A5□<br>D-A6□ |     | D-A59W |     | D-F5□W<br>D-J59W<br>D-F5□<br>D-J5□<br>D-F5BAL<br>D-F59F |      | D-F5NTL |      | D-A3□<br>D-A44<br>D-G39<br>D-K39 |     | D-Z7□<br>D-Z80<br>D-Y59□<br>D-Y69□<br>D-Y7P<br>D-Y7PV<br>D-Y7□W<br>D-Y7□WV<br>D-Y7BAL |     | D-P4DWL |     |
|-------------------|-----------------|-----|-------------------------------------------------------------|------|----------------|-----|--------|-----|---------------------------------------------------------|------|---------|------|----------------------------------|-----|---------------------------------------------------------------------------------------|-----|---------|-----|
|                   | A               | B   | A                                                           | B    | A              | B   | A      | B   | A                                                       | B    | A       | B    | A                                | B   | A                                                                                     | B   | A       | B   |
| 32                | 6.5             | 4   | 10.5                                                        | 8    | 0.5            | 0   | 4.5    | 2   | 7                                                       | 4.5  | 12      | 9.5  | 0.5                              | 0   | 4                                                                                     | 1.5 | 3.5     | 1   |
| 40                | 6.5             | 4   | 10.5                                                        | 8    | 0.5            | 0   | 4.5    | 2   | 7                                                       | 4.5  | 12      | 9.5  | 0.5                              | 0   | 4                                                                                     | 1.5 | 3.5     | 1   |
| 50                | 7               | 4.5 | 11                                                          | 8.5  | 1              | 0   | 5      | 2.5 | 7.5                                                     | 5    | 12.5    | 10   | 1                                | 0   | 4.5                                                                                   | 2   | 4       | 1.5 |
| 63                | 7               | 4.5 | 11                                                          | 8.5  | 1              | 0   | 5      | 2.5 | 7.5                                                     | 5    | 12.5    | 10   | 1                                | 0   | 4.5                                                                                   | 2   | 4       | 1.5 |
| 80                | 10              | 8.5 | 14                                                          | 12.5 | 4              | 2.5 | 8      | 6.5 | 10.5                                                    | 9    | 15.5    | 14   | 4                                | 2.5 | 7.5                                                                                   | 6   | 7       | 5.5 |
| 100               | 10              | 8.5 | 14                                                          | 12.5 | 4              | 2.5 | 8      | 6.5 | 10.5                                                    | 9    | 15.5    | 14   | 4                                | 2.5 | 7.5                                                                                   | 6   | 7       | 5.5 |
| 125               | 12              | 12  | 16                                                          | 16   | 6              | 6   | 10     | 10  | 12.5                                                    | 12.5 | 17.5    | 17.5 | 6                                | 6   | 9.5                                                                                   | 9.5 | 9       | 9   |

Note) Adjust the auto switch after confirming the operation to set actually.

## Auto Switch Proper Mounting Height

(mm)

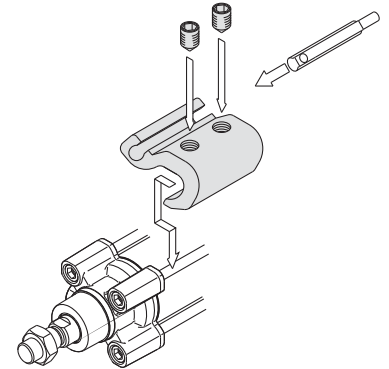
| Auto switch model | D-A9□<br>D-M9□<br>D-M9□W<br>D-M9□AL |      | D-A9□V |      | D-M9□V<br>D-M9□WV<br>D-M9□AVL |      | D-A5□<br>D-A6□<br>D-A59W |      | D-F5□<br>D-J5□<br>D-F59F<br>D-F5□W<br>D-J59W<br>D-F5BAL<br>D-F5NTL |      | D-A3□<br>D-G39<br>D-K39 |      | D-A44 |      | D-Z7□<br>D-Z80<br>D-Y59□<br>D-Y7P<br>D-Y7□W<br>D-Y7BAL |      | D-Y69□<br>D-Y7PV<br>D-Y7□WV |      | D-P4DWL |      |
|-------------------|-------------------------------------|------|--------|------|-------------------------------|------|--------------------------|------|--------------------------------------------------------------------|------|-------------------------|------|-------|------|--------------------------------------------------------|------|-----------------------------|------|---------|------|
|                   | 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   | 35                       | 24.5 | 32.5                                                               | 25   | 67                      | 27.5 | 77    | 27.5 | 25.5                                                   | 23   | 26.5                        | 23   | 38      | 31   |
| 40                | 28.5                                | 25.5 | 31.5   | 25.5 | 34                            | 25.5 | 38.5                     | 27.5 | 36.5                                                               | 27.5 | 71.5                    | 27.5 | 81.5  | 27.5 | 29.5                                                   | 26   | 30                          | 26   | 42      | 33   |
| 50                | 33.5                                | 31   | 36     | 31   | 38.5                          | 31   | 43.5                     | 34.5 | 41                                                                 | 34   | 77                      | —    | 87    | —    | 33.5                                                   | 31   | 34.5                        | 31   | 46.5    | 39   |
| 63                | 38.5                                | 36   | 40.5   | 36   | 43                            | 36   | 48.5                     | 39.5 | 46                                                                 | 39   | 83.5                    | —    | 93.5  | —    | 39                                                     | 36   | 40                          | 36   | 51.5    | 44   |
| 80                | 46.5                                | 45   | 49     | 45   | 52                            | 45   | 55                       | 46.5 | 52.5                                                               | 46.5 | 92.5                    | —    | 103   | —    | 47.5                                                   | 45   | 48.5                        | 45   | 58      | 51.5 |
| 100               | 54                                  | 53.5 | 57     | 53.5 | 59.5                          | 53.5 | 62                       | 55   | 59.5                                                               | 55   | 103                     | —    | 113.5 | —    | 55.5                                                   | 53.5 | 56.5                        | 53.5 | 65.5    | 60.5 |
| 125               | 65.5                                | 64.5 | 68.5   | 64.5 | 71                            | 64.5 | 71.5                     | 66.5 | 70.5                                                               | 66.5 | 115                     | —    | 125   | —    | 67.5                                                   | 65   | 68.5                        | 65   | 76.5    | 72   |

## Series C96

# Auto Switch Mounting 2

### Auto Switch Mounting Bracket Part No.

| Auto switch model                                                               | Bore size (mm) |           |           |           |           |           |           |
|---------------------------------------------------------------------------------|----------------|-----------|-----------|-----------|-----------|-----------|-----------|
|                                                                                 | ø32            | ø40       | ø50       | ø63       | ø80       | ø100      | ø125      |
| D-A9□/A9□V<br>D-M9□/M9□V<br>D-M9□W/M9□WV<br>D-M9□AL/M9□AVL                      | BMB5-032       | BMB5-032  | BA7-040   | BA7-040   | BA7-063   | BA7-063   | BA7-080   |
| D-A3□/A44<br>D-G39/K39                                                          | BMB2-032       | BMB2-040  | BMB1-050  | BMB1-063  | BMB1-080  | BMB1-100  | BS1-125   |
| D-A5□/A6□<br>D-A59W<br>D-F5□/J5□<br>D-F5□W/J59W<br>D-F59F<br>D-F5BAL<br>D-F5NTL | BT-03          | BT-03     | BT-05     | BT-05     | BT-06     | BT-06     | BT-08     |
| D-P4DWL                                                                         | BMB3T-040      | BMB3T-040 | BMB3T-050 | BMB3T-050 | BMB3T-080 | BMB3T-080 | BAP2T-080 |
| D-Z7□/Z80<br>D-Y59□/Y69□<br>D-Y7P/Y7PV<br>D-Y7□W<br>D-Y7□WV<br>D-Y7BAL          | BMB4-032       | BMB4-032  | BMB4-050  | BMB4-050  | BA4-063   | BA4-063   | BA4-080   |



• Mounting example for D-A9□(V), M9□(V), M9□W(V), M9□A(V)L

#### [Mounting screws set made of stainless steel]

The following set of mounting screws made of stainless steel is also available. Use it in accordance with the operating environment. (Please order the mounting bracket separately, since it is not included.)

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

Note 1) For details on BBA1, refer to page 56.

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

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

Note 2) When using type D-M9□A(V)L or Y7BAL, please do not use the iron set screws included with the auto switch mounting bracket (BMB5-032, BA7-□□□, BAB4-□□□, BA4-□□□) shown above, instead order the set of stainless steel set screws (BBA1), and please use the stainless steel set screws (M4 x 6L) included in BBA1.

### Operating Range

| Auto switch model                                    | Bore size (mm) |     |     |     |     |      |     |
|------------------------------------------------------|----------------|-----|-----|-----|-----|------|-----|
|                                                      | 32             | 40  | 50  | 63  | 80  | 100  | 125 |
| D-A9□/A9□V                                           | 7              | 7.5 | 8.5 | 9.5 | 9.5 | 10.5 | 12  |
| D-M9□/M9□V<br>D-M9□W/M9□WV<br>D-M9□AL/M9□AVL         | 4              | 4.5 | 5   | 6   | 6   | 6    | 7   |
| D-Z7□/Z80                                            | 7.5            | 8.5 | 7.5 | 9.5 | 9.5 | 10.5 | 13  |
| D-A5□/A6□                                            | 9              | 9   | 10  | 11  | 11  | 11   | 10  |
| D-A59W                                               | 13             | 13  | 13  | 14  | 14  | 15   | 17  |
| D-A3□/A44                                            | 9              | 9   | 10  | 11  | 11  | 11   | 10  |
| D-Y59□/Y69□<br>D-Y7P/Y7□V<br>D-Y7□W/Y7□WV<br>D-Y7BAL | 5.5            | 5.5 | 7   | 7.5 | 6.5 | 5.5  | 7   |
| D-F5□/J5□<br>D-F5□W/J59W<br>D-F5BAL/F5NTL<br>D-F59F  | 3.5            | 4   | 4   | 4.5 | 4.5 | 4.5  | 5   |
| D-G39/K39                                            | 9              | 9   | 9   | 10  | 10  | 11   | 11  |
| D-P4DWL                                              | 4              | 4   | 4   | 4.5 | 4   | 4.5  | 4.5 |

\* Since this is a guideline including hysteresis, not meant to be guaranteed.

(Assuming approximately ±30% dispersion.)

There may be the case it will vary substantially depending on an ambient environment.

Besides the models listed “How to Order,” the following auto switches are applicable.  
For detailed auto switch specifications, refer to the auto switch guide.

| Type               | Auto switch model         | Electrical entry        | Features                                   |
|--------------------|---------------------------|-------------------------|--------------------------------------------|
| Solid state switch | D-M9NV, M9PV, M9BV        | Grommet (Perpendicular) | —                                          |
|                    | D-Y69A, Y69B, Y7PV        |                         | —                                          |
|                    | D-M9NWV, M9PWV, M9BWV     |                         | Diagnosis indication (2-colour)            |
|                    | D-Y7NWV, Y7PWV, Y7BWV     |                         | Water resistant (2-colour)                 |
|                    | D-M9NAVL, M9PAVL, M9BAVL  |                         | —                                          |
|                    | D-Y59A, Y59B, Y7P         | Grommet (In-line)       | —                                          |
|                    | D-F59, F5P, J59           |                         | —                                          |
|                    | D-Y7NW, Y7PW, Y7BW        |                         | Diagnosis indication (2-colour)            |
|                    | D-F59W, F5PW, J59W        |                         | Water resistant (2-colour)                 |
|                    | D-F5BAL, Y7BAL            |                         | With timer                                 |
|                    | D-F5NTL                   |                         | Strong magnetic field resistant (2-colour) |
|                    | D-P5DWL                   |                         | —                                          |
| Reed switch        | D-A93V, A96V              | Grommet (Perpendicular) | —                                          |
|                    | D-A90V                    | Grommet (In-line)       | Without indicator light                    |
|                    | D-A67, Z80                |                         | —                                          |
|                    | D-A53, A54, A56, Z73, Z76 |                         | —                                          |

\* For details about auto switches with pre-wired connector, refer to the auto switch guide.

\* Normally closed (NC = b contact), solid state switch (D-F9G, F9H, Y7G, Y7H type) are also available.  
For details, refer to the auto switch guide.



## Specific Product Precautions

### Adjustment

#### Warning

##### 1. Do not open the cushion valve above the stopper.

Cushion valves are provided with a crimp (ø32) or a retaining ring (ø40 to ø125) as a stopping mechanism, and the cushion valve should not be opened above that point.

If air is supplied and operation started without confirming the above condition, the cushion valve may be ejected from the cover.

##### 2. Be certain to activate the air cushion at the stroke end.

When it is intended to use the cushion valve in the fully opened position, select a style with a damper. If this is not done, the tie-rods or piston rod assembly will be damaged.

##### 3. When replacing brackets, use the hexagon wrenches shown below.

| 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                    |
| 125            | 10                 | 28.5                    |

Atex Compliant

# Solid State Auto Switch With Pre-wired Connector

Refer to SMC website for the details of the products conforming to the international standards.

II 3GD Ex nA II T5x -10°C ≤ Ta ≤ +60°C  
II 3GD tD A22 IP67 T93°C X



## 1 With Pre-wired Connector

- Eliminates the harnessing work by cable with connector specifications
- Adopts global standardised connector (IEC947-5-2)
- IP67 construction



Note) All other specifications (dimensions, drawings, etc.) are the same as the non ATEX type.

## How to Order

**D-M9N S A PC -588**

**Solid state auto switch**  
**Standard part no.**  
For the applicable auto switch model, refer to the table below.

|                     |       |
|---------------------|-------|
| <b>Cable length</b> |       |
| <b>S</b>            | 0.5 m |
| <b>M</b>            | 1.0 m |

|                        |             |
|------------------------|-------------|
| <b>Connector model</b> |             |
| <b>A</b>               | M8 - 3 pin  |
| <b>B</b>               | M8 - 4 pin  |
| <b>D</b>               | M12 - 4 pin |

Suffix for  
ATEX certified CAT.3

## Connector Specifications

| Connector model       | M8-3 pins                                                       | M8-4 pins | M12-4 pins |
|-----------------------|-----------------------------------------------------------------|-----------|------------|
| Pin arrangement       |                                                                 |           |            |
| Conformed standard    | JIS C 4524, JIS C 4525, IEC 947-5-2, NECA 0402                  |           |            |
| Impact resistance     | 300 m/s <sup>2</sup>                                            |           |            |
| Enclosure             | IP-67 (IEC60529 standard)                                       |           |            |
| Insulation resistance | 100 MΩ or more at 500 VDC Mega                                  |           |            |
| Withstand voltage     | 1500 VAC 1 minute (between contacts), leak current 1 mA or less |           |            |

## Applicable Auto Switch

| Mounting style | Function            | Electrical entry        | Applicable model    | Lead wire length (m) |     |
|----------------|---------------------|-------------------------|---------------------|----------------------|-----|
|                |                     |                         |                     | 0.5                  | 1.0 |
| Tie-rod        | —                   | Grommet (In-line)       | F5P                 | ●                    | —   |
| Direct         | —                   | Grommet (In-line)       | Y7P                 | ●                    | —   |
|                |                     | Grommet (Perpendicular) | Y7PV                | ●                    | —   |
|                |                     | Grommet (In-line)       | M9N, M9P, M9B       | ●                    | ●   |
|                |                     | Grommet (Perpendicular) | M9NV, M9PV, M9BV    | ●                    | ●   |
|                | 2-colour indication | Grommet (In-line)       | M9NW, M9PW, M9BW    | ●                    | ●   |
|                |                     | Grommet (Perpendicular) | M9NWV, M9PWV, M9BWV | ●                    | ●   |

\* This category 3 type autoswitch can only be used in zones 2 and 22.

# Solid State Auto Switch With Pre-wired Connector

Refer to SMC website for the details of the products conforming to the international standards.



## 1 With Pre-wired Connector

- Eliminates the harnessing work by cable with connector specifications
- Adopts global standardised connector (IEC947-5-2)
- IP67 construction



### How to Order

**D-M9N S A PC**

**Solid state auto switch**  
**Standard part no.**  
For the applicable auto switch  
model, refer to the table below.

**Cable length**

|          |       |
|----------|-------|
| <b>S</b> | 0.5 m |
| <b>M</b> | 1.0 m |
| <b>L</b> | 3.0 m |

**Connector model**

|          |             |
|----------|-------------|
| <b>A</b> | M8 - 3 pin  |
| <b>B</b> | M8 - 4 pin  |
| <b>D</b> | M12 - 4 pin |

### Connector Specifications

| Connector model       | M8-3 pins                                                       | M8-4 pins | M12-4 pins |
|-----------------------|-----------------------------------------------------------------|-----------|------------|
| Pin arrangement       |                                                                 |           |            |
| Conformed standard    | JIS C 4524, JIS C 4525, IEC 947-5-2, NECA 0402                  |           |            |
| Impact resistance     | 300 m/s <sup>2</sup>                                            |           |            |
| Enclosure             | IP-67 (IEC60529 standard)                                       |           |            |
| Insulation resistance | 100 MΩ or more at 500 VDC Mega                                  |           |            |
| Withstand voltage     | 1500 VAC 1 minute (between contacts), leak current 1 mA or less |           |            |

### Applicable Auto Switch

| Mounting style | Function                 | Electrical entry        | Applicable model    | Lead wire length (m) |     |     |
|----------------|--------------------------|-------------------------|---------------------|----------------------|-----|-----|
|                |                          |                         |                     | 0.5                  | 1.0 | 3.0 |
| Rail           | Magnetic field resistant | Grommet (In-line)       | P4DW                | —                    | —   | ●   |
| Tie-rod        | —                        |                         | F59, F5P, J59       | ●                    | —   | —   |
|                | 2-colour indication      |                         | F59W, F5PW J59W     | ●                    | —   | —   |
|                | Diagnostic output        |                         | F59F                | ●                    | —   | —   |
|                | Water resistant          |                         | F5BA                | —                    | —   | —   |
|                | With timer               |                         | F5NT                | —                    | —   | —   |
| Direct         | —                        | Grommet (In-line)       | Y59A, Y7P, Y59B     | ●                    | —   | —   |
|                |                          | Grommet (Perpendicular) | Y69A, Y7PV, Y69B    | ●                    | —   | —   |
|                |                          | Grommet (In-line)       | M9N, M9P, M9B       | ●                    | ●   | —   |
|                |                          | Grommet (Perpendicular) | M9NV, M9PV, M9BV    | ●                    | ●   | —   |
|                | 2-colour indication      | Grommet (In-line)       | Y7NW, Y7PW, Y7BW    | ●                    | —   | —   |
|                |                          | Grommet (Perpendicular) | Y7NWW, Y7PWV, Y7BWV | ●                    | —   | —   |
|                |                          | Grommet (In-line)       | M9NW, M9PW, M9BW    | ●                    | ●   | —   |
|                |                          | Grommet (Perpendicular) | M9NWW, M9PWV, M9BWV | ●                    | ●   | —   |
|                | Water resistant          | Grommet (In-line)       | Y7BA                | —                    | —   | —   |
|                |                          |                         | M9NA, M9PA, M9BA    | ●                    | ●   | —   |
|                |                          | Grommet (Perpendicular) | M9NAV, M9PAV, M9BAV | ●                    | ●   | —   |

## Mounting Bracket Tie-rod Mounting

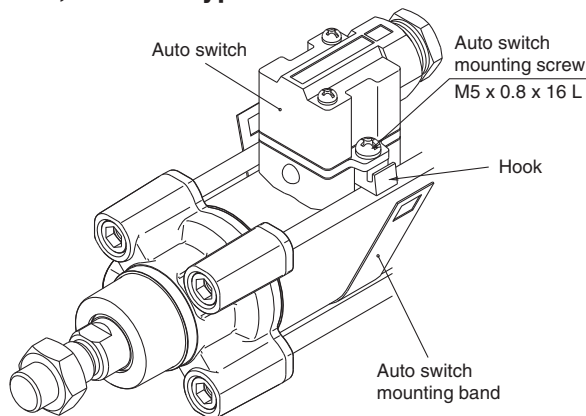
### <Applicable Auto Switch>

Solid state switch ... D-G39, D-K39

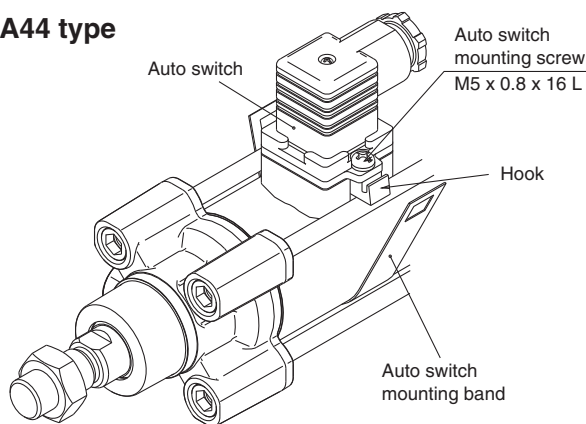
Reed switch ..... D-A33, D-A34, D-A44

### How to Mount and Move the Auto Switch

#### D-A3□, D-G3/K3 type



#### D-A44 type



1. Loosen the auto switch mounting screws at both sides to pull down the hook.
2. Put an auto switch mounting band on the cylinder tube and set it at the auto switch mounting position, and then hook the band.
3. Screw lightly the auto switch mounting screw.
4. Set the whole body to the detecting position by sliding, tighten the mounting screw to secure the auto switch. (The tightening torque should be about 2 to 3 N·m.)
5. Modification of the detecting position should be made in the state of 3.

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

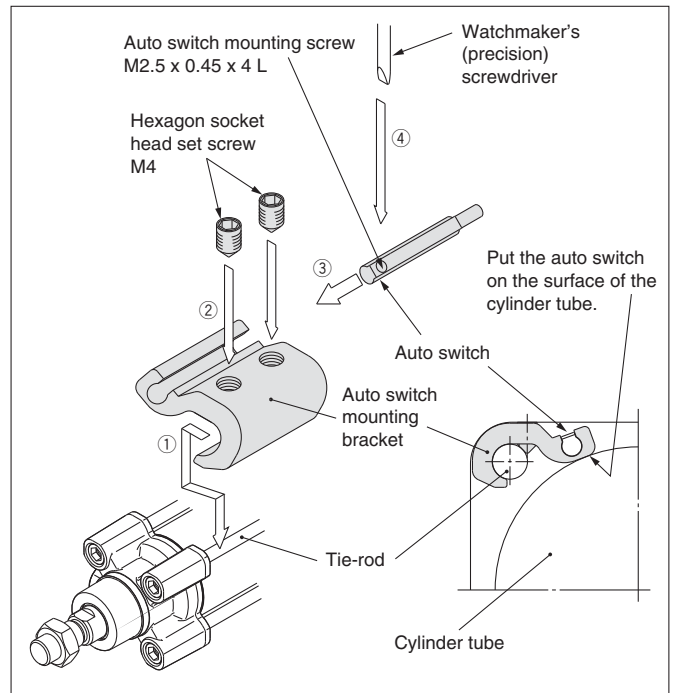
| Cylinder series | Applicable bore size (mm) |          |          |          |          |          |         |
|-----------------|---------------------------|----------|----------|----------|----------|----------|---------|
|                 | 32                        | 40       | 50       | 63       | 80       | 100      | 125     |
| C96             | BMB2-032                  | BMB2-040 | BMB1-050 | BMB1-063 | BMB1-080 | BMB1-100 | BS1-125 |

### <Applicable Auto Switch>

Solid state switch ... D-M9N(V), D-M9P(V), D-M9B(V)  
D-M9NW(V), D-M9PW(V), D-M9BW(V)  
D-M9NA(V), D-M9PA(V), D-M9BA(V)

Reed switch ..... D-A90(V), A93(V), A96(V)

### How to Mount and Move the Auto Switch



1. Fix it to the detecting position with a set screw by installing an auto switch mounting bracket in cylinder tie-rod and letting the bottom surface of an auto switch mounting bracket contact the cylinder tube firmly.
2. Fix it to the detecting position with a set screw (M4). (Use a hexagon wrench.)
3. Fit an auto switch into the auto switch mounting groove to set it roughly to the mounting position for an auto switch.
4. After confirming the detecting position, tighten up the mounting screw (M2.5) attached to an auto switch, and secure the auto switch.
5. When changing the detecting position, carry out in the state of 3.

Note 1) To protect auto switches, ensure that main body of an auto switch should be embedded into auto switch mounting groove with a depth of 15 mm or more.

Note 2) Set the tightening torque of a hexagon socket head set screw (M4) to be 1.0 to 1.2 N·m.

Note 3) When tightening an auto switch mounting screw (M2.5), use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm.

Also, set the tightening torque to be 0.05 to 0.15 N·m. As a guide, turn 90° from the position where it comes to feel tight.

### Auto Switch Mounting Bracket Part No. (Including Bracket, Set Screw)

| Cylinder series | Applicable bore size (mm) |          |         |         |         |         |         |
|-----------------|---------------------------|----------|---------|---------|---------|---------|---------|
|                 | 32                        | 40       | 50      | 63      | 80      | 100     | 125     |
| C96             | BMB5-032                  | BMB5-032 | BA7-040 | BA7-040 | BA7-063 | BA7-063 | BA7-080 |

Note 1) When using type D-M9□A(V)L, please order stainless steel screw set BBA1 separately (page 56), and use the stainless steel set screws, after selecting set screws of the appropriate length for the cylinder series—as shown in the table above.

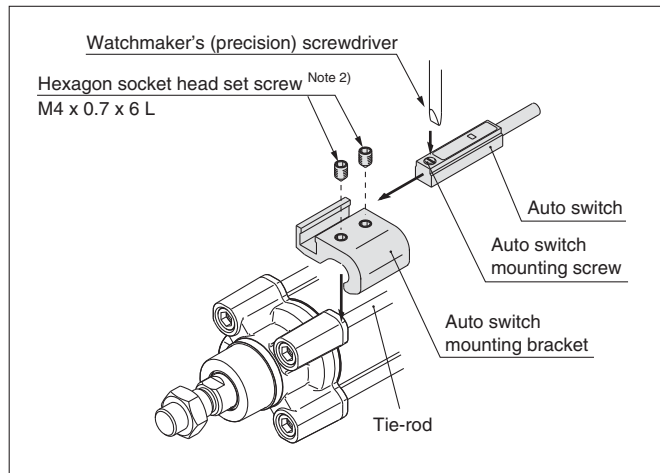
Note 2) Colour or gloss differences in the metal surfaces have no effect on metal performance.

The special properties of the chromate (trivalent) applied to the main body of the auto switch mounting bracket for BA7-□ and BMB5-□ result in differences in coloration depending on the production lot, but these have no adverse impact on corrosion resistance.

## <Applicable Auto Switch>

Solid state switch ... D-Y59<sup>△</sup>, Y69<sup>△</sup>, D-Y7P(V)  
D-Y7NW(V), Y7PW(V), Y7BW(V)  
D-Y7BAL  
Reed switch ..... D-Z73, Z76, Z80

## How to Mount and Move the Auto Switch



**Note 1)** When tightening an auto switch mounting screw, use a watchmaker's screwdriver with a handle diameter of 5 to 6 mm.  
**Also, set the tightening torque to be 0.05 to 0.1 N·m.**  
**As a guide, turn 90° from the position where it comes to feel tight. Set the tightening torque of a hexagon socket head set screw (M4 x 0.7) to be 1.0 to 1.2 N·m.**

1. Fix it to the detecting position with a set screw by installing an auto switch mounting bracket in cylinder tie-rod and letting the bottom surface of an auto switch mounting bracket contact the cylinder tube firmly. (Use a hexagon wrench.)
2. Fit an auto switch into the auto switch mounting groove to set it roughly to the mounting position for an auto switch.
3. After confirming the detecting position, tighten up the mounting screw attached to an auto switch, and secure the auto switch.
4. When changing the detecting position, carry out in the state of 2.

\* To protect auto switches, ensure that main body of an auto switch should be embedded into auto switch mounting groove with a depth of 15 mm or more.

## Auto Switch Mounting Bracket Part No. (Including Bracket, Set Screw)

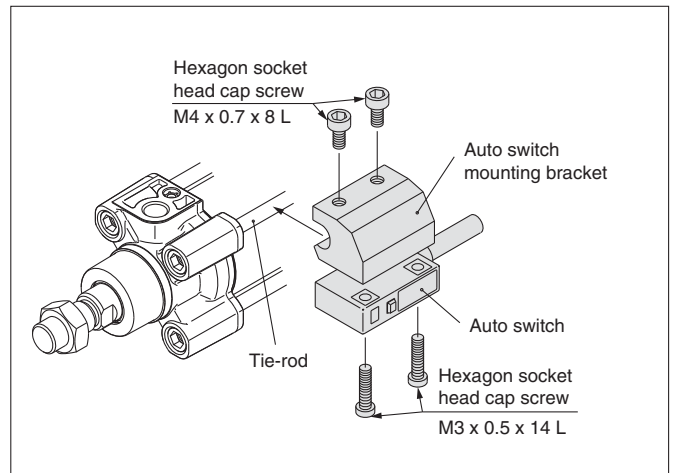
| Cylinder series | Applicable bore size (mm) |          |          |          |         |         |         |
|-----------------|---------------------------|----------|----------|----------|---------|---------|---------|
|                 | 32                        | 40       | 50       | 63       | 80      | 100     | 125     |
| C96             | BMB4-032                  | BMB4-032 | BMB4-050 | BMB4-050 | BA4-063 | BA4-063 | BA4-080 |

Note 2) When using type D-Y7BAL, please order stainless steel screw set BBA1 separately (page 56), and use the stainless steel set screws, after selecting set screws of the appropriate length for the cylinder series — as shown in the table above.

## <Applicable Auto Switch>

Solid state switch ... D-P4DWL

## How to Mount and Move the Auto Switch



1. Slightly screw the hexagon socket head cap screw (M4 x 0.7 x 8 L) into the M4 tapped portion of auto switch mounting bracket. (2 locations) Use caution that the tip of the hexagon socket head cap screw should not stick out to the concave portion of auto switch mounting bracket.
2. Put a hexagon socket head cap screw (M3 x 0.5 x 14 L) through the auto switch's through-hole (2 locations), and then push it down into the M3 tapped part on the auto switch mounting bracket while turning it lightly.
3. Place the concave part of the auto switch mounting bracket into the cylinder tie-rod, and slide the auto switch mounting bracket in order to set roughly to the detecting position.
4. After reconfirming the detecting position, tighten the M3 mounting screw to secure the auto switch by making the bottom face of auto switch attached to the cylinder tube. (Tightening torque of M3 screw should be 0.5 to 0.7 N·m.)
5. Tighten up M4 screw of auto switch mounting bracket to secure the auto switch mounting bracket. (Ensure that tightening torque of M4 screw should be set 1.0 to 1.2 N·m.)

## Auto Switch Mounting Bracket Part No. (Including Bracket, Screw)

| Cylinder series | Applicable bore size (mm) |           |           |           |           |           |           |
|-----------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
|                 | 32                        | 40        | 50        | 63        | 80        | 100       | 125       |
| C96             | BMB3T-040                 | BMB3T-040 | BMB3T-050 | BMB3T-050 | BMB3T-080 | BMB3T-080 | BAP2T-080 |

## Mounting Bracket Tie-rod Mounting

### <Applicable Auto Switch>

**Solid state switch ... D-F59, D-F5P**

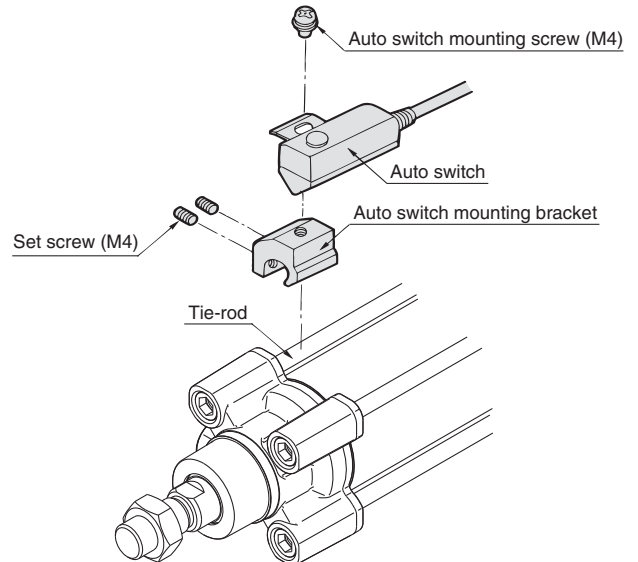
**D-J59, D-J51, D-F5BAL**

**D-F59W, D-F5PW, D-J59W**

**D-F59F, D-F5NTL**

**Reed switch ..... D-A53, D-A54, D-A56, D-A64, D-A67**  
**D-A59W**

1. Fix the auto switch on the auto switch mounting bracket with the auto switch mounting screw (M4) and install the set screw.
2. Fit the auto switch mounting bracket into the cylinder tie-rod and then fix the auto switch at the detecting position with the hexagonal wrench. (Be sure to put the auto switch on the surface of cylinder tube.)
3. When changing the detecting position, loosen the set screw to move the auto switch and then re-fix the auto switch on the cylinder tube. (Tightening torque of M4 screw should be 1.0 to 1.2 N·m.)



### Auto Switch Mounting Bracket Part No. (Including Bracket, Screw, Set Screw)

| Cylinder series | Applicable bore size (mm) |       |       |       |       |       |       |
|-----------------|---------------------------|-------|-------|-------|-------|-------|-------|
|                 | 32                        | 40    | 50    | 63    | 80    | 100   | 125   |
| <b>C96</b>      | BT-03                     | BT-03 | BT-05 | BT-05 | BT-06 | BT-06 | BT-08 |

#### [Mounting screws set made of stainless steel]

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

(Please order the auto switch mounting bracket separately, since it is not included.)

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

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

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

### Auto Switch Mounting Screw Set

| Part no.    | Contents |                            |               |          | Applicable auto switch mounting bracket part no. | Applicable auto switch   |
|-------------|----------|----------------------------|---------------|----------|--------------------------------------------------|--------------------------|
|             | No.      | Description                | Size          | Quantity |                                                  |                          |
| <b>BBA1</b> | 1        | Auto switch mounting screw | M4 x 0.7 x 8L | 1        | BT-□□                                            | D-A5, A6<br>D-F5, J5     |
|             |          |                            |               |          | BT-03, BT-04, BT-05<br>BT-06, BT-08, BT-12       |                          |
|             | 2        | Set screw                  | M4 x 0.7 x 6L | 2        | BA4-040, BA4-063, BA4-080<br>BMB4-032, BMB4-050  | D-Z7, Z8<br>D-Y5, Y6, Y7 |
|             |          |                            |               |          | BMB5-032<br>BA7-040, BA7-063, BA7-080            | D-A9<br>D-M9             |
|             | 3        | Set screw                  | M4 x 0.7 x 8L | 2        | BT-16, BT-18A, BT-20                             | D-A5, A6<br>D-F5, J5     |
|             |          |                            |               |          | BS4-125, BS4-160<br>BS4-180, BS4-200             | D-Z7, Z8<br>D-Y5, Y6, Y7 |
|             |          |                            |               |          | BS5-125, BS5-160<br>BS5-180, BS5-200             | D-A9<br>D-M9             |

## Simple Specials 1

These changes are dealt with Simple Specials System.

Symbol

### 1 Change of Rod End Shape

-XA0 to XA30

#### Applicable Series

| Series | Description   | Model  | Action                    | Symbol for change of rod end shape |
|--------|---------------|--------|---------------------------|------------------------------------|
| C96    | Standard type | C96S   | Double acting, Single rod | XA0 to 30                          |
|        |               | C96SW  | Double acting, Double rod | XA0 to 30                          |
|        | Smooth type   | C96Y   | Double acting, Single rod | XA0 to 30                          |
| CP96   | Standard type | CP96S  | Double acting, Single rod | XA0 to 30                          |
|        |               | CP96SW | Double acting, Double rod | XA0 to 30                          |

#### ⚠ 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 desire.  
 $D \leq 6 \rightarrow D - 1 \text{ mm}$ ,  $6 < D \leq 25 \rightarrow D - 2 \text{ mm}$ ,  $D > 25 \rightarrow D - 4 \text{ mm}$
- In the case of double rod type and single acting retraction type, enter the dimensions when the rod is retracted.
- Only the single side of a double rod is able to manufacture.

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

# Simple Specials 2

## -XC14: Change of Trunnion Bracket Mounting Position

These changes are dealt with Simple Specials System.

### 2 Change of Trunnion Bracket Mounting Position

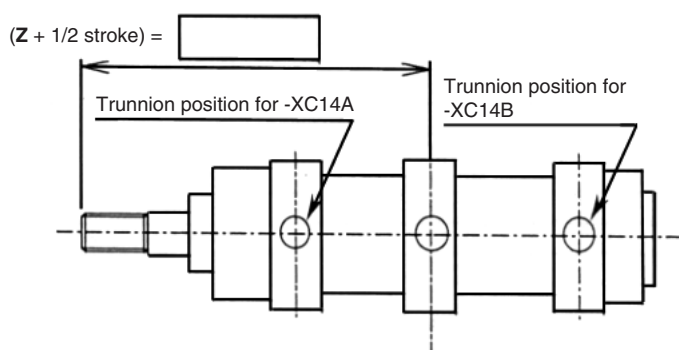
Symbol

**-XC14**

The position for mounting the trunnion pivot bracket on the cylinder can be moved from the standard mounting position to any desired position.

#### Applicable Series

| Series     | Description   | Model       | Action                    | Note |
|------------|---------------|-------------|---------------------------|------|
| <b>C96</b> | Standard type | <b>C96</b>  | Double acting, Single rod |      |
|            |               | <b>C96W</b> | Double acting, Double rod |      |



#### ⚠ Precautions

1. Specify "Z + 1/2 stroke" in the case the trunnion bracket position is not -XC14A, B or trunnion is not a center trunnion.
2. SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
3. The possible range of trunnion bracket mounting position is indicated in the table below.
4. Some trunnion mounting positions do not allow auto switch mounting. Please consult with SMC for more information.

#### Series C96

(mm)

| Bore size  | Symbol | Trunnion bracket position |                |                                        |                |
|------------|--------|---------------------------|----------------|----------------------------------------|----------------|
|            |        | For -XC14                 |                | Reference : Standard (Centre trunnion) | Minimum stroke |
|            |        | Minimum                   | Maximum        |                                        |                |
| <b>32</b>  |        | 89                        | 101 + stroke   | 95 + 0.5 stroke                        | 0              |
| <b>40</b>  |        | 103                       | 110 + stroke   | 106.5 + 0.5 stroke                     |                |
| <b>50</b>  |        | 118                       | 126 + stroke   | 122 + 0.5 stroke                       |                |
| <b>63</b>  |        | 128.5                     | 130.5 + stroke | 129.5 + 0.5 stroke                     |                |
| <b>80</b>  |        | 148.5                     | 151.5 + stroke | 150 + 0.5 stroke                       |                |
| <b>100</b> |        | 161.5                     | 158.5 + stroke | 160 + 0.5 stroke                       | 5              |
| <b>125</b> |        | 202.5                     | 195.5 + stroke | 199 + 0.5 stroke                       | 10             |

## 3 Heat Resistant Cylinder (−10 to 150°C)

Symbol  
-XB6

Air cylinder which changed the seal material and grease, so that it could be used even at higher temperature up to 150 from −10°C.

### Applicable Series

| Series | Description  | Model  | Action                    | Note | Page (for std. model) |
|--------|--------------|--------|---------------------------|------|-----------------------|
| CP96   | Air cylinder | CP96S  | Double acting, Single rod |      | Page 4                |
|        |              | CP96SW | Double acting, Double rod |      |                       |
| C96    | Air cylinder | C96S   | Double acting, Single rod |      | Page 26               |
|        |              | C96SW  | Double acting, Double rod |      |                       |

### How to Order

Standard model no. **-XB6**  
Heat resistant cylinder

### Specifications

|                                                         |                       |
|---------------------------------------------------------|-----------------------|
| Ambient temperature range                               | −10 to 150°C          |
| Seals materials                                         | Fluororubber          |
| Grease                                                  | Heat resistant grease |
| Specifications other than above and external dimensions | Same as standard type |

### Warning Precautions

Be aware that smoking cigarettes, etc. after your hands have come into contact with the grease used in this cylinder can create a gas that is hazardous to humans.



- Note 1) Operate without lubrication from a pneumatic system lubricator.  
 Note 2) Please contact SMC for details on the maintenance intervals for this cylinder, which differ from those of the standard cylinder.  
 Note 3) In principle, it is impossible to make built-in magnet type and the one with auto switch. But, as for the one with auto switch, and the heat resistant cylinder with heat resistant auto switch, since it will be differed depending on the series, please contact SMC.  
 Note 4) Piston speed is ranged from 50 to 500 mm/s.

## 4 Cold Resistant Cylinder (−40 to 70°C)

Symbol  
-XB7

Air cylinder which changed the seal material and grease, so that it could be used even at lower temperature down to −40°C.

### Applicable Series

| Series | Description  | Model | Action                    | Note                                                                                                  | Page (for std. model) |
|--------|--------------|-------|---------------------------|-------------------------------------------------------------------------------------------------------|-----------------------|
| C96    | Air cylinder | C96S  | Double acting, Single rod | Except with switch, Mounting bracket is available with basic only, Minimum operating pressure 0.2 MPa | Page 26               |

### How to Order

Standard model no. **-XB7**  
Cold resistant cylinder

### Specifications

|                           |                       |
|---------------------------|-----------------------|
| Ambient temperature range | −40 to 70°C           |
| Seals material            | Low nitrile rubber    |
| Grease                    | Cold resistant grease |
| Auto switch               | Not mountable         |
| Dimensions                | Same as standard type |
| Additional specifications | Same as standard type |

### Warning Precautions

Be aware that smoking cigarettes, etc. after your hands have come into contact with the grease used in this cylinder can create a gas that is hazardous to humans.



- Note 1) Operate without lubrication from a pneumatic system lubricator.  
 Note 2) Use dry air which is suitable for heatless air dryer, etc. not to cause the moisture to be frozen.  
 Note 3) Please contact SMC for details on the maintenance intervals for this cylinder, which differ from those of the standard cylinder.  
 Note 4) Mounting auto switch is impossible.

## 5 With Heavy Duty Scraper

Symbol  
**-XC4**

It is suitable for using cylinders under the environment, where there are much dusts in a surrounding area by using a heavy duty scraper on the wiper ring, or using cylinders under earth and sand exposed to the die-cast equipment, construction machinery, or industrial vehicles.

### Applicable Series

| Series | Description  | Model  | Action                    | Note        | Page (for std. model) |
|--------|--------------|--------|---------------------------|-------------|-----------------------|
| CP96   | Air cylinder | CP96S  | Double acting, Single rod | ø32 to ø100 | Page 4                |
|        |              | CP96SW | Double acting, Double rod | ø32 to ø100 |                       |
| C96    | Air cylinder | C96S   | Double acting, Single rod | ø32 to ø100 | Page 26               |
|        |              | C96SW  | Double acting, Double rod | ø32 to ø100 |                       |

### How to Order

Standard model no.

**-XC4**

With heavy duty scraper  
(SCB scraper)

**Specifications: Same as standard type.**

**Dimensions: Same as standard type.**

### ⚠ Caution

**Do not replace heavy duty scrapers.**

- Since heavy duty scrapers are press-fit, do not replace the cover only, but rather the entire rod cover assembly.

## 6 Tie-rod, Cushion Valve, Tie-rod Nut, etc. Made of Stainless Steel

Symbol  
**-XC7**

When using in locations where the rust generation or corrosion likelihood exists, the standard parts material have been partly changed to the stainless steel.

### Applicable Series

| Series | Description  | Model  | Action                    | Page (for std model) |
|--------|--------------|--------|---------------------------|----------------------|
| CP96   | Air cylinder | CP96S  | Double acting, Single rod | Page 4               |
|        |              | CP96SW | Double acting, Double rod |                      |
| C96    | Air cylinder | C96S   | Double acting, Single rod | Page 26              |
|        |              | C96SW  | Double acting, Double rod |                      |

### How to Order

Standard model no.

**-XC7**

Tie-rod, cushion valve, tie-rod nut, etc.  
made of stainless steel

### Specifications

|                                            |                                                                                    |
|--------------------------------------------|------------------------------------------------------------------------------------|
| Component parts changed to stainless steel | Tie-rod, Tie-rod nut, Mounting bracket nut, Spring washer, Cushion valve, Lock nut |
| Additional specifications                  | Same as standard type                                                              |
| Dimensions                                 | Same as standard type                                                              |

Symbol

**-XC10**

# 7 Dual Stroke Cylinder/Double Rod Type

Two cylinders are constructed as one cylinder in a back-to-back configuration allowing the cylinder stroke to be controlled in three steps.

## Applicable Series

| Series | Description  | Model | Action                    | Note                              | Page (for std. model) |
|--------|--------------|-------|---------------------------|-----------------------------------|-----------------------|
| CP96   | Air cylinder | CP96S | Double acting, Single rod | Except clevis and trunnion styles | Page 4                |
| C96    | Air cylinder | C96S  | Double acting, Single rod | Except clevis and trunnion styles | Page 26               |

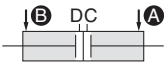
## How to Order

CP96S  
C96S **Mounting style** **Bore size** - **Stroke A** + **Stroke B** - **XC10**  
Dual stroke cylinder

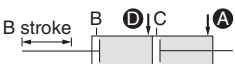
## Specifications

| Series | Bore size (mm) | Maximum manufacturable stroke (mm) |
|--------|----------------|------------------------------------|
| CP96   | 32 to 125      | 1000                               |
| C96    |                |                                    |

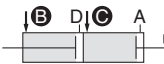
## Function



When air pressure is supplied to ports **A** and **B**, both A and B strokes retract.



When air pressure is supplied to ports **A** and **D**, B out strokes.

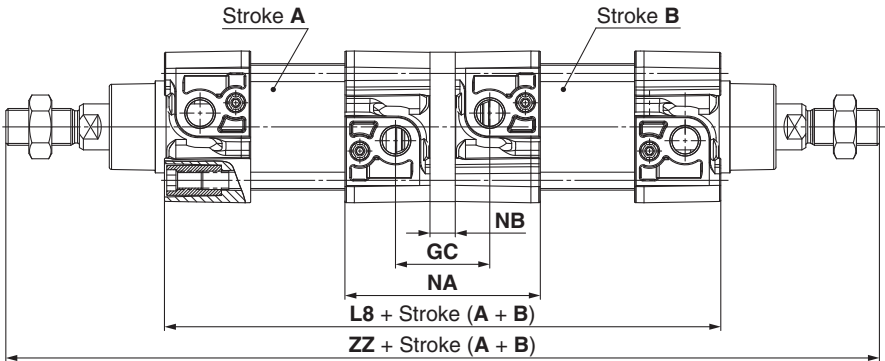
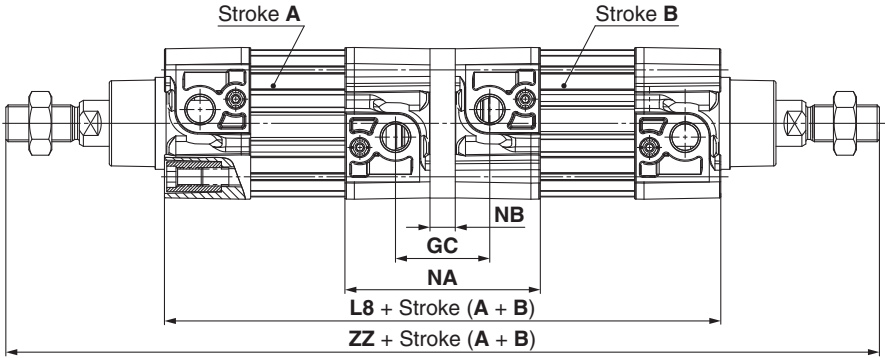


When air pressure is supplied to ports **B** and **C**, A out strokes.



When air pressure is supplied to ports **C** and **D**, both strokes A and B out strokes.

## Dimensions (Dimensions other than below are the same as standard type.)



| Bore size (mm) | L8  | ZZ  | NA  | NB | GC |
|----------------|-----|-----|-----|----|----|
| ø32            | 198 | 294 | 74  | 10 | 36 |
| ø40            | 220 | 328 | 85  | 10 | 38 |
| ø50            | 222 | 360 | 85  | 10 | 41 |
| ø63            | 252 | 390 | 100 | 10 | 43 |
| ø80            | 270 | 442 | 104 | 14 | 52 |
| ø100           | 290 | 472 | 114 | 14 | 52 |
| ø125           | 334 | 572 | 130 | 14 | 52 |

## 8 Dual Stroke Cylinder/Single Rod Type

Symbol  
-XC11

Two cylinders can be integrated by connecting them in line, and the cylinder stroke can be controlled in two stages in both directions.

### Applicable Series

| Series | Description  | Model | Action                    | Note                  | Page (for std. model) |
|--------|--------------|-------|---------------------------|-----------------------|-----------------------|
| CP96   | Air cylinder | CP96S | Double acting, Single rod | Except trunnion style | Page 4                |
| C96    | Air cylinder | C96S  | Double acting, Single rod | Except trunnion style | Page 26               |

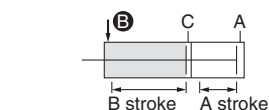
### How to Order

CP96S  
C96S **Mounting style** **Bore size** - **Stroke A** + **Stroke B-A** - XC11

● Dual stroke cylinder/Single rod type

Specifications: Same as standard type.

### Function



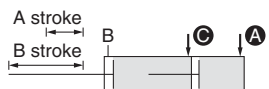
When air pressure is supplied to the port **B**, both A and B strokes retract.



When air pressure is supplied from port **A**, the rod operates for A stroke.



When air pressure is supplied from port **C**, the rod operates for B stroke.



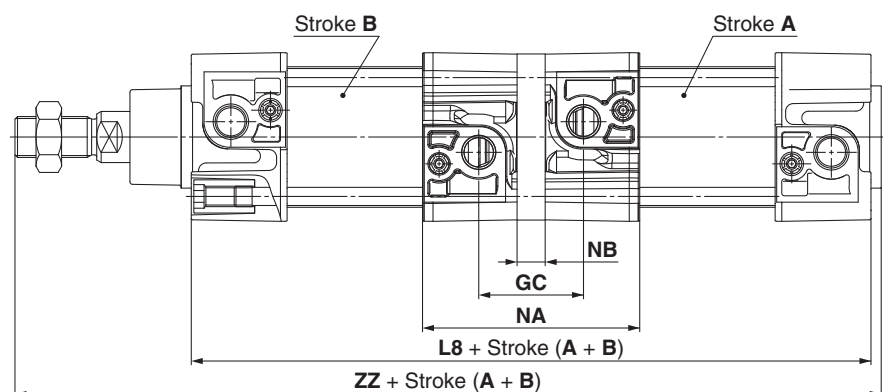
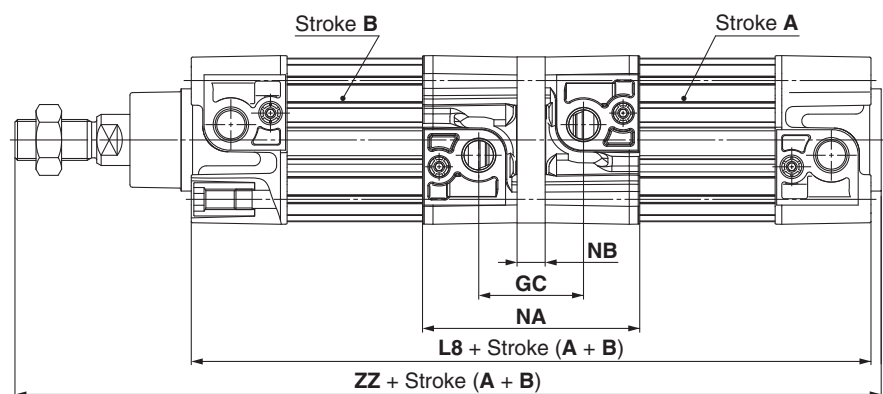
When air pressure is supplied from ports **A** and **C**, the output force is doubled in the A stroke.

### Precautions

#### ⚠ Caution

1. Do not supply air until the cylinder is fixed with the attached bolt.
2. If air is supplied without securing the cylinder, the cylinder could lurch, posing the risk of bodily injury or damage to the peripheral equipment.

### Dimensions (Dimensions other than below are the same as standard type.)



| Bore size (mm) | L8  | ZZ  | NA  | NB | GC |
|----------------|-----|-----|-----|----|----|
| ø32            | 199 | 251 | 74  | 10 | 36 |
| ø40            | 221 | 279 | 85  | 10 | 38 |
| ø50            | 223 | 296 | 85  | 10 | 41 |
| ø63            | 253 | 326 | 100 | 10 | 43 |
| ø80            | 271 | 361 | 104 | 14 | 52 |
| ø100           | 291 | 386 | 114 | 14 | 52 |
| ø125           | 335 | 460 | 130 | 14 | 52 |

## 9 Fluororubber Seals

Symbol  
**-XC22**

### Applicable Series

| Series | Description  | Model  | Action                    | Note | Page (for std. model) |
|--------|--------------|--------|---------------------------|------|-----------------------|
| CP96   | Air cylinder | CP96S  | Double acting, Single rod |      | Page 4                |
|        |              | CP96SW | Double acting, Double rod |      |                       |
| C96    | Air cylinder | C96S   | Double acting, Single rod |      | Page 26               |
|        |              | C96SW  | Double acting, Double rod |      |                       |

### How to Order

Standard model no. **- XC22**

Fluororubber seals ●



Note 1) Please confirm with SMC, as the type of chemical and the operating temperature may not allow the use of this product.

Note 2) Cylinders with auto switches can also be produced; however, auto switch related parts (auto switch units, mounting brackets, built-in magnets) are the same as standard products. Before using these, please contact SMC regarding their suitability for the operating environment.

### Specifications

|                                                         |                                                                                                                   |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Seal material                                           | Fluororubber                                                                                                      |
| Ambient temperature range                               | With auto switch : -10 to 60°C (No freezing) <sup>Note1)</sup><br>Without auto switch : -10 to 70°C (No freezing) |
| Specifications other than above and external dimensions | Same as standard type for each series                                                                             |

## 10 With Coil Scraper

Symbol  
**-XC35**

It gets rid of frost, ice, weld spatter, cutting chips adhered to the piston rod, and protects the seals, etc.

### Applicable Series

| Series | Description  | Model  | Action                    | Note        | Page (for std. model) |
|--------|--------------|--------|---------------------------|-------------|-----------------------|
| CP96   | Air cylinder | CP96S  | Double acting, Single rod | ø32 to ø100 | Page 4                |
|        |              | CP96SW | Double acting, Double rod | ø32 to ø100 |                       |
| C96    | Air cylinder | C96S   | Double acting, Single rod | ø32 to ø100 | Page 26               |
|        |              | C96SW  | Double acting, Double rod | ø32 to ø100 |                       |

### How to Order

Standard model no. **- XC35**

With coil scraper ●

**Specifications: Same as standard type.**  
**Dimensions: Same as standard type.**



## 11 Made of Stainless Steel (With Hard Chrome Plated Piston Rod)

Symbol

**-XC68**

Applicable for uses where rust and corrosion are expected, such as by immersing in water.

### Applicable Series

| Series | Description  | Model  | Action                    | Page (for std. model) |
|--------|--------------|--------|---------------------------|-----------------------|
| CP96   | Air cylinder | CP96S  | Double acting, Single rod | Page 4                |
|        |              | CP96SW | Double acting, Double rod |                       |
| C96    | Air cylinder | C96S   | Double acting, Single rod | Page 26               |
|        |              | C96SW  | Double acting, Double rod |                       |

Note) There is a maximum stroke limit for C (P) 96 cylinder.

### Maximum Stroke

(mm)

| Series | Double acting, Single rod                                               | Double acting, Double rod       |
|--------|-------------------------------------------------------------------------|---------------------------------|
| CP96   | $\phi 32$ : 1800<br>$\phi 40$ to $\phi 100$ : 1700<br>$\phi 125$ : 1600 | 1000<br>(Same as standard type) |
| C96    | $\phi 32$ : 1000<br>$\phi 40$ to $\phi 100$ : 1700<br>$\phi 125$ : 1600 | 1000<br>(Same as standard type) |

### Specifications

|                                     |                         |
|-------------------------------------|-------------------------|
| Parts changed to stainless steel    | Piston rod, Rod end nut |
| Other specifications and dimensions | Same as standard type   |

### How to Order

|                                                                 |        |
|-----------------------------------------------------------------|--------|
| Standard model no.                                              | - XC68 |
| Made of stainless steel<br>(With hard chrome plated piston rod) |        |



# Actuators Precautions 1

Be sure to read this before handling.

## Design and Selection

### Warning

1. **There is a danger of sudden action by air cylinders if sliding parts of machinery are twisted, etc., and changes in forces occur.**

In such cases, human injury may occur; e.g., by catching hands or feet in the machinery, or damage to the machinery itself may occur. Therefore, the machine should be designed to avoid such dangers.

2. **Install a protective cover when there is a risk of human injury**

If a driven object and moving parts of a cylinder pose a danger of human injury, design the structure to avoid contact with the human body.

3. **Securely tighten all stationary parts and connected parts so that they will not become loose.**

Especially when a cylinder operates with high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.

4. **A deceleration circuit may be required.**

When a driven object is operated at high speed or the load is heavy, a cylinder's cushion will not be sufficient to absorb the impact. Install a deceleration circuit to reduce the speed before cushioning to relieve the impact. In this case, the rigidity of the machinery should also be examined.

5. **Consider a possible drop in operating pressure due to a power outage, etc.**

When a cylinder is used in a clamping mechanism, there is a danger of work pieces dropping if there is a decrease in clamping force due to a drop in circuit pressure caused by a power outage, etc. Therefore, safety equipment should be installed to prevent damage to machinery and/or human injury. Suspension mechanisms and lifting devices also require consideration for drop prevention.

6. **Consider a possible loss of power source.**

Measures should be taken to protect against human injury and equipment damage in the event that there is a loss of power to equipment controlled by air pressure, electricity or hydraulics, etc.

7. **Design circuitry to prevent sudden lurching of driven objects.**

When a cylinder is driven by an exhaust centre type directional control valve or when starting up after residual pressure is exhausted from the circuit, etc., the piston and its driven object will lurch at high speed if pressure is applied to one side of the cylinder because of the absence of air pressure inside the cylinder. Therefore, select equipment and design circuits to prevent sudden lurching, because there is a danger of human injury and/or damage to equipment when this occurs.

8. **Consider emergency stops.**

Design so that human injury and/or damage to machinery and equipment will not be caused when machinery is stopped by a safety device under abnormal conditions, such as a power outage or a manual emergency stop.

9. **Consider the action when operation is restarted after an emergency stop or abnormal stop.**

Design the machinery so that human injury or equipment damage will not occur upon restart of operation. When the cylinder has to be reset at the starting position, install safe manual control equipment.

### Warning

10. **Confirm the specifications.**

The products advertised in this catalogue are designed according to use in industrial compressed air systems. If the products are used in conditions where pressure, temperature, etc., are out of specification, damage and/or malfunction may be caused. Do not use in these conditions. (Refer to the specifications.)

Consult SMC if you use a fluid other than compressed air.

11. **Intermediate stops**

When intermediate stopping of a cylinder piston is performed with a 3 position closed centre type directional control valve, it is difficult to achieve stopping positions as accurate and precise as with hydraulic pressure due to the compressibility of air.

Furthermore, since valves and cylinders, etc., are not guaranteed for zero air leakage, it may not be possible to hold a stopped position for an extended period of time. Contact SMC in case it is necessary to hold a stopped position for an extended period.

### Caution

1. **Operate within the limits of the maximum usable stroke.**

The piston rod will be damaged if operated beyond the maximum stroke. Refer to the air cylinder model selection procedure for the maximum usable stroke.

2. **Operate the piston within a range such that collision damage will not occur at the stroke end.**

Operate within a range such that damage will not occur when the piston having inertial force stops by striking the cover at the stroke end. Refer to the cylinder model selection procedure for the range within which damage will not occur.

3. **Use a speed controller to adjust the cylinder drive speed, gradually increasing from a low speed to the desired speed setting.**

4. **Provide intermediate supports for long stroke cylinders.**

Provide intermediate supports for cylinders with long strokes to prevent rod damage due to sagging of the rod, deflection of the tube, vibration and external loads, etc.

It is assumed the persons determining the stroke requirements have technical training and expertise in the design limitations of pneumatic equipment and are aware that death, personal injury, and property damage may result from the improper use of these products. Proper use is the users responsibility.

CP96

CP96K

55-CP96

C96

C96K

C96Y

55-C96

Auto Switch

Simple Specials  
Made to Order

Precautions



# Actuators Precautions 2

Be sure to read this before handling.

## Mounting

### ⚠ Caution

1. **Be certain to align the rod axis with the load and direction of movement when connecting.**

When not properly aligned, the rod and tube may be twisted, and damage may be caused due to wear on areas such as the inner tube surface, bushings, rod surface and seals.

2. **When an external guide is used, connect the rod end and the load in such a way that there is no interference at any point within the stroke.**
3. **Do not scratch or gouge the sliding parts of the cylinder tube or piston rod, etc., by striking or grasping them with other objects.**

Cylinder bores are manufactured to precise tolerances, so that even a slight deformation may cause malfunction. Also, scratches or gouges, etc., in the piston rod may lead to damaged seals and cause air leakage.

4. **Prevent the seizure of rotating parts.**

Prevent the seizure of rotating parts (pins, etc.) by applying grease.

5. **Do not use until you can verify that equipment can operate properly.**

Verify correct mounting by appropriate function and leakage inspections after compressed air and power are connected following mounting, maintenance or conversions.

6. **Operating manual**

The product should be mounted and operated after thoroughly reading the manual and understanding its contents.

Keep the operating manual where it can be referred to as needed.

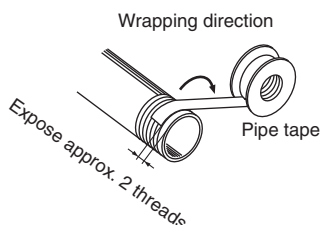
7. **Preparation before piping**

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

8. **Wrapping of pipe tape**

When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the piping.

Also, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



## Cushion

### ⚠ Caution

1. **Readjust using the cushion needle.**

Cushion is adjusted at the factory, however, the cushion needle on the cover should be readjusted when the product is put into service, based upon factors such as the size of the load and the operating speed. When the cushion needle is turned clockwise, the restriction becomes smaller and the cushion's effectiveness is increased. Tighten the lock nut securely after adjustment is performed.

2. **Do not operate with the cushion needle in a fully closed condition.**

This will cause damage to the seals.

### ⚠ Warning

1. **Use clean air.**

Do not use compressed air which includes chemicals, synthetic oils containing organic solvents, salt or corrosive gases, etc., as it can cause damage or malfunction.

### ⚠ Caution

1. **Install air filters.**

Install air filters at the upstream side of valves. The filtration degree should be 5 µm or finer.

2. **Install an after-cooler, air dryer or water separator, etc.**

Air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an after-cooler, air dryer or water separator, etc.

3. **Use the product within the specified range of fluid and ambient temperature.**

Take measures to prevent freezing, since moisture in circuits can be frozen below 5°C, and this may cause damage to seals and lead to malfunction.

## Maintenance

### ⚠ Warning

1. **Removal of equipment, and supply/exhaust of compressed air.**

When equipment is removed, first check measures to prevent dropping of driven objects and run-away of equipment, etc. Then, cut off the supply pressure and electric power, and exhaust all compressed air from the system.

When machinery is restarted, proceed with caution after confirming measures to prevent cylinder from lurching.

### ⚠ Caution

1. **Drain flushing**

Remove drainage from air filters regularly. (Refer to the specifications.)



# Auto Switches Precautions 1

Be sure to read this before handling.

## Design / Selection

### Warning

#### 1. Confirm the specifications.

Read the specifications carefully and use this product appropriately. The product may be damaged or malfunction if it is used outside the specification range for current load, voltage, temperature or impact.

We do not guarantee against any damage if the product is used outside of the specification range.

#### 2. Cautions for use in an interlock circuit

When an auto switch is used for an interlock signal requiring high reliability, devise a double interlock system to avoid trouble by providing a mechanical protection function, or by also using another switch (sensor) together with the auto switch.

Also, perform periodic maintenance and confirm proper operation.

#### 3. Do not make any modifications (including exchanging the printed circuit boards) to the product.

It may cause human injuries and accidents.

### Caution

#### 1. Pay attention to the length of time that a switch is ON at an intermediate stroke position.

When an auto switch is placed at an intermediate position of the stroke and a load is driven at the time the piston passes, the auto switch will operate, but if the speed is too great the operating time will be shortened and the load may not operate properly. The maximum detectable piston speed is:

$$V \text{ (mm/s)} = \frac{\text{Auto switch operating range (mm)}}{\text{Time load applied (ms)}} \times 1000$$

In cases of high piston speed, the use of an auto switch (D-F5NTL, F7NTL, G5NTL, M5NTL, M5PTL) with a built-in OFF delay timer (200 ms) makes it possible to extend the load operating time.

The wide-range detection type D-G5NBL (operating range 35 to 50 mm) may also be useful, depending on the application. Please consult with SMC for other models.

#### 2. Keep wiring as short as possible.

##### <Reed>

As the length of the wiring to a load gets longer, the rush current at switching ON becomes greater, and this may shorten the product's life. (The switch will stay ON all the time.)

- 1) Use a contact protection box when the wire length is 5 m or longer.
- 2) Even if an auto switch has a built-in contact protection circuit, when the wiring is more than 30 m long, it is not able to adequately absorb the rush current and its life may be reduced. It is again necessary to connect a contact protection box in order to extend its life. Please consult with SMC in this case.

### Caution

##### <Solid state>

- 3) Although wire length should not affect switch function, use a wire 100 m or shorter.

If the wiring is longer it will likely increase noise although the length is less than 100 m.

When the wire length is long, we recommend the ferrite core is attached to the both ends of the lead wire to prevent excess noise.

A contact protection box is not necessary for solid state switches due to the nature of this product construction.

#### 3. Do not use a load that generates surge voltage. If a surge voltage is generated, the discharge occurs at the contact, possibly resulting in the shortening of product life.

If driving a load such as a relay that generates a surge voltage,

##### <Reed>

Use an auto switch with built-in contact protection circuit or use a contact protection box.

##### <Solid state>

Use a built-in surge absorbing element type device.

#### 4. Take precautions when multiple cylinders/actuators are used close together.

When multiple auto switch cylinders/actuators are used in close proximity, magnetic field interference may cause the auto switches to malfunction. Maintain a minimum cylinder separation of 40 mm. (When the allowable interval is specified for each cylinder series, use the indicated value.)

The auto switches may malfunction due to the interference from the magnetic fields.

Use of a magnetic screen plate (MU-S025) or commercially available magnetic screen tape can reduce the interference of magnetic force.

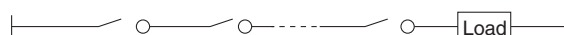
#### 5. Pay attention to the internal voltage drop of the auto switch.

##### <Reed>

- 1) Auto switch with an indicator light (Except D-A56, A76H, A96, A96V, C76, E76A, Z76)

- If auto switches are connected in series as shown below, take note that there will be a large voltage drop because of internal resistance in the light emitting diodes. (Refer to the internal voltage drop in the auto switch specifications.) [The voltage drop will be "n" times larger when "n" auto switches are connected.]

Even though an auto switch operates normally, the load may not operate.



- In the same way, when operating under a specified voltage, although an auto switch may operate normally, the load may not operate. Therefore, the formula below should be satisfied after confirming the minimum operating voltage of the load.

$$\text{Supply voltage} - \text{Internal voltage drop of auto switch} > \text{Minimum operating voltage of load}$$

CP96

CP96K

55-CP96

C96

C96K

C96Y

55-C96

Auto Switch

Simple Specials  
Made to Order

Precautions



# Auto Switches Precautions 2

Be sure to read this before handling.

## Design / Selection

### ⚠ Caution

- 2) If the internal resistance of a light emitting diode causes a problem, select an auto switch without an indicator light (D-A6□, A80, A80H, A90, A90V, C80, R80, 90, E80A, Z80).

#### <Solid state/2-wire type>

- 3) Generally, the internal voltage drop will be greater with a 2-wire solid state auto switch than with a reed auto switch. Take the same precautions as in 1). Also, take note that a 12 VDC relay is not applicable.

### 6. Pay attention to leakage current.

#### <Solid state/2-wire type>

Current (leakage current) flows to the load to operate the internal circuit when in the OFF state.

Operating current of load (OFF condition) > Leakage current

If the criteria given in the above formula are not met, it will not reset correctly (stays ON). Use a 3-wire auto switch if this specification will not be satisfied.

Moreover, leakage current flow to the load will be “n” times larger when “n” auto switches are connected in parallel.

### 7. Ensure sufficient clearance for maintenance activities.

When designing an application, be certain to allow sufficient clearance for maintenance.

### 8. When multiple auto switches are required.

“n” indicates the number of auto switches which can be physically mounted on the cylinders/actuators. Detection intervals depends on the auto switch mounting structure and set position, therefore some required interval and set positions may not be available.

### 9. Limitations of detectable positioning

When using certain mounting brackets, the surface and position where an auto switch can be mounted maybe restricted due to physical interference. For example, when using some bracket types the auto switch cannot be surface mounted at the bottom side of foot bracket, etc.

Select the set position of the auto switch so that it does not interfere with the mounting bracket of the cylinders/actuators (such as trunnion or reinforcement ring).

### 10. Use the cylinder and auto switch in proper combination.

The auto switch is pre-adjusted to activate properly for an auto-switch-capable SMC cylinder/actuator.

If the auto switch is mounted improperly, used for another brand of cylinders/actuators or used after the alternation of the machine installation, the auto switch may not activate properly.

## Mounting / Adjustment

### ⚠ Caution

#### 1. Do not drop or bump.

Do not drop, bump or apply excessive impacts (300 m/s<sup>2</sup> or more for reed auto switches and 1000 m/s<sup>2</sup> or more for solid state auto switches) while handling. Although the body of the auto switch may not be damaged, the inside of the auto switch could be damaged and cause malfunction.

#### 2. Observe the proper tightening torque for mounting an auto switch.

When an auto switch is tightened beyond the range of tightening torque, auto switch mounting screws, auto switch mounting brackets or auto switch may be damaged.

On the other hand, tightening below the range of tightening torque may allow the auto switch to slip out of position.

#### 3. Do not carry a cylinder by the auto switch lead wires.

Never carry a cylinder by its lead wires. This may not only cause broken lead wires, but it may cause internal elements of the auto switch to be damaged by the stress.

#### 4. Fix the auto switch with appropriate screw installed on the switch body. If using other screws, auto switch may be damaged.

#### 5. Mount an auto switch at the centre of the operating range. In the case of 2-colour display auto switch, mount it at the centre of the green LED illuminating range.

Adjust the mounting position of the auto switch so that the piston stops at the centre of the operating range. (The mounting position shown in the catalogue indicates the optimum position at stroke end.)

If mounted at the end of the operating range (around the borderline of ON and OFF), operation will be unstable depending on the operating environment. Also there are some cylinders or actuators with individual setting methods for auto switches. If so, mount it in accordance with the indicated method.

Even if 2-colour indication solid state auto switches are fixed at a proper operating range (the green light lights up), the operation may become unstable depending on the installation environment or magnetic field disturbance.

(Magnetic body, external magnetic field, proximal installation of cylinders with built-in magnet and actuators, temperature change, other factors for magnetic force fluctuation during operation, etc.)



# Auto Switches Precautions 3

Be sure to read this before handling.

## Wiring

### ⚠ Caution

#### 1. Confirm proper insulation of wiring.

Be certain that there is no faulty wiring insulation (contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.

#### 2. Do not wire with power lines or high voltage lines.

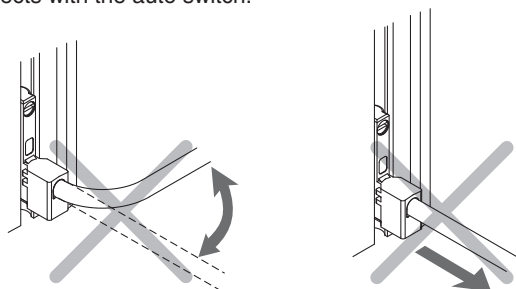
Wire separately from power lines or high voltage lines, avoiding parallel wiring or wiring in the same conduit with these lines. Control circuits containing auto switches may malfunction due to noise from these other lines.

#### 3. Avoid repeatedly bending or stretching lead wires.

Broken lead wires will result from repeatedly applying bending stress or stretching force to the lead wires.

Stress and tensile force applied to the connection between the lead wire and auto switch increases the possibility of disconnection.

Keep the lead wire from moving especially in the area where it connects with the auto switch.



#### 4. Be certain to connect the load before power is applied.

##### <2-wire type>

If the power is turned ON when an auto switch is not connected to a load, the auto switch will be instantly damaged because of excess current (short circuit).

It is the same as when the 2-wire brown lead wire (+, output) is directly connected to the (+) power supply terminal.

#### 5. Do not allow short-circuit of loads.

##### <Reed>

If the power is turned ON with a load in a short circuited condition, the auto switch will be instantly damaged because of excess current flow into the switch.

##### <Solid state>

All models of D-J51, G5NB and PNP output type auto switches do not have built-in short circuit protection circuits.

If a load is short circuited, the auto switch will be instantly damaged as in the case of reed auto switches.

Take special care to avoid reverse wiring with the brown power supply line and the black output line on 3-wire type auto switches.

#### 6. Avoid incorrect wiring.

##### <Reed>

A 24 VDC auto switch with indicator light has polarity. The brown lead wire or terminal No. 1 is (+), and the blue lead wire or terminal No. 2 is (-).

[For D-97, (+) is on the no-displayed side, (-) is on the black line side.]

1) If connections are reversed, an auto switch will operate, however, the light emitting diode will not light up.

Also, take note that a current greater than that specified will damage a light emitting diode and it will no longer operate.

Applicable model:

D-A73, A73H, A73C, C73, C73C, E73A, Z73

D-R73, R73C, 97, 93A, A93, A93V

D-A33, A34, A33A, A34A, A44, A44A

D-A53, A54, B53, B54

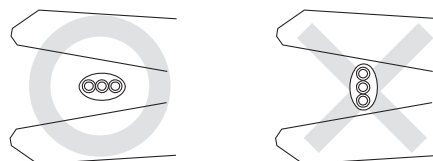
2) When using a 2-colour indicator type auto switch (D-A79W, A59W and B59W), the auto switch will constantly remain ON if the connections are reversed.

##### <Solid state>

1) If connections are reversed on a 2-wire type auto switch, the auto switch will not be damaged if protected by a protection circuit, but the auto switch will always stay in an ON state. However, it is still necessary to avoid reversed connections, since the auto switch could be damaged by a load short circuit in this condition.

2) If connections are reversed (power supply line + and power supply line -) on a 3-wire type auto switch, the auto switch will be protected by a protection circuit. However, if the power supply line (+) is connected to the blue wire and the power supply line (-) is connected to the black wire, the auto switch will be damaged.

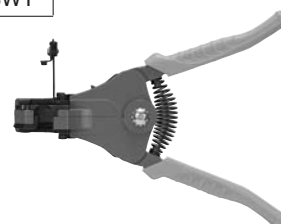
#### 7. When the lead wire sheath is stripped, confirm the stripping direction. The insulator may be split or damaged depending on the direction. (D-M9□ only)



#### Recommended Tool

| Description   | Model     |
|---------------|-----------|
| Wire stripper | D-M9N-SWY |

\* Stripper for a round cable (ø2.0) can be used for a 2-wire type cable.





# Auto Switches Precautions 4

Be sure to read this before handling.

## Operating Environment

### ⚠ Warning

#### 1. Never use in an atmosphere of explosive gases.

The structure of auto switches is not intended to prevent explosion. Never use in an atmosphere with an explosive gas since this may cause a serious explosion.

Please contact SMC concerning ATEX compliant products.

### ⚠ Caution

#### 1. Do not use in an area where a magnetic field is generated.

Auto switches will malfunction or magnets inside cylinders/actuators will become demagnetised. (Please consult with SMC if a magnetic field resistant auto switch can be used.)

#### 2. Do not use in an environment where the auto switch will be continually exposed to water.

Although auto switches satisfy IEC standard IP67 construction except some models (D-A3□, A44□, G39□, K39□, RNK, RPK) do not use auto switches in applications where continually exposed to water splash or spray. Poor insulation or swelling of the potting resin inside auto switches may cause malfunction.

#### 3. Do not use in an environment with oil or chemicals.

Please consult with SMC if auto switches will be used in an environment with coolant, cleaning solvent, various oils or chemicals. If auto switches are used under these conditions for even a short time, they may be adversely affected by improper insulation, malfunction due to swelling of the potting resin, or hardening of the lead wires.

#### 4. Do not use in an environment with temperature cycles.

Please consult with SMC if auto switches are used where there are temperature cycles other than normal temperature changes, as there may be adverse effects inside the auto switches.

#### 5. Do not use in an environment where there is excessive impact shock.

<Reed>

When excessive impact (300 m/s<sup>2</sup> or more) is applied to a reed auto switch during operation, the contact point will malfunction and generate or cut off a signal momentarily (1 ms or less). Please consult with SMC if a solid state auto switch can be used according to the environment.

#### 6. Do not use in an area where surges are generated.

<Solid state>

When there are units (solenoid type lifter, high frequency induction furnace, motor, radio equipment etc.) which generate a large amount of surge in the area around cylinders/actuators with solid state auto switches, this may cause deterioration or damage to the auto switch's internal circuit elements. Avoid sources of surge generation and disorganised lines.

### ⚠ Caution

#### 7. Avoid accumulation of iron waste or close contact with magnetic substances.

When a large amount of iron waste such as machining chips or spatter is accumulated, or a magnetic substance (something attracted by a magnet) is brought into close proximity with a cylinder with auto switches, or an actuator, it may cause the auto switch to malfunction due to a loss of the magnetic force inside the cylinder/actuator.

#### 8. Please contact SMC concerning water resistance, elasticity of lead wires, usage at welding sites, etc.

#### 9. Do not use in direct sunlight.

#### 10. Do not mount the product in locations where it is exposed to radiant heat.

## Maintenance

### ⚠ Warning

#### 1. Removal of equipment, and supply/exhaust of compressed air

Before any machinery or equipment is removed, first ensure that the appropriate measures are in place to prevent the fall or erratic movement of driven objects and equipment, then cut off the electric power and reduce the pressure in the system to zero. Only then should you proceed with the removal of any machinery and equipment.

When machinery is restarted, proceed with caution after confirming that appropriate measures are in place to prevent actuators from moving suddenly.

### ⚠ Caution

#### 1. Perform the following maintenance periodically in order to prevent possible danger due to unexpected auto switch malfunction.

1) Secure and tighten auto switch mounting screws.

If screws become loose or the mounting position is dislocated, retighten them after readjusting the mounting position.

2) Confirm that there is no damage to lead wires.

To prevent faulty insulation, replace auto switches or repair lead wires, etc., if damage is discovered.

3) Confirm the display of the green light on the 2-colour display auto switch.

Confirm that the piston stops at the centre of the operating range (the green LED is on). If the red LED is on, the mounting position is not appropriate.

Readjust to the centre of the operating range. Also there are some cylinders or actuators with individual setting methods for auto switches. If so, mount it in accordance with the indicated method.



## 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

- 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 catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.
- 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.
- Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
  - 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.
  - 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.
  - Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.
- Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
  - Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
  - 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 catalogue.
  - An application which could have negative effects on people, property, or animals requiring special safety analysis.
  - 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

- 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

- The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.\*2)  
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
- 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.
- Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue 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

- The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
- 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.

## Safety Instructions

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.

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Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.