








# Air Cylinder

## Series CM2

ø20, ø25, ø32, ø40

### Series Variations

| Series  | Action  | Rod                                      | Cushion | Basic | Standard variations        |               |           |              |                      | Bore size (mm) | Page |
|---|---|--|---------|-------|----------------------------|---------------|-----------|--------------|----------------------|----------------|------|
|   |   |  |         |       | Built-in One-touch fitting | With rod boot | Air-hydro | Clean series | Copper/Fluorine-free |                |      |
| <b>Standard Series CM2</b><br>                           | Double acting   | Single rod                               | Rubber  | ●     | ●                          | ●             | ●         | ●            | 20<br>25<br>32<br>40 | 128            |      |
|   |   | Double rod                               | Rubber  | ●     | ●                          | ●             | ●         | ●            |                      | 146            |      |
|   | Single acting   | Single rod (Spring return/Spring extend) | Rubber  | ●     | ●                          | ●             | ●         | ●            |                      | 156            |      |
|   |   | Double rod                               | Rubber  | ●     | ●                          | ●             | ●         | ●            |                      | 171            |      |
| <b>Non-rotating Rod Series CM2K</b><br>                 | Double acting   | Single rod                               | Rubber  | ●     | ●                          | ●             | ●         | ●            | 20                   | 176            |      |
|   |   | Double rod                               | Rubber  | ●     | ●                          | ●             | ●         | ●            | 25                   | 181            |      |
|   | Single acting   | Single rod (Spring return/Spring extend) | Rubber  | ●     | ●                          | ●             | ●         | ●            | 32                   | 186            |      |
| <b>Direct Mount Series CM2R</b><br>                    | Double acting   | Single rod                               | Rubber  | ●     | ●                          | ●             | ●         | ●            | 20                   | 193            |      |
|   |   |  | Air     | ●     | ●                          | ●             | ●         | ●            |                      |                |      |
| <b>Direct Mount, Non-rotating Rod Series CM2RK</b><br> | Double acting   | Single rod                               | Rubber  | ●     | ●                          | ●             | ●         | ●            | 20                   | 198            |      |
| <b>Low Friction Series CM2Q</b><br>                    | Use the new "Smooth Cylinder Series CM2Y" to realize both-direction low friction and low-speed operation. (Refer to Best Pneumatics No. 3.) |  |         |       |                            |               |           |              |                      |                |      |
| <b>Centralized Piping Series CM2□P</b><br>             | Double acting   | Single rod                               | Rubber  | ●     | ●                          | ●             | ●         | ●            | 20                   | 199            |      |
|   |   |  |         | ●     | ●                          | ●             | ●         | ●            |                      |                |      |
| <b>With End Lock Series CBM2</b><br>                   | Double acting   | Single rod                               | Rubber  | ●     | ●                          | ●             | ●         | ●            | 20                   | 204            |      |
|   |   |  | Air     | ●     | ●                          | ●             | ●         | ●            |                      |                |      |

**Low-speed cylinder Series CM2X**  


Refer to Best Pneumatics No. 3.

- CJ1
- CJP
- CJ2
- CM2**
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Individual -X□
- Technical data

# Combinations of Standard Products and Made to Order Specifications

## Series CM2

## Series CM2

Use the new "Smooth Cylinder Series CM2Y" to realize both-direction low friction and low-speed operation. (Refer to Best Pneumatics No. 3.)

- : Standard
- : Made to Order specifications
- : Special product (Contact SMC for details.)
- : Not available

| Symbol              | Specification  | Applicable bore size | Series      |     | CM2 (Standard) |     | CM2K (Not-rotating) |               |            | CM2R (Direct mount) |               | CM2RK (Direct mount, Non-rotating) |               | CM2□P (Centralized Piping) |               | CM2□Q (Low Friction) |               | CBM2 (With end Lock) |               | CM2X (Low-speed cylinder) |        |
|---------------------|--|----------------------|-------------|-----|----------------|-----|---------------------|---------------|------------|---------------------|---------------|------------------------------------|---------------|----------------------------|---------------|----------------------|---------------|----------------------|---------------|---------------------------|--------|
|                     |  |                      | Action/Type |     | Double acting  |     | Single acting       | Double acting |            | Single acting       | Double acting |                                    | Double acting |                            | Double acting | Double acting        | Double acting |                      | Double acting |                           |        |
|                     |  |                      | Cushion     |     | Single rod     |     | Double rod          |               | Single rod | Single rod          |               | Double rod                         | Single rod    | Single rod                 |               | Single rod           | Single rod    | Single rod           |               | Single rod                |        |
|                     |  |                      | Rubber      | Air | Rubber         | Air | Rubber              | Rubber        | Air        | Rubber              | Air           | Rubber                             | Rubber        | Air                        | Rubber        | Rubber               | Rubber        | Rubber               | Rubber        | Air                       | Rubber |
|                     |  | ø20 to ø40           | ø20 to ø40  |     |                |     |                     |               |            |                     |               |                                    |               |                            |               |                      |               |                      |               |                           |        |
| Standard            | Standard   |                      | ●           | ●   | ●              | ●   | ●                   | ●             | ●          | ●                   | ●             | ●                                  | ●             | ●                          | ●             | ●                    | ●             | ●                    | ●             | ●                         | ●      |
| D                   | Built-in magnet  |                      | ●           | ●   | ●              | ●   | ●                   | ●             | ●          | ●                   | ●             | ●                                  | ●             | ●                          | ●             | ●                    | ●             | ●                    | ●             | ●                         | ●      |
| CM2□F               | With one-touch fittings  |                      | ●           | ●   | ●              | ●   | ●                   | ●             | ●          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| CM2□-□ <sub>k</sub> | With rod boot  |                      | ●           | ●   | ●              | ●   | ○                   | ●             | ●          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| CM2□H               | Air-hydro type   | ø20 to ø40           | ●           | —   | ●              | —   | —                   | —             | —          | —                   | —             | —                                  | ●             | —                          | —             | —                    | —             | —                    | —             | —                         | —      |
| 10-, 11-            | Clean series   |                      | ●           | ●   | ●              | ●   | ○                   | —             | —          | —                   | —             | —                                  | ●             | ○                          | —             | ○                    | ○             | ● <sup>Note 3)</sup> | ○             | ●                         | ○      |
| 20-                 | Copper and Fluorine-free   |                      | ●           | ●   | ●              | ●   | ●                   | ●             | ●          | ●                   | ●             | ●                                  | ●             | ●                          | ○             | —                    | ○             | ○                    | ○             | ○                         | —      |
| CM2□ <sub>R</sub>   | Water resistant  |                      | ●           | ●   | ●              | ○   | ○                   | —             | —          | —                   | —             | ○                                  | ○             | —                          | ○             | —                    | ○             | ○                    | ○             | ○                         | —      |
| CM2□X               | Low-speed cylinder   |                      | ●           | ○   | ○              | ○   | —                   | —             | —          | —                   | —             | —                                  | ●             | —                          | —             | ○                    | —             | —                    | —             | —                         | ●      |
| XB6                 | Heat-resistant cylinder (-10 to 150°C) <sup>Note 1)</sup>        |                      | ○           | ○   | ○              | ○   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XB7                 | Cold-resistant cylinder <sup>Note 1)</sup>                       |                      | ○           | ○   | ○              | ○   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XB9                 | Low-speed cylinder (5 to 50 mm/s)                                |                      | ○           | ○   | ○              | ○   | —                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XB12                | External stainless steel cylinder                                |                      | ○           | ○   | ○              | ○   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XB13                | Low-speed cylinder (5 to 50 mm/s)                                |                      | ○           | ○   | ○              | ○   | —                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC3                 | Special port position  |                      | ○           | ○   | ○              | ○   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC4                 | With heavy duty scraper  |                      | ○           | ○   | ○              | ○   | ○                   | —             | —          | —                   | —             | ○                                  | ○             | —                          | ○             | —                    | ○             | —                    | ○             | —                         | ○      |
| XC5                 | Heat-resistant cylinder (-10 to 110°C) <sup>Note 1)</sup>        |                      | ○           | ○   | ○              | ○   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC6                 | Made of stainless steel  |                      | ○           | ○   | ○              | ○   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC8                 | Adjustable stroke cylinder/Adjustable extension type             |                      | ○           | ○   | —              | —   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC9                 | Adjustable stroke cylinder/Adjustable retraction type            |                      | ○           | ○   | —              | —   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC10                | Dual stroke cylinder/Double rod type                             |                      | ○           | ○   | —              | —   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC11                | Dual stroke cylinder/Single rod type                             | ø20 to ø40           | ○           | ○   | —              | —   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC12                | Tandem cylinder  |                      | ○           | ○   | —              | —   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC13                | Auto switch rail mounting  |                      | ○           | ○   | ○              | ○   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC20                | Head cover axial port  |                      | ○           | ○   | —              | —   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC22                | Fluororubber seal  |                      | ○           | ○   | ○              | ○   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC25                | No fixed orifice of connecting port                              |                      | ○           | —   | ○              | —   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC27                | Double clevis pins made of stainless steel (Stainless steel 304) |                      | ○           | ○   | —              | —   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC29                | Double knuckle joint with spring pin                             |                      | ○           | ○   | ○              | ○   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |
| XC35                | With coil scraper  |                      | ○           | ○   | ○              | ○   | ○                   | —             | —          | —                   | —             | ○                                  | ○             | —                          | ○             | —                    | ○             | —                    | ○             | —                         | ○      |
| XC38                | Vacuum specification (Rod through-hole)                          |                      | —           | —   | ○              | ○   | —                   | —             | —          | —                   | —             | —                                  | —             | —                          | —             | —                    | —             | —                    | —             | —                         | —      |
| XC52                | Mounting nut with set screw                                      |                      | ○           | ○   | ○              | ○   | ○                   | ○             | ○          | ○                   | ○             | ○                                  | ○             | ○                          | ○             | ○                    | ○             | ○                    | ○             | ○                         | ○      |

Note 1) The products with an auto switch are not compatible.  
 Note 2) Refer to Best Pneumatics No. 3 for Low-speed cylinders.  
 Note 3) Available only for locking at head end.  
 Note 4) Available only for locking on rod side.

- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Individual -X□
- Technical data



# Air Cylinder: Standard Type Double Acting, Single Rod Series **CM2** ø20, ø25, ø32, ø40

## How to Order

|                                  |  |                  |  |  |                 |                                |
|----------------------------------|--|------------------|--|--|-----------------|--------------------------------|
| <b>B</b> Basic style             | <b>T</b> Head side trunnion style          | <b>Bore size</b> | <b>20</b> 20 mm  | <b>Cylinder stroke (mm)</b><br>(Refer to "Standard Stroke" on page 129.) | <b>Cushion</b>  | <b>Nil</b> Rubber bumper       |
| <b>L</b> Axial foot style        | <b>E</b> Clevis integrated style           |                  | <b>25</b> 25 mm  |  |                 | <b>A</b> Air cushion           |
| <b>F</b> Rod side flange style   | <b>BZ</b> Boss-cut basic style             | <b>32</b> 32 mm  | <b>Made to Order</b><br>(Refer to page 129 for details.) | <b>Port thread type</b>  | <b>Rod boot</b> | <b>Nil</b> None                |
| <b>G</b> Head side flange style  | <b>FZ</b> Boss-cut rod side flange style   | <b>40</b> 40 mm  |  |  |                 | <b>J</b> Nylon tarpaulin       |
| <b>C</b> Single clevis style     | <b>UZ</b> Boss-cut rod side trunnion style |                  |  |  |                 | <b>Number of auto switches</b> |
| <b>D</b> Double clevis style     |  |                  |  |  |                 | <b>Nil</b> 2 pcs.              |
| <b>U</b> Rod side trunnion style |  |                  |  |  |                 | <b>S</b> 1 pc.                 |
|                                  |  |                  |  |  |                 | <b>n</b> "n" pcs.              |

**Auto switch**

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

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

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

**CM2** **L** **40** - **150** **A** - **M9BW** -

**With auto switch**

**CDM2** **L** **40** - **150** **A** - **M9BW** -

**Type**

|            |           |
|------------|-----------|
| <b>Nil</b> | Pneumatic |
| <b>H</b>   | Air-hydro |

**Built-in Magnet Cylinder Model**

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.  
(Example) CDM2F32-100

\* Air-hydro type: Rc only

### Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

| Type               | Special function                           | Electrical entry | Indicator light | Wiring (Output)                             | Load voltage |               | Auto switch model | Lead wire length (m) |       |       |            |            | Pre-wired connector | Applicable load |            |            |   |            |     |
|--------------------|--|------------------|-----------------|---|--------------|---------------|-------------------|----------------------|-------|-------|------------|------------|---------------------|-----------------|------------|------------|---|------------|-----|
|                    |  |                  |                 |   | DC           | AC            |                   | 0.5 (Nil)            | 1 (M) | 3 (L) | 5 (Z)      | None (N)   |                     |                 |            |            |   |            |     |
| Solid state switch | —  | Grommet          | Yes             | 3-wire (NPN)                                | 5V, 12V      | —             | <b>M9N</b>        | ●                    | ●     | ●     | ○          | —          | ○                   | IC circuit      | Relay, PLC |            |   |            |     |
|                    |  |                  |                 | 3-wire (PNP)                                |              |               | <b>M9P</b>        | ●                    | ●     | ●     | ○          | —          | ○                   |                 |            |            |   |            |     |
|                    |  | Connector        |                 | 2-wire                                      | 12V          | <b>M9B</b>    | ●                 | ●                    | ●     | ○     | —          | ○          | —                   |                 |            |            |   |            |     |
|                    |  | Terminal conduit |                 | 3-wire (NPN)                                | 5V, 12V      | <b>H7C</b>    | ●                 | ●                    | ●     | ●     | —          | —          | —                   |                 |            |            |   |            |     |
|                    | Diagnostic indication (2-color indication) | Grommet          | Yes             | 2-wire                                      | 24V          | 12V           | —                 | <b>G39A</b> **       | —     | —     | —          | —          | ●                   | —               |            | IC circuit |   |            |     |
|                    |  |                  |                 | 3-wire (NPN)                                |              |               |                   | <b>K39A</b> **       | —     | —     | —          | —          | ●                   | —               |            | —          |   |            |     |
|                    |  |                  |                 | 3-wire (PNP)                                | <b>M9NW</b>  | ●             | ●                 | ●                    | ○     | —     | ○          | IC circuit |                     |                 |            |            |   |            |     |
|                    |  |                  |                 | 2-wire                                      | <b>M9PW</b>  | ●             | ●                 | ●                    | ○     | —     | ○          | —          |                     |                 |            |            |   |            |     |
|                    |  |                  |                 | Water resistant (2-color indication)        | <b>M9BW</b>  | ●             | ●                 | ●                    | ○     | —     | ○          | —          |                     |                 |            |            |   |            |     |
|                    |  |                  |                 | With diagnostic output (2-color indication) | 4-wire (NPN) | 5V, 12V       | <b>H7BA</b>       | —                    | —     | ●     | ○          | —          | ○                   | —               |            |            |   |            |     |
| Reed switch        | —  | Grommet          | Yes             | 3-wire (NPN equivalent)                     | —            | 5V            | —                 | <b>A96</b>           | ●     | —     | ●          | —          | —                   | —               | IC circuit | Relay, PLC |   |            |     |
|                    |  |                  |                 | Connector                                   |              |               |                   | 2-wire               | 24V   | 12V   | <b>A93</b> | ●          | —                   | ●               | —          |            | — | —          | —   |
|                    |  |                  |                 |   | 100V or less | <b>A90</b>    | ●                 |                      |       |       | —          | ●          | —                   | —               | —          |            | — | IC circuit |     |
|                    |  |                  |                 |   | 100V, 200V   | <b>B54</b> ** | ●                 |                      |       |       | —          | ●          | —                   | —               | —          |            | — | —          |     |
|                    |  |                  |                 |   | 200V or less | <b>B64</b> ** | ●                 |                      |       |       | —          | ●          | —                   | —               | —          |            | — | —          |     |
|                    |  | Terminal conduit |                 | 2-wire                                      | 24V          | 12V           | 100V, 200V        | <b>C73C</b>          | ●     | —     | ●          | ●          | ●                   | —               | —          |            | — | IC circuit |     |
|                    |  |                  |                 |   |              |               |                   | <b>C80C</b>          | ●     | —     | ●          | ●          | ●                   | —               | —          |            | — | —          |     |
|                    |  |                  |                 |   |              |               |                   | <b>A33A</b> **       | —     | —     | —          | —          | ●                   | —               | —          |            | — | —          | PLC |
|                    |  |                  |                 |   |              |               |                   | <b>A34A</b> **       | —     | —     | —          | —          | ●                   | —               | —          |            | — | —          | —   |
|                    |  |                  |                 |   |              |               |                   | <b>A44A</b> **       | —     | —     | —          | —          | ●                   | —               | —          |            | — | —          | —   |
| DIN terminal       | <b>B59W</b>                                | ●                | —               | ●   | —            | —             | —                 | —                    | —     | —     | —          | Relay, PLC |                     |                 |            |            |   |            |     |

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW  
 1 m ..... M (Example) M9NWM  
 3 m ..... L (Example) M9NWL  
 5 m ..... Z (Example) M9NWZ  
 None ..... N (Example) H7CN

\* Solid state auto switches marked with "○" are produced upon receipt of order.  
 \* D-A9□V/M9□V/M9□WV and D-M9□A(V)L cannot be mounted.  
 \* Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.  
 \*\* D-A3□A/A44A/G39A/K39A/B54/B64 cannot be mounted on bore sizes ø20 and ø25 cylinder with air cushion.

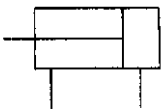
\* Since there are other applicable auto switches than listed above, refer to page 218 for details.  
 \* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.  
 \* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

# Air Cylinder: Standard Type Double Acting, Single Rod *Series CM2*



Clevis integrated

**JIS Symbol**  
Double acting,  
Single rod



With air cushion



### Made to Order Specifications (For details, refer to pages 1373 to 1498.)

| Symbol | Specifications   |
|--------|--|
| —XA□   | Change of rod end shape  |
| —XB6   | Heat resistant cylinder (150°C)                                  |
| —XB7   | Cold resistant cylinder  |
| —XB9   | Low speed cylinder (10 to 50 mm/s)                               |
| —XB12  | External stainless steel cylinder                                |
| —XB13  | Low speed cylinder (5 to 50 mm/s)                                |
| —XC3   | Special port location  |
| —XC4   | With heavy duty scraper  |
| —XC5   | Heat resistant cylinder (110°C)                                  |
| —XC6   | Piston rod and rod end nut made of stainless steel               |
| —XC8   | Adjustable stroke cylinder/Adjustable extension type             |
| —XC9   | Adjustable stroke cylinder/Adjustable retraction type            |
| —XC10  | Dual stroke cylinder/Double rod type                             |
| —XC11  | Dual stroke cylinder/Single rod type                             |
| —XC12  | Tandem cylinder  |
| —XC13  | Auto switch mounting rail style                                  |
| —XC20  | Head cover axial port  |
| —XC22  | Fluororubber seals   |
| —XC25  | No fixed orifice of connecting port                              |
| —XC27  | Double clevis pin and double knuckle pin made of stainless steel |
| —XC29  | Double knuckle joint with spring pin                             |
| —XC35  | With coil scraper  |
| —XC52  | Mounting nut with set screw                                      |

### Rod Boot Material

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

\* Maximum ambient temperature for the rod boot itself.

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

### Specifications

| Bore size (mm)                       |  | 20  | 25            | 32            | 40            |
|--------------------------------------|--|---|---------------|---------------|---------------|
| <b>Type</b>                          |  | Pneumatic   |               |               |               |
| <b>Action</b>                        |  | Double acting, Single rod   |               |               |               |
| <b>Fluid</b>                         |  | Air   |               |               |               |
| <b>Proof pressure</b>                |  | 1.5 MPa   |               |               |               |
| <b>Maximum operating pressure</b>    |  | 1.0 MPa   |               |               |               |
| <b>Minimum operating pressure</b>    |  | 0.05 MPa  |               |               |               |
| <b>Ambient and fluid temperature</b> |  | Without auto switch: -10 to +70°C (No freezing)<br>With auto switch: -10 to +60°C (No freezing) |               |               |               |
| <b>Lubrication</b>                   |  | Not required (Non-lube)   |               |               |               |
| <b>Stroke length tolerance</b>       |  | +1.4<br>0 mm  |               |               |               |
| <b>Piston speed</b>                  |  | Rubber bumper: 50 to 750 mm/s, Air cushion: 50 to 1000 mm/s                                     |               |               |               |
| <b>Cushion</b>                       |  | Rubber bumper, Air cushion  |               |               |               |
| <b>Allowable kinetic energy</b>      | <b>Rubber bumper</b>                               | 0.27 J  | 0.4 J         | 0.65 J        | 1.2 J         |
|                                      | <b>Air cushion (Effective cushion length (mm))</b> | 0.54 J (11.0)   | 0.78 J (11.0) | 1.27 J (11.0) | 2.35 J (11.8) |

### Standard Stroke

| Bore size (mm) | Standard stroke <sup>(1)</sup> (mm)        | Maximum stroke (mm) |
|----------------|--|---------------------|
| 20             | 25, 50, 75, 100, 125, 150<br>200, 250, 300 | 1000                |
| 25             |  | 1500                |
| 32             |  | 2000                |
| 40             |  | 2000                |



Note 1) Other intermediate strokes can be manufactured upon receipt of order. Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Note 2) When exceeding 300 strokes, the allowable maximum stroke length is determined by the stroke selection table (front matter 28).

### Boss-cut style

Boss for the head side cover bracket is eliminated and the total length of cylinder is shortened.



### Comparison of the Full Length Dimension (Versus standard type)

|  |  | (mm) |     |     |     |
|--|--|------|-----|-----|-----|
|  |  | ø20  | ø25 | ø32 | ø40 |
|  |  | ▲13  | ▲13 | ▲13 | ▲16 |

### Mounting style

- Boss-cut basic style (BZ)
- Boss-cut flange style (FZ)
- Boss-cut trunnion style (UZ)

### Mounting Bracket/Part No.

| Mounting bracket             | Min. order | Bore size (mm) |          |          |    | Description (for min. order)                                |
|------------------------------|------------|----------------|----------|----------|----|---|
|                              |            | 20             | 25       | 32       | 40 |   |
| Axial foot *                 | 2          | CM-L020B       | CM-L032B | CM-L040B |    | 2 foot, 1 mounting nut                                      |
| Flange                       | 1          | CM-F020B       | CM-F032B | CM-F040B |    | 1 flange  |
| Single clevis**              | 1          | CM-C020B       | CM-C032B | CM-C040B |    | 1 single clevis, 3 liners                                   |
| Double clevis*** (with pins) | 1          | CM-D020B       | CM-D032B | CM-D040B |    | 1 double clevis, 3 liners, 1 clevis pins, 2 retaining rings |
| Trunnion (with nuts)         | 1          | CM-T020B       | CM-T032B | CM-T040B |    | 1 trunnion, 1 trunnion nut                                  |

\* Order 2 foot brackets for each cylinder unit.

\*\* 3 Liners are attached with a clevis bracket for adjusting the mounting angle.

\*\*\* Clevis pins and retaining rings (cotter pins for ø40) are attached.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical data

## Mounting Style and Accessory

| Mounting                           | Accessory           | Standard equipment |                  |                      | Option                              |                               |          |                              |                                  |  |
|------------------------------------|---------------------|--------------------|------------------|----------------------|-------------------------------------|-------------------------------|----------|------------------------------|----------------------------------|--|
|                                    | Mounting nut        | Rod end nut        | Clevis pin       | Single knuckle joint | Double knuckle joint <sup>(3)</sup> | Clevis bracket <sup>(4)</sup> | Rod boot | Pivot bracket <sup>(6)</sup> | Pivot bracket pin <sup>(7)</sup> |  |
| Basic style                        | ●(1 pc.)            | ●                  | —                | ●                    | ●                                   | —                             | ●        | —                            | —                                |  |
| Axial foot style                   | ●(2)                | ●                  | —                | ●                    | ●                                   | —                             | ●        | —                            | —                                |  |
| Rod side flange style              | ●(1)                | ●                  | —                | ●                    | ●                                   | —                             | ●        | —                            | —                                |  |
| Head side flange style             | ●(1)                | ●                  | —                | ●                    | ●                                   | —                             | ●        | —                            | —                                |  |
| Clevis integrated style            | — <sup>(1)</sup>    | ●                  | —                | ●                    | ●                                   | ●                             | ●        | —                            | —                                |  |
| Single clevis style                | — <sup>(1)</sup>    | ●                  | —                | ●                    | ●                                   | —                             | ●        | ●                            | ●                                |  |
| Double clevis style <sup>(3)</sup> | — <sup>(1)</sup>    | ●                  | ● <sup>(5)</sup> | ●                    | ●                                   | —                             | ●        | —                            | —                                |  |
| Rod side trunnion style            | ●(1) <sup>(2)</sup> | ●                  | —                | ●                    | ●                                   | —                             | ●        | ●                            | ●                                |  |
| Head side trunnion style           | ●(1) <sup>(2)</sup> | ●                  | —                | ●                    | ●                                   | —                             | ●        | ●                            | ●                                |  |
| Boss-cut basic style               | ●(1)                | ●                  | —                | ●                    | ●                                   | —                             | ●        | —                            | —                                |  |
| Boss-cut flange style              | ●(1)                | ●                  | —                | ●                    | ●                                   | —                             | ●        | —                            | —                                |  |
| Boss-cut trunnion style            | ●(1)                | ●                  | —                | ●                    | ●                                   | —                             | ●        | —                            | —                                |  |



Note 1) Mounting nuts are not attached for clevis integrated style, single clevis, and double clevis styles.

Note 2) Trunnion nuts are attached for rod side trunnion and head side trunnion styles.

Note 3) Knuckle pin and snap ring (cotter pin for ø40) are shipped together with double clevis and double knuckle joint.

Note 4) Pin and snap ring are shipped together with clevis bracket.

Note 5) Clevis pins come with retaining rings (cotter pins for ø40).

Note 6) Pivot brackets do not come with pins and retaining rings.

Note 7) Pivot bracket pins come with retaining rings.

## Mounting Bracket, Accessory/Material, Surface Treatment

| Segment           | Component parts          | Material  | Surface treatment  |
|-------------------|--------------------------|---|--|
| Mounting bracket  | Foot                     | Rolled steel plate                              | Nickel plated  |
|                   | Flange                   | Rolled steel plate                              | Nickel plated  |
|                   | Single clevis            | Rolled steel                                    | Nickel plated  |
|                   | Double clevis            | Rolled steel                                    | Nickel plated  |
|                   | Trunnion                 | Cast iron                                       | Electroless nickel plated  |
| Accessory         | Rod end nut              | Carbon steel                                    | Nickel plated  |
|                   | Mounting nut             | Carbon steel                                    | Nickel plated  |
|                   | Trunnion nut             | Carbon steel                                    | Nickel plated  |
|                   | Clevis bracket           | Rolled steel plate                              | Nickel plated  |
|                   | Clevis pin               | Carbon steel                                    | (None)   |
|                   | Single knuckle joint     | Rolled steel<br>ø40: Sulfur easy chipping steel | Electroless nickel plated  |
|                   | Double knuckle joint     | Rolled steel<br>ø40: Cast iron                  | Electroless nickel plated<br>Metallic bronze color painted for ø40 |
|                   | Double clevis pin        | Carbon steel                                    | (None)   |
|                   | Double knuckle joint pin | Carbon steel                                    | (None)   |
|                   | Pivot bracket            | Rolled steel plate                              | Nickel plated  |
| Pivot bracket pin | Carbon steel             | (None)  |  |

## Mass

(kg)

| Bore size (mm)                           |                                 | 20   | 25   | 32   | 40   |
|--|---------------------------------|------|------|------|------|
| Basic mass                               | Basic style                     | 0.14 | 0.21 | 0.28 | 0.56 |
|  | Axial foot style                | 0.29 | 0.37 | 0.44 | 0.83 |
|  | Flange style                    | 0.20 | 0.30 | 0.37 | 0.68 |
|  | Clevis integrated style         | 0.12 | 0.19 | 0.27 | 0.52 |
|  | Single clevis style             | 0.18 | 0.25 | 0.32 | 0.65 |
|  | Double clevis style             | 0.19 | 0.27 | 0.33 | 0.69 |
|  | Trunnion style                  | 0.18 | 0.28 | 0.34 | 0.66 |
|  | Boss-cut basic style            | 0.13 | 0.19 | 0.26 | 0.53 |
|  | Boss-cut flange style           | 0.19 | 0.28 | 0.35 | 0.65 |
|  | Boss-cut trunnion style         | 0.17 | 0.26 | 0.32 | 0.63 |
| Additional mass per each 50 mm of stroke |                                 | 0.04 | 0.06 | 0.08 | 0.13 |
| Option bracket                           | Clevis bracket (With pin)       | 0.07 | 0.07 | 0.14 | 0.14 |
|  | Single knuckle joint            | 0.06 | 0.06 | 0.06 | 0.23 |
|  | Double knuckle joint (With pin) | 0.07 | 0.07 | 0.07 | 0.20 |
|  | Pivot bracket                   | 0.06 | 0.06 | 0.06 | 0.06 |
|  | Pivot bracket pin               | 0.02 | 0.02 | 0.02 | 0.03 |

Calculation: (Example) **CM2L32-100**

- Basic mass.....0.44 (Foot style, ø32)
  - Additional mass.....0.08/50 stroke
  - Cylinder stroke.....100 stroke
- $$0.44 + 0.08 \times 100/50 = 0.60 \text{ kg}$$

## ⚠ Precautions

**Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.**

## Operating Precautions

### ⚠ Warning

#### 1. Do not rotate the cover.

If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.

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

Using it in the fully closed state will cause the cushion seal to be damaged. When adjusting the cushion needle, use the "Hexagon wrench key: nominal size 1.5".

#### 3. Do not open the cushion needle wide excessively.

If the cushion needle were set to be completely wide (more than 3 turns from fully closed), it would be equivalent to the cylinder with no cushion, thus making the impacts extremely high. Do not use it in such a way. Besides, using with fully open could give damage to the piston or cover.

### ⚠ Caution

#### 1. Not able to disassemble.

Cover and cylinder tube are connected to each other by caulking method, thus making it impossible to disassemble. Therefore, internal parts of a cylinder other than rod seal are not replaceable.

#### 2. Use caution to the popping of a retaining ring.

When replacing rod seals and removing and mounting a snap ring, use a proper tool (retaining ring plier: tool for installing a type C retaining ring). Even if a proper tool is used, it is likely to inflict damage to a human body or peripheral equipment, as a retaining ring may be flown out of the tip of a plier. Be much careful with the popping of a retaining ring. Besides, be certain that a retaining ring is placed firmly into the groove of rod cover before supplying air at the time of installment.

#### 3. Do not touch the cylinder during operation.

Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.

#### 4. Do not use an air cylinder as an air-hydro cylinder.

If it uses turbine oil in place of fluids for cylinder, it may result in oil leakage.

#### 5. Combine the rod end section, so that a rod boot might not be twisted.

If a rod boot is installed with being twisted when installing a cylinder, it will cause a rod boot to fail during operation.

## Air-hydro

CM2H  Mounting style  Bore size  Stroke  Rod boot

• Air-hydro

A low hydraulic pressure cylinder used at a pressures of 1.0 MPa or below.

Through the concurrent use of a CC series air-hydro unit, it is possible to operate at a constant or low speeds or to effect an intermediate stop, just like a hydraulic unit, while using pneumatic equipment such as a valve.



### Specifications

|                               |  |
|-------------------------------|--|
| Type                          | Air-hydro  |
| Fluid                         | Turbine oil  |
| Action                        | Double acting single rod   |
| Bore size (mm)                | ø20, ø25, ø32, ø40   |
| Proof pressure                | 1.5 MPa  |
| Max. operating pressure       | 1.0 MPa  |
| Min. operating pressure       | 0.18 MPa   |
| Piston speed                  | 15 to 300 mm/s   |
| Ambient and fluid temperature | +5 to +60°C  |
| Stroke length tolerance       | +1.4<br>0 mm   |
| Cushion                       | Rubber bumper (Standard equipment)   |
| Mounting                      | Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style, Clevis integrated style, Boss-cut style |

\* Auto switch can be mounted. Dimensions are the same as standard type of series CM2.

- For construction, refer to page 134.
- Since the dimensions of mounting style is the same as pages 136 to 143, refer to those pages.

## Built-in One-touch Fittings

CM2  Mounting style  Bore size  F  Stroke

• Built-in One-touch fittings

This type has the One-touch fitting integrated in a cylinder, which enables to reduce the piping labor and installing space dramatically.



### Specifications

|                         |  |
|-------------------------|--|
| Action                  | Double acting, Single rod  |
| Bore size (mm)          | ø20, ø25, ø32, ø40   |
| Max. operating pressure | 1.0 MPa  |
| Min. operating pressure | 0.05 MPa   |
| Cushion                 | Rubber bumper  |
| Piping                  | One-touch fittings   |
| Piston speed            | 50 to 750 mm/s   |
| Mounting                | Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style, Clevis integrated style, Boss-cut style |

\* Auto switch can be mounted.

### Applicable Tubing O.D./I.D.

| Bore size (mm)                   | 20   | 25  | 32  | 40  |
|----------------------------------|--|-----|-----|-----|
| Applicable tubing O.D./I.D. (mm) | 6/4  | 6/4 | 6/4 | 8/6 |
| Applicable tubing material       | Can be used for either nylon, soft nylon or polyurethane tubing. |     |     |     |

### ⚠ Caution

- One-touch fitting cannot be replaced.
  - One-touch fitting is press-fit into the cover, thus cannot be replaced.
- Refer to Fittings and Tubing Precautions (Best Pneumatics No. 6) for handling one-touch fittings.

- For construction, refer to page 134.
- For dimensions of each mounting style, refer to pages 136 to 143.
- For other specifications, refer to page 129.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual  
-X□

Technical  
data

# Series CM2

## Clean Series

10-CM2 Mounting style Bore size Stroke

• Clean Series (With relief port)

The type which is applicable for using inside the clean room graded Class 100 by making an actuator's rod section a double seal construction and discharging by relief port directly to the outside of clean room.

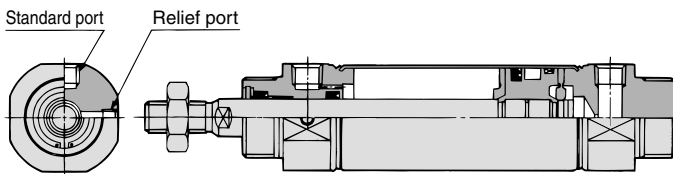


### Specifications

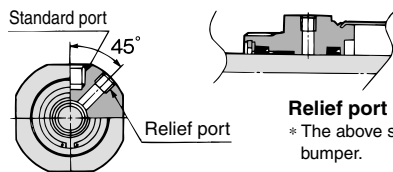
|                         |  |
|-------------------------|--|
| Action                  | Double acting, Single rod  |
| Bore size (mm)          | ø20, ø25, ø32, ø40   |
| Max. operating pressure | 1.0 MPa  |
| Min. operating pressure | 0.05 MPa   |
| Cushion                 | Rubber bumper, Air cushion   |
| Relief port size        | M5 x 0.8   |
| Piston speed            | 30 to 400 mm/s   |
| Mounting                | Basic style, Axial foot style, Rod side flange style, Head side flange style, Boss-cut style |

\* Auto switch can be mounted.

### Construction



ø20, ø25



ø32, ø40

**Relief port**  
\* The above shows the case of rubber bumper.

For details, refer to the separate catalog, "Pneumatic Clean Series".

## Copper/Fluorine-free

20-CM2 Mounting style Bore size Stroke

• Copper/fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.



### Specifications

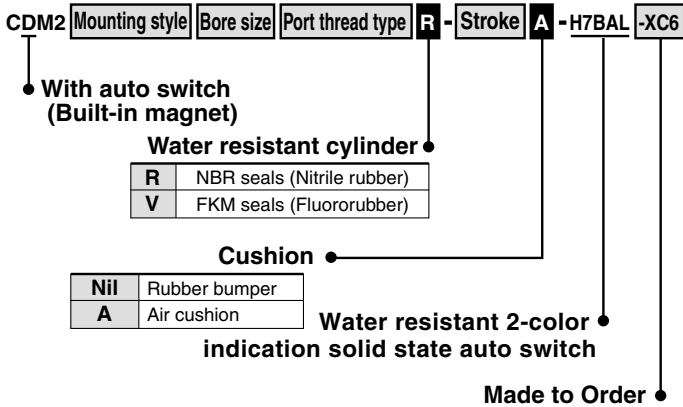
|                         |  |                 |
|-------------------------|--|-----------------|
| Action                  | Double acting, Single rod  |                 |
| Bore size (mm)          | ø20, ø25, ø32, ø40   |                 |
| Max. operating pressure | 1.0 MPa  |                 |
| Min. operating pressure | 0.05 MPa   |                 |
| Cushion                 | Rubber bumper  | Air cushion     |
| Piston speed            | 50 to 750 mm/s   | 50 to 1000 mm/s |
| Mounting                | Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style, Clevis integrated style, Boss-cut style |                 |

\* Auto switch can be mounted.

### Construction



## Water Resistant



Ideal for use in a machine tool environment exposed to coolant mist. Also suited for use in areas in which water splashes, such as food processing equipment or car washers.



### ⚠ Caution

- Rod seal and scraper is not replaceable.
- Scraper is press-fit into the rod cover, thus cannot be replaced.

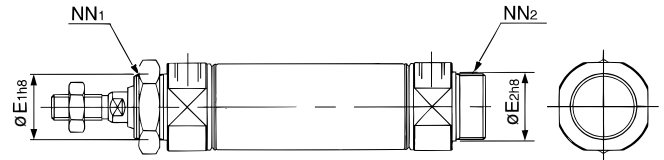
Details → Page 895

## Specifications

|                      |  |
|----------------------|--|
| Action               | Double acting, Single rod                              |
| Bore size (mm)       | 20, 25, 32, 40   |
| Cushion              | Rubber bumper, Air cushion                             |
| Auto switch mounting | Band mounting  |
| Made to Order        | Piston rod, Rod end nut made of stainless steel (-XC6) |

\* Specifications other than the above are the same as the standard basic type.

## Dimensions



| Bore size (mm) | E <sub>1</sub>                    | E <sub>2</sub> *                  | NN <sub>1</sub> | NN <sub>2</sub> * |
|----------------|-----------------------------------|-----------------------------------|-----------------|-------------------|
| 20             | 22 <sup>0</sup> <sub>-0.033</sub> | 20 <sup>0</sup> <sub>-0.033</sub> | M22 x 1.5       | M20 x 1.5         |

\* Other dimensions are the same as double acting, single rod, standard type. (\*: Same as the standard.)

## Mounting Bracket/Part No.

| Mounting bracket     | Min. order | Bore size (mm) | Description (for min. order) |
|----------------------|------------|----------------|------------------------------|
|                      |            | 20             |                              |
| Axial foot **        | 2          | CM-L020C       | 2 foot, 1 mounting nut       |
| Flange               | 1          | CM-F020C       | 1 flange                     |
| Trunnion (with nuts) | 1          | CM-T020C       | 1 trunnion, 1 trunnion nut   |

\* ø25 to ø40: Same as the standard type

\*\* Order 2 foot brackets for every cylinder.

## Low-speed Cylinder



Smooth operation with a little sticking and slipping at low speed. Can start smoothly with a little ejection even after being rendered for hours.



The dimensions are the same as the double acting, single rod type. Refer to Best Pneumatics No. 3 for details.

## Specifications

|                               |   |
|-------------------------------|---|
| Bore size (mm)                | 20, 25, 32, 40  |
| Type                          | Pneumatic   |
| Action                        | Double acting, Single rod   |
| Fluid                         | Air   |
| Proof pressure                | 1.5 MPa   |
| Max. operating pressure       | 1.0 MPa   |
| Min. operating pressure       | 0.025 MPa   |
| Ambient and fluid temperature | Without auto switch: -10 to 70°C (No freezing)<br>With auto switch: -10 to 60°C (No freezing) |
| Cushion                       | Rubber bumper   |

## Piston Speed

| Bore size (mm)               | 20         | 25  | 32   | 40  |
|------------------------------|------------|-----|------|-----|
| Piston speed (mm/s)          | 0.5 to 300 |     |      |     |
| Allowable kinetic energy (J) | 0.27       | 0.4 | 0.65 | 1.2 |

Refer to Best Pneumatics No. 3 for details.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

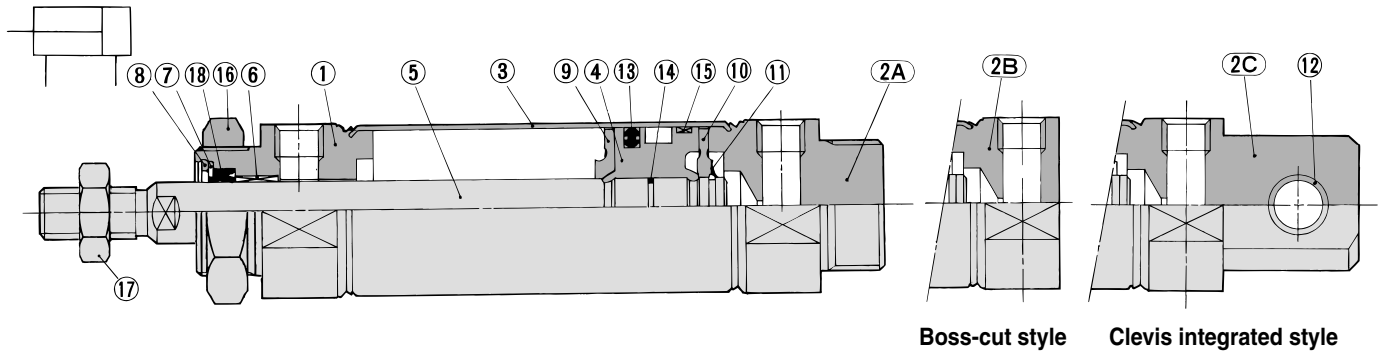
Individual  
-X□

Technical  
data

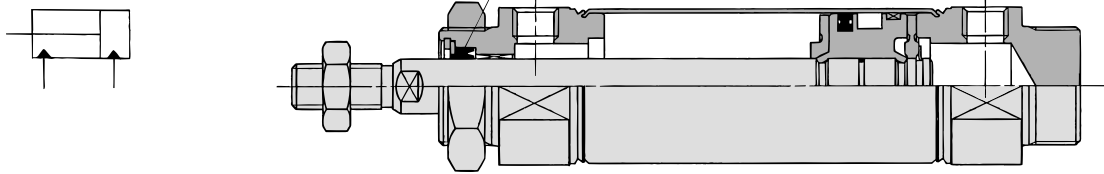


# Series CM2

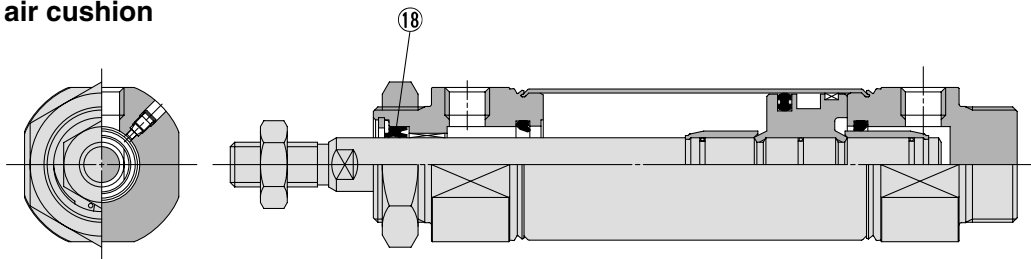
## Rubber bumper



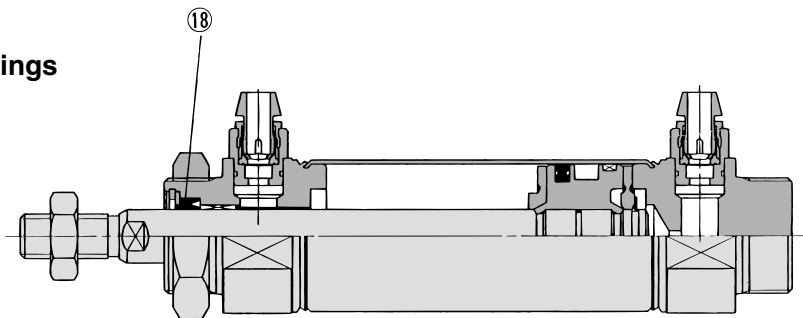
## Air-hydro



## With air cushion



## Built-in One-touch fittings



## Component Parts

| No. | Description    | Material                              | Note               |
|-----|----------------|---------------------------------------|--------------------|
| 1   | Rod cover      | Aluminum alloy                        | Clear anodized     |
| 2A  | Head cover A   | Aluminum alloy                        | Clear anodized *   |
| 2B  | Head cover B   | Aluminum alloy                        | Clear anodized **  |
| 2C  | Head cover C   | Aluminum alloy                        | Clear anodized *** |
| 3   | Cylinder tube  | Stainless steel                       |                    |
| 4   | Piston         | Aluminum alloy                        | Chromated          |
| 5   | Piston rod     | Carbon steel                          | Hard chrome plated |
| 6   | Bushing        | Copper oil-impregnated sintered alloy |                    |
| 7   | Seal retainer  | Stainless steel                       |                    |
| 8   | Retaining ring | Carbon steel                          | Phosphate coated   |
| 9   | Bumper A       | Urethane                              |                    |
| 10  | Bumper B       | Urethane                              |                    |
| 11  | Retaining ring | Stainless steel                       |                    |

\* Basic style, \*\* Boss-cut style, \*\*\* Clevis integrated style

| No. | Description    | Material                              | Note          |
|-----|----------------|---------------------------------------|---------------|
| 12  | Clevis bushing | Copper oil-impregnated sintered alloy |               |
| 13  | Piston seal    | NBR                                   |               |
| 14  | Piston gasket  | NBR                                   |               |
| 15  | Wear ring      | Resin                                 |               |
| 16  | Mounting nut   | Carbon steel                          | Nickel plated |
| 17  | Rod end nut    | Carbon steel                          | Nickel plated |

## Replacement Part: Seal

● With rubber bumper/With air cushion/Built-in One-touch fittings

| No. | Description | Material | Part no. |         |          |          |
|-----|-------------|----------|----------|---------|----------|----------|
|     |             |          | 20       | 25      | 32       | 40       |
| 18  | Rod seal    | NBR      | PDU-8Z   | PDU-10Z | PDU-12LZ | PDU-14LZ |

● Air-hydro

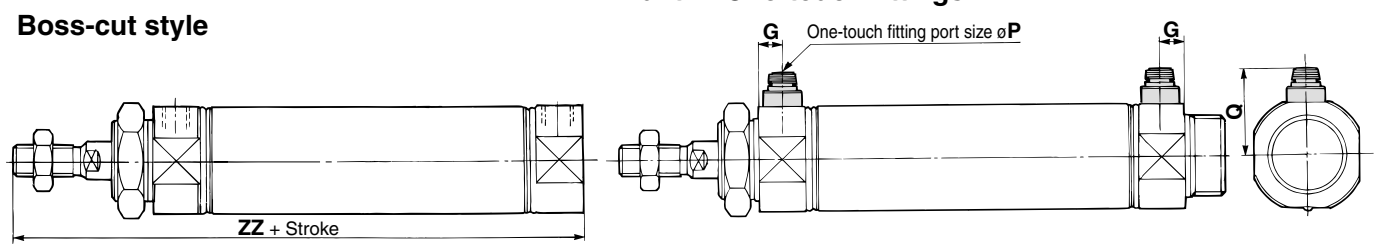
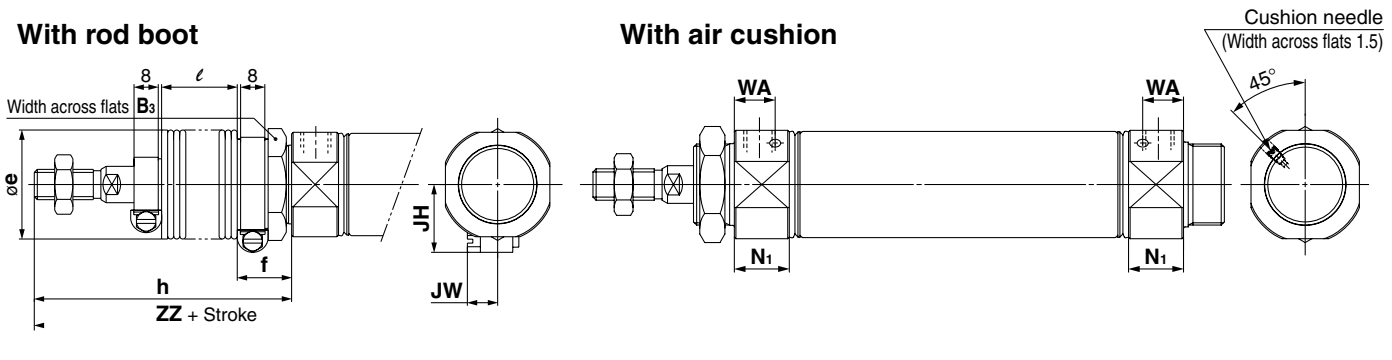
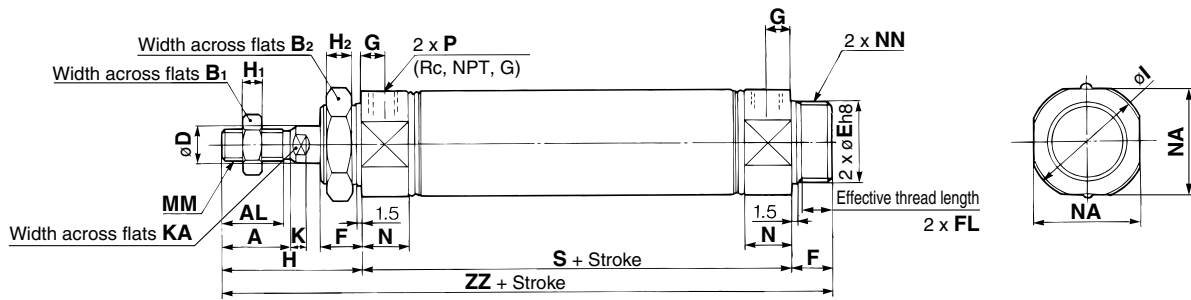
| 18 | Rod seal | NBR | HDU-8 | HDU-10 | HDU-12L | HDU-14 |
|----|----------|-----|-------|--------|---------|--------|
|----|----------|-----|-------|--------|---------|--------|

\* Since the seal kit does not include a grease pack, order it separately.

Grease pack part no.: GR-S-010 (10 g)

**Basic Style (B)**

CM2B Bore size — Stroke



| Bore size | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | E                    | F  | FL   | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   | S  | ZZ  |
|-----------|----|------|----------------|----------------|----|----------------------|----|------|----|----|----------------|----------------|------|-----|----|------------|------|------|-----------|-----|----|-----|
| 20        | 18 | 15.5 | 13             | 26             | 8  | 20 <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 116 |
| 25        | 22 | 19.5 | 17             | 32             | 10 | 26 <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 120 |
| 32        | 22 | 19.5 | 17             | 32             | 12 | 26 <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 122 |
| 40        | 24 | 21   | 22             | 41             | 14 | 32 <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 154 |

**With Rod Boot** (mm)

| Symbol<br>Stroke | B <sub>3</sub> | e  | f  | h       |           |            |            |            |            |            |         |           |            |            |            |            |            |         |           | l          |            |            |            |            |  |  |  | ZZ |  |  |  |  |  |  |  |
|------------------|----------------|----|----|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|--|--|--|----|--|--|--|--|--|--|--|
|                  |                |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |  |  |  |    |  |  |  |  |  |  |  |
| 20               | 30             | 36 | 18 | 68      | 81        | 93         | 106        | 131        | 156        | 181        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 143     | 156       | 168        | 181        | 206        | 231        | 256        |  |  |  |    |  |  |  |  |  |  |  |
| 25               | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 160        | 185        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 147     | 160       | 172        | 185        | 210        | 235        | 260        |  |  |  |    |  |  |  |  |  |  |  |
| 32               | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 160        | 185        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 149     | 162       | 174        | 187        | 212        | 237        | 262        |  |  |  |    |  |  |  |  |  |  |  |
| 40               | 41             | 46 | 20 | 77      | 90        | 102        | 115        | 140        | 165        | 190        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 181     | 194       | 206        | 219        | 244        | 269        | 294        |  |  |  |    |  |  |  |  |  |  |  |

| With Rod Boot (mm) |      |      | Boss-cut Style (mm) |                  |               |     |     |     |     |     | With Air Cushion (mm) |           |                | Built-in One-touch Fittings (mm) |           |    |   |      |
|--------------------|------|------|---------------------|------------------|---------------|-----|-----|-----|-----|-----|-----------------------|-----------|----------------|----------------------------------|-----------|----|---|------|
| Bore size          | JH   | JW   | Bore size           | ZZ               |               |     |     |     |     |     |                       | Bore size | N <sub>1</sub> | WA                               | Bore size | G  | P | Q    |
|                    |      |      |                     | Without rod boot | With rod boot |     |     |     |     |     |                       |           |                |                                  |           |    |   |      |
| 20                 | 23.5 | 10.5 | 20                  | 103              | 130           | 143 | 155 | 168 | 193 | 218 | 243                   | 20        | 17.5           | 13                               | 20        | 8  | 6 | 21.5 |
| 25                 | 23.5 | 10.5 | 25                  | 107              | 134           | 147 | 159 | 172 | 197 | 222 | 247                   | 25        | 17.5           | 13                               | 25        | 8  | 6 | 24.5 |
| 32                 | 23.5 | 10.5 | 32                  | 109              | 136           | 149 | 161 | 174 | 199 | 224 | 249                   | 32        | 17.5           | 13                               | 32        | 8  | 6 | 27   |
| 40                 | 27   | 10.5 | 40                  | 138              | 165           | 178 | 190 | 203 | 228 | 253 | 278                   | 40        | 21.5           | 16                               | 40        | 11 | 8 | 32.5 |

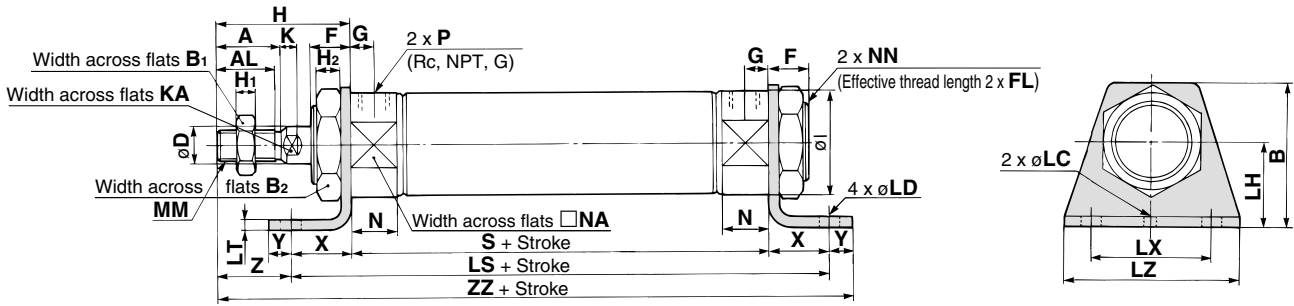
- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

- D-
- X
- Individual
- X
- Technical data

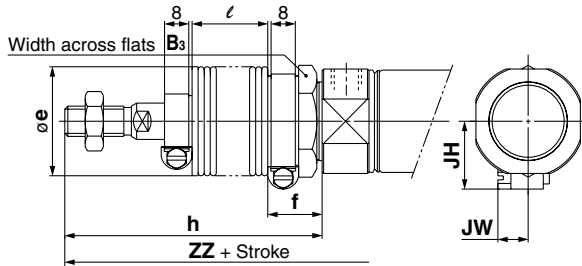
# Series CM2

## Axial Foot Style (L)

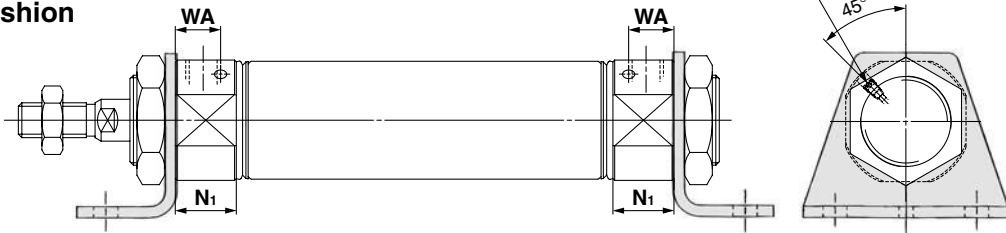
CM2L Bore size — Stroke



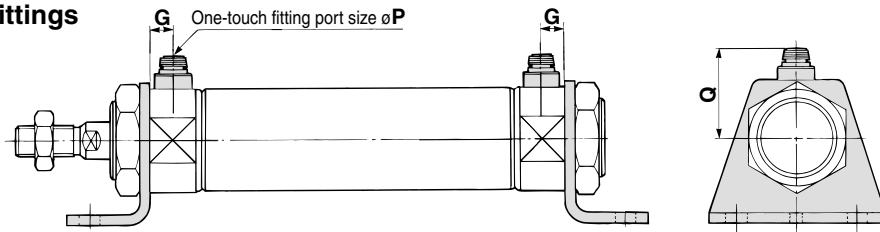
### With rod boot



### With air cushion



### Built-in One-touch fittings



| Bore size | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | D  | F  | FL   | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | LC | LD  | LH | LS  | LT  | LX | LZ | MM         | N    | NA   | NN        | P   | S  | X  | Y  | Z  | ZZ  |
|-----------|----|------|----|----------------|----------------|----|----|------|----|----|----------------|----------------|------|-----|----|----|-----|----|-----|-----|----|----|------------|------|------|-----------|-----|----|----|----|----|-----|
| 20        | 18 | 15.5 | 40 | 13             | 26             | 8  | 13 | 10.5 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | 4  | 6.8 | 25 | 102 | 3.2 | 40 | 55 | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 20 | 8  | 21 | 131 |
| 25        | 22 | 19.5 | 47 | 17             | 32             | 10 | 13 | 10.5 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | 4  | 6.8 | 28 | 102 | 3.2 | 40 | 55 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 20 | 8  | 25 | 135 |
| 32        | 22 | 19.5 | 47 | 17             | 32             | 12 | 13 | 10.5 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | 4  | 6.8 | 28 | 104 | 3.2 | 40 | 55 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 20 | 8  | 25 | 137 |
| 40        | 24 | 21   | 54 | 22             | 41             | 14 | 16 | 13.5 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | 4  | 7   | 30 | 134 | 3.2 | 55 | 75 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 23 | 10 | 27 | 171 |

### With Rod Boot

| Symbol<br>Stroke | B <sub>3</sub> | e  | f    | h       |           |            |            |            |            |            |         | ℓ         |            |            |            |            |            |         |           | Z          |            |            |            |            |  |  |  |
|------------------|----------------|----|------|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|--|--|--|
|                  |                |    |      | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |  |  |  |
| 20               | 30             | 36 | 19.2 | 68      | 81        | 93         | 106        | 131        | 156        | 181        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 48      | 61        | 73         | 86         | 111        | 136        | 161        |  |  |  |
| 25               | 32             | 36 | 19.2 | 72      | 85        | 97         | 110        | 135        | 160        | 185        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 52      | 65        | 77         | 90         | 115        | 140        | 165        |  |  |  |
| 32               | 32             | 36 | 19.2 | 72      | 85        | 97         | 110        | 135        | 160        | 185        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 52      | 65        | 77         | 90         | 115        | 140        | 165        |  |  |  |
| 40               | 41             | 46 | 21.2 | 77      | 90        | 102        | 115        | 140        | 165        | 190        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 54      | 67        | 79         | 92         | 117        | 142        | 167        |  |  |  |

### With Rod Boot

| Symbol<br>Stroke | ZZ      |           |            |            |            |            |            | JH   | JW   |
|------------------|---------|-----------|------------|------------|------------|------------|------------|------|------|
|                  | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |      |      |
| 20               | 158     | 171       | 183        | 196        | 221        | 246        | 271        | 23.5 | 10.5 |
| 25               | 162     | 175       | 187        | 200        | 225        | 250        | 275        | 23.5 | 10.5 |
| 32               | 164     | 177       | 189        | 202        | 227        | 252        | 277        | 23.5 | 10.5 |
| 40               | 198     | 211       | 223        | 236        | 261        | 286        | 311        | 27   | 10.5 |

### With Air Cushion

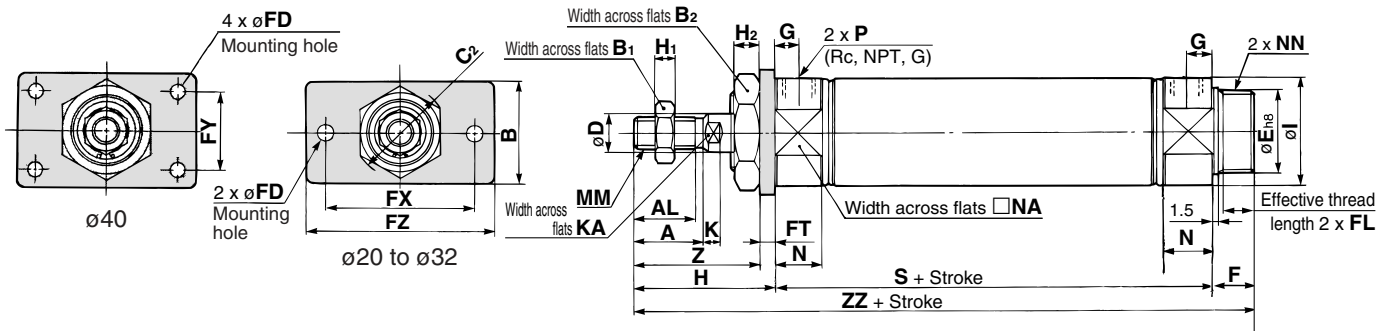
| Bore size | N <sub>1</sub> | WA |
|-----------|----------------|----|
| 20        | 17.5           | 13 |
| 25        | 17.5           | 13 |
| 32        | 17.5           | 13 |
| 40        | 21.5           | 16 |

### Built-in One-touch Fittings

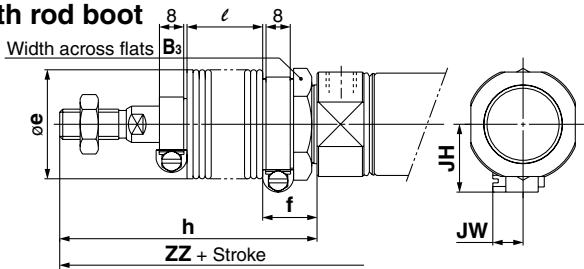
| Bore size | G  | P | Q    |
|-----------|----|---|------|
| 20        | 8  | 6 | 21.5 |
| 25        | 8  | 6 | 24.5 |
| 32        | 8  | 6 | 27   |
| 40        | 11 | 8 | 32.5 |

**Rod Side Flange Style (F)**

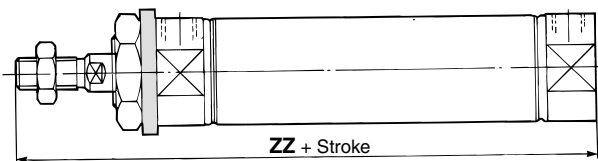
CM2F Bore size — Stroke



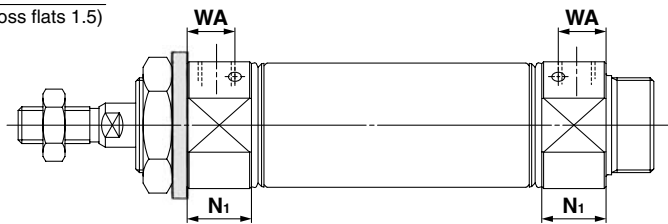
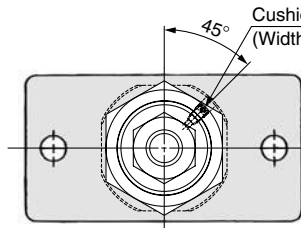
**With rod boot**



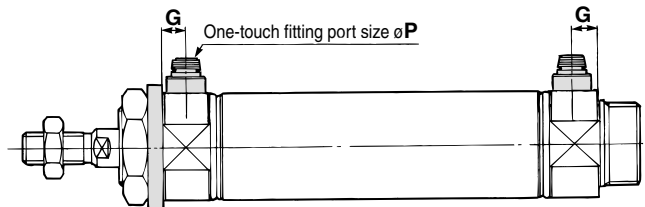
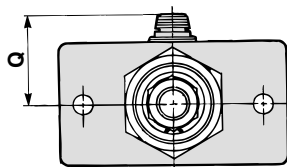
**Boss-cut style**



**With air cushion**



**Built-in One-touch fittings**



- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

| Bore size | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | C <sub>2</sub> | D  | E                                 | F  | FL   | FD | FT | FX | FY | FZ | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   | S  | Z  | ZZ  |
|-----------|----|------|----|----------------|----------------|----------------|----|-----------------------------------|----|------|----|----|----|----|----|----|----|----------------|----------------|------|-----|----|------------|------|------|-----------|-----|----|----|-----|
| 20        | 18 | 15.5 | 34 | 13             | 26             | 30             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 37 | 116 |
| 25        | 22 | 19.5 | 40 | 17             | 32             | 37             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 41 | 120 |
| 32        | 22 | 19.5 | 40 | 17             | 32             | 37             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 41 | 122 |
| 40        | 24 | 21   | 52 | 22             | 41             | 47.3           | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 7  | 5  | 66 | 36 | 82 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 45 | 154 |

**With Rod Boot**

| Symbol<br>Stroke<br>Bore size | B <sub>3</sub> | e  | f  | h       |           |            |            |            |            |            |         | l         |            |            |            |            |            |         |           | ZZ         |            |            |            |            |  |  |  |
|-------------------------------|----------------|----|----|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|--|--|--|
|                               |                |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |  |  |  |
| 20                            | 30             | 36 | 20 | 68      | 81        | 93         | 106        | 131        | 156        | 181        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 143     | 156       | 168        | 181        | 206        | 231        | 256        |  |  |  |
| 25                            | 32             | 36 | 20 | 72      | 85        | 97         | 110        | 135        | 160        | 185        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 147     | 160       | 172        | 185        | 210        | 235        | 260        |  |  |  |
| 32                            | 32             | 36 | 20 | 72      | 85        | 97         | 110        | 135        | 160        | 185        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 149     | 162       | 174        | 187        | 212        | 237        | 262        |  |  |  |
| 40                            | 41             | 46 | 23 | 77      | 90        | 102        | 115        | 140        | 165        | 190        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 181     | 194       | 206        | 219        | 244        | 269        | 294        |  |  |  |

**With Rod Boot (mm)**

| Bore size | JH   | JW   |
|-----------|------|------|
| 20        | 23.5 | 10.5 |
| 25        | 23.5 | 10.5 |
| 32        | 23.5 | 10.5 |
| 40        | 27   | 10.5 |

**Boss-cut Style**

| Bore size | ZZ               |         |           |            |            |            |            |            |
|-----------|------------------|---------|-----------|------------|------------|------------|------------|------------|
|           | Without rod boot | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |
| 20        | 103              | 130     | 143       | 155        | 168        | 193        | 218        | 243        |
| 25        | 107              | 134     | 147       | 159        | 172        | 197        | 222        | 247        |
| 32        | 109              | 136     | 149       | 161        | 174        | 199        | 224        | 249        |
| 40        | 138              | 165     | 178       | 190        | 203        | 228        | 253        | 278        |

**With Air Cushion (mm)**

| Bore size | N <sub>1</sub> | WA |
|-----------|----------------|----|
| 20        | 17.5           | 13 |
| 25        | 17.5           | 13 |
| 32        | 17.5           | 13 |
| 40        | 21.5           | 16 |

**Built-in One-touch Fittings (mm)**

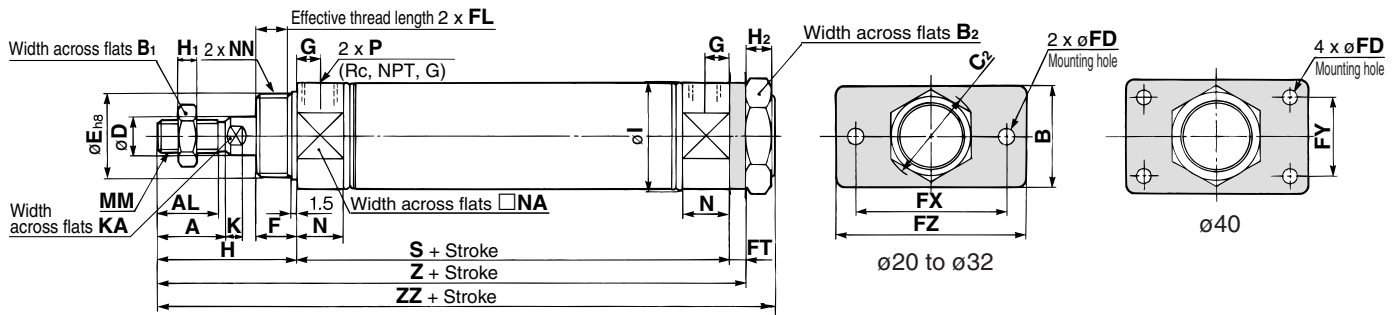
| Bore size | G  | P | Q    |
|-----------|----|---|------|
| 20        | 8  | 6 | 21.5 |
| 25        | 8  | 6 | 24.5 |
| 32        | 8  | 6 | 27   |
| 40        | 11 | 8 | 32.5 |

- D-□
- X□
- Individual -X□
- Technical data

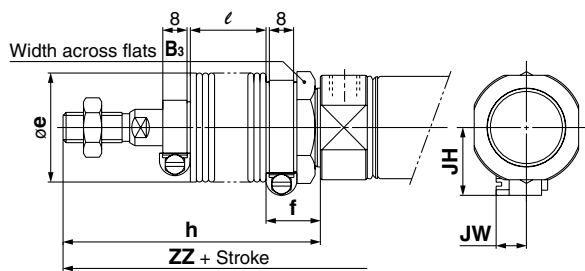
# Series CM2

## Head Side Flange Style (G)

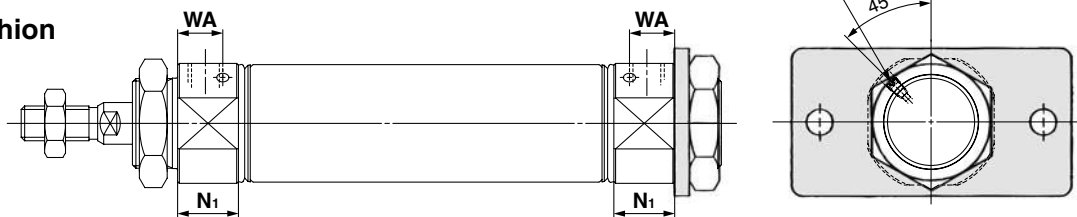
CM2G  —



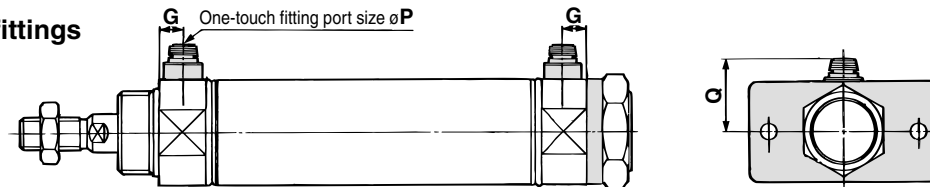
### With rod boot



### With air cushion



### Built-in One-touch fittings



| Bore size | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | C <sub>2</sub> | D  | E                                 | F  | FL   | FD | FT | FX | FY | FZ | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    |
|-----------|----|------|----|----------------|----------------|----------------|----|-----------------------------------|----|------|----|----|----|----|----|----|----|----------------|----------------|------|
| 20        | 18 | 15.5 | 34 | 13             | 26             | 30             | 8  | 20 <sup>-0.033</sup> <sub>0</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 41 | 5              | 8              | 28   |
| 25        | 22 | 19.5 | 40 | 17             | 32             | 37             | 10 | 26 <sup>-0.033</sup> <sub>0</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 33.5 |
| 32        | 22 | 19.5 | 40 | 17             | 32             | 37             | 12 | 26 <sup>-0.033</sup> <sub>0</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 37.5 |
| 40        | 24 | 21   | 52 | 22             | 41             | 47.3           | 14 | 32 <sup>-0.039</sup> <sub>0</sub> | 16 | 13.5 | 7  | 5  | 66 | 36 | 82 | 11 | 50 | 8              | 10             | 46.5 |

| Bore size | K   | KA | MM         | N    | NA   | NN        | P   | S  | Z   | ZZ  |
|-----------|-----|----|------------|------|------|-----------|-----|----|-----|-----|
| 20        | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 107 | 116 |
| 25        | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 111 | 120 |
| 32        | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 113 | 122 |
| 40        | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 143 | 154 |

| Bore size | N <sub>1</sub> | WA |
|-----------|----------------|----|
| 20        | 17.5           | 13 |
| 25        | 17.5           | 13 |
| 32        | 17.5           | 13 |
| 40        | 21.5           | 16 |

| Bore size | G  | P | Q    |
|-----------|----|---|------|
| 20        | 8  | 6 | 21.5 |
| 25        | 8  | 6 | 24.5 |
| 32        | 8  | 6 | 27   |
| 40        | 11 | 8 | 32.5 |

### With Rod Boot

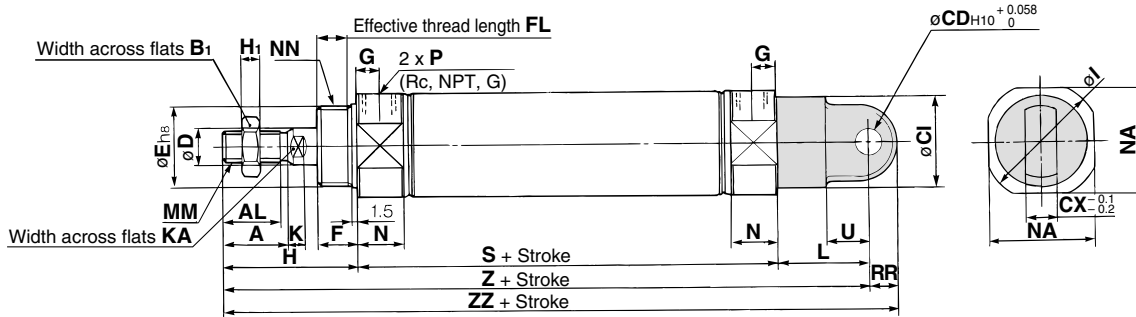
| Symbol<br>Stroke | B <sub>3</sub> | e  | f  | h       |           |            |            |            |            |            |         | l         |            |            |            |            |            |         |           | ZZ         |            |            |            |            |  |  |  |
|------------------|----------------|----|----|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|--|--|--|
|                  |                |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |  |  |  |
| 20               | 30             | 36 | 18 | 68      | 81        | 93         | 106        | 131        | 156        | 181        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 143     | 156       | 168        | 181        | 206        | 231        | 256        |  |  |  |
| 25               | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 160        | 185        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 147     | 160       | 172        | 185        | 210        | 235        | 260        |  |  |  |
| 32               | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 160        | 185        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 149     | 162       | 174        | 187        | 212        | 237        | 262        |  |  |  |
| 40               | 41             | 46 | 20 | 77      | 90        | 102        | 115        | 140        | 165        | 190        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 181     | 194       | 206        | 219        | 244        | 269        | 294        |  |  |  |

### With Rod Boot (mm)

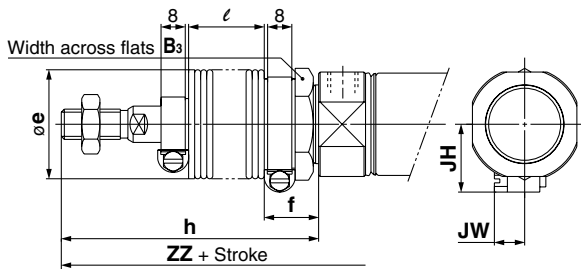
| Bore size | JH   | JW   |
|-----------|------|------|
| 20        | 23.5 | 10.5 |
| 25        | 23.5 | 10.5 |
| 32        | 23.5 | 10.5 |
| 40        | 27   | 10.5 |

Single Clevis Style (C)

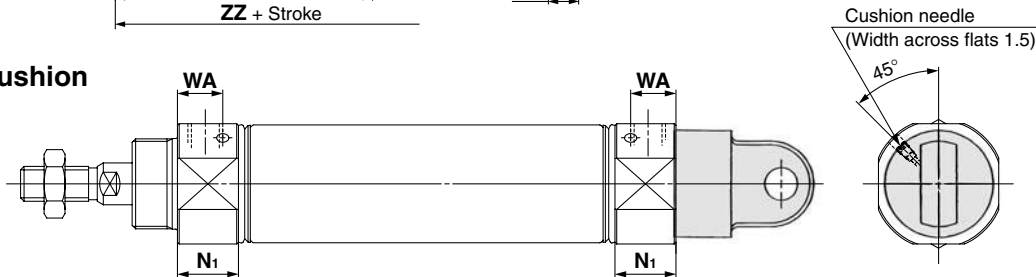
CM2C Bore size — Stroke



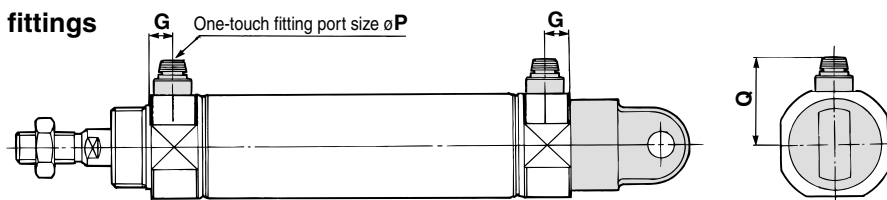
With rod boot



With air cushion



Built-in One-touch fittings



| Bore size | A  | AL   | B <sub>1</sub> | CI | CD | CX | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | L  | MM         | N    | NA   | NN        | P   | RR | S  | U  | Z   | ZZ  |
|-----------|----|------|----------------|----|----|----|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|----|------------|------|------|-----------|-----|----|----|----|-----|-----|
| 20        | 18 | 15.5 | 13             | 24 | 9  | 10 | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | 30 | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 9  | 62 | 14 | 133 | 142 |
| 25        | 22 | 19.5 | 17             | 30 | 9  | 10 | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | 30 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 9  | 62 | 14 | 137 | 146 |
| 32        | 22 | 19.5 | 17             | 30 | 9  | 10 | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | 30 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 9  | 64 | 14 | 139 | 148 |
| 40        | 24 | 21   | 22             | 38 | 10 | 15 | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | 39 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 11 | 88 | 18 | 177 | 188 |

With Rod Boot

| Symbol<br>Stroke | B <sub>3</sub> | e  | f  | h       |           |            |            |            |            |            |         | ℓ         |            |            |            |            |            |         |           | Z          |            |            |            |            |  |  |  |
|------------------|----------------|----|----|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|--|--|--|
|                  |                |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |  |  |  |
| 20               | 30             | 36 | 18 | 68      | 81        | 93         | 106        | 131        | 156        | 181        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 160     | 173       | 185        | 198        | 223        | 248        | 273        |  |  |  |
| 25               | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 160        | 185        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 164     | 177       | 189        | 202        | 227        | 252        | 277        |  |  |  |
| 32               | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 160        | 185        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 166     | 179       | 191        | 204        | 229        | 254        | 279        |  |  |  |
| 40               | 41             | 46 | 20 | 77      | 90        | 102        | 115        | 140        | 165        | 190        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 204     | 217       | 229        | 242        | 267        | 292        | 317        |  |  |  |

With Rod Boot

| Symbol<br>Stroke | ZZ      |           |            |            |            |            |            |      | JH   | JW |
|------------------|---------|-----------|------------|------------|------------|------------|------------|------|------|----|
|                  | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |      |      |    |
| 20               | 169     | 182       | 194        | 207        | 232        | 257        | 282        | 23.5 | 10.5 |    |
| 25               | 173     | 186       | 198        | 211        | 236        | 261        | 286        | 23.5 | 10.5 |    |
| 32               | 175     | 188       | 200        | 213        | 238        | 263        | 288        | 23.5 | 10.5 |    |
| 40               | 215     | 228       | 240        | 253        | 278        | 303        | 328        | 27   | 10.5 |    |

With Air Cushion

| Bore size | N <sub>1</sub> | WA |
|-----------|----------------|----|
| 20        | 17.5           | 13 |
| 25        | 17.5           | 13 |
| 32        | 17.5           | 13 |
| 40        | 21.5           | 16 |

Built-in One-touch Fittings

| Bore size | G  | P | Q    |
|-----------|----|---|------|
| 20        | 8  | 6 | 21.5 |
| 25        | 8  | 6 | 24.5 |
| 32        | 8  | 6 | 27   |
| 40        | 11 | 8 | 32.5 |

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

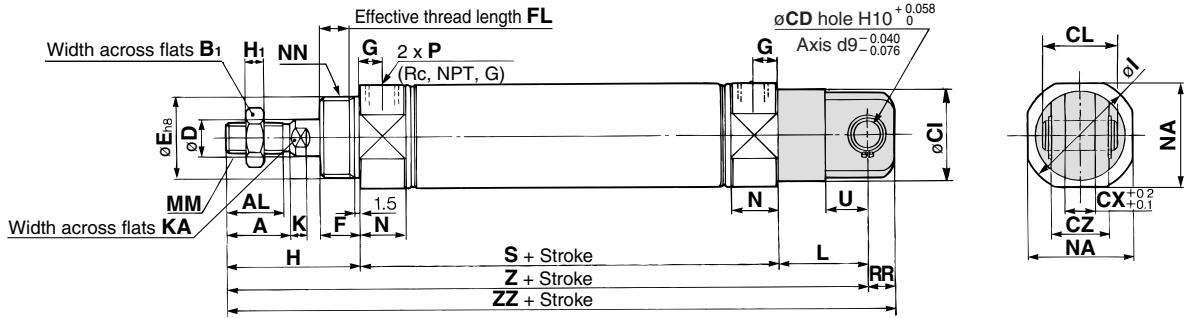
-X□

Technical data

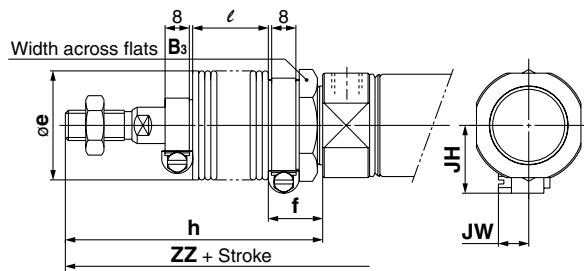
# Series CM2

## Double Clevis Style (D)

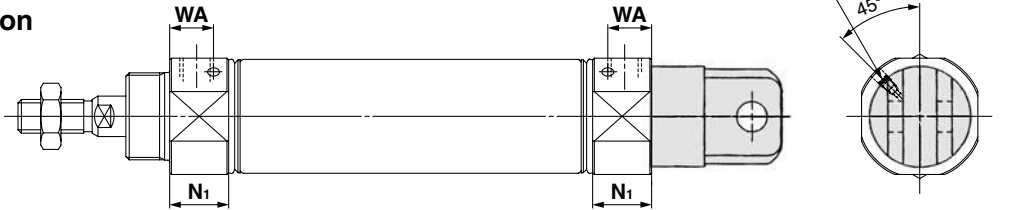
CM2D Bore size — Stroke



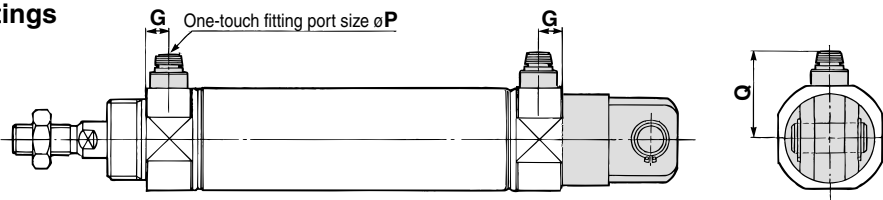
### With rod boot



### With air cushion



### Built-in One-touch fittings



| Bore size | A  | AL   | B <sub>1</sub> | CD | CI | CL   | CX | CZ | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | L  | MM         | N    | NA   | NN        | P   | RR | S  | U  | Z   | ZZ  |
|-----------|----|------|----------------|----|----|------|----|----|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|----|------------|------|------|-----------|-----|----|----|----|-----|-----|
| 20        | 18 | 15.5 | 13             | 9  | 24 | 25   | 10 | 19 | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | 30 | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 9  | 62 | 14 | 133 | 142 |
| 25        | 22 | 19.5 | 17             | 9  | 30 | 25   | 10 | 19 | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | 30 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 9  | 62 | 14 | 137 | 146 |
| 32        | 22 | 19.5 | 17             | 9  | 30 | 25   | 10 | 19 | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | 30 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 9  | 64 | 14 | 139 | 148 |
| 40        | 24 | 21   | 22             | 10 | 38 | 41.2 | 15 | 30 | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | 39 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 11 | 88 | 18 | 177 | 188 |

\* Clevis pin and snap ring (cotter pin for bore size ø40) are shipped together. (mm)

### With Rod Boot

| Symbol<br>Stroke | B <sub>3</sub> | e  | f  | h       |           |            |            |            |            |            |         | ℓ         |            |            |            |            |            |         |           | Z          |            |            |            |            |  |  |  |
|------------------|----------------|----|----|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|--|--|--|
|                  |                |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |  |  |  |
| 20               | 30             | 36 | 18 | 68      | 81        | 93         | 106        | 131        | 156        | 181        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 160     | 173       | 185        | 198        | 223        | 248        | 273        |  |  |  |
| 25               | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 160        | 185        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 164     | 177       | 189        | 202        | 227        | 252        | 277        |  |  |  |
| 32               | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 160        | 185        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 166     | 179       | 191        | 204        | 229        | 254        | 279        |  |  |  |
| 40               | 41             | 46 | 20 | 77      | 90        | 102        | 115        | 140        | 165        | 190        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 204     | 217       | 229        | 242        | 267        | 292        | 317        |  |  |  |

### With Rod Boot

| Symbol<br>Stroke | ZZ      |           |            |            |            |            |            |      | JH   | JW |
|------------------|---------|-----------|------------|------------|------------|------------|------------|------|------|----|
|                  | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |      |      |    |
| 20               | 169     | 182       | 194        | 207        | 232        | 257        | 282        | 23.5 | 10.5 |    |
| 25               | 173     | 186       | 198        | 211        | 236        | 261        | 286        | 23.5 | 10.5 |    |
| 32               | 175     | 188       | 200        | 213        | 238        | 263        | 288        | 23.5 | 10.5 |    |
| 40               | 215     | 228       | 240        | 253        | 278        | 303        | 328        | 27   | 10.5 |    |

### With Air Cushion

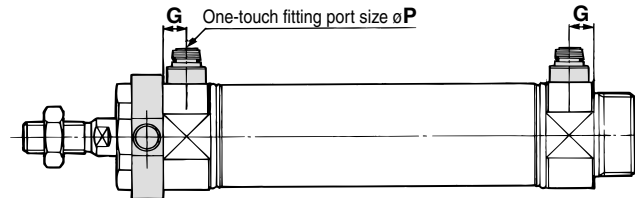
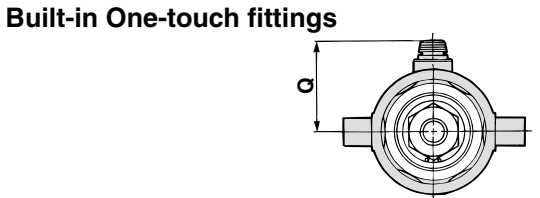
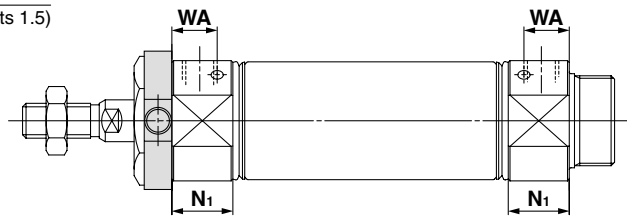
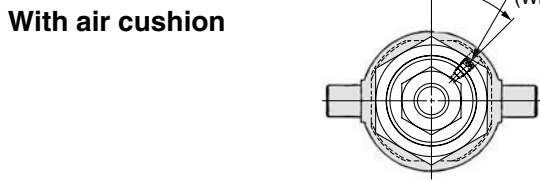
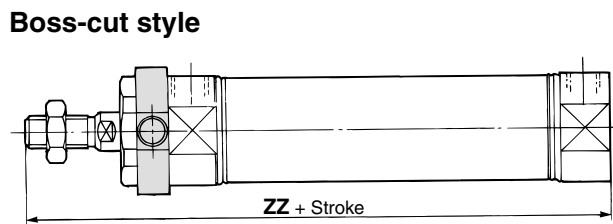
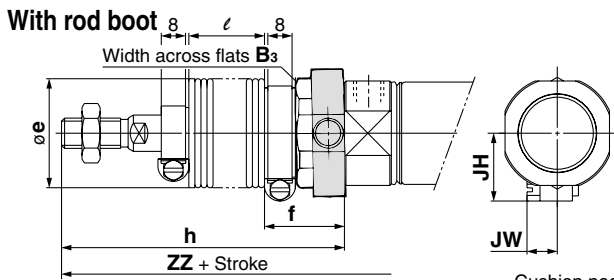
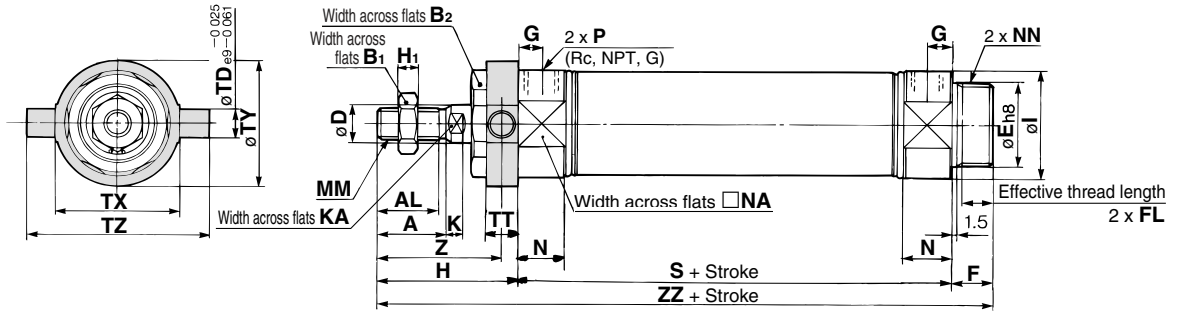
| Bore size | N <sub>1</sub> | WA |
|-----------|----------------|----|
| 20        | 17.5           | 13 |
| 25        | 17.5           | 13 |
| 32        | 17.5           | 13 |
| 40        | 21.5           | 16 |

### Built-in One-touch Fittings

| Bore size | G  | P | Q    |
|-----------|----|---|------|
| 20        | 8  | 6 | 21.5 |
| 25        | 8  | 6 | 24.5 |
| 32        | 8  | 6 | 27   |
| 40        | 11 | 8 | 32.5 |

**Rod Side Trunnion Style (U)**

CM2U Bore size — Stroke



- CJ1**
- CJP**
- CJ2**
- CM2**
- CG1**
- MB**
- MB1**
- CA2**
- CS1**
- CS2**

| Bore size | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | E                    | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   |
|-----------|----|------|----------------|----------------|----|----------------------|----|------|----|----|----------------|------|-----|----|------------|------|------|-----------|-----|
| 20        | 18 | 15.5 | 13             | 26             | 8  | 20 <sup>-0.033</sup> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 |
| 25        | 22 | 19.5 | 17             | 32             | 10 | 26 <sup>-0.033</sup> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 |
| 32        | 22 | 19.5 | 17             | 32             | 12 | 26 <sup>-0.033</sup> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 |
| 40        | 24 | 21   | 22             | 41             | 14 | 32 <sup>-0.039</sup> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 |

(mm)

| Bore size | S  | TD | TT | TX | TY | TZ | Z    | ZZ  |
|-----------|----|----|----|----|----|----|------|-----|
| 20        | 62 | 8  | 10 | 32 | 32 | 52 | 36   | 116 |
| 25        | 62 | 9  | 10 | 40 | 40 | 60 | 40   | 120 |
| 32        | 64 | 9  | 10 | 40 | 40 | 60 | 40   | 122 |
| 40        | 88 | 10 | 11 | 53 | 53 | 77 | 44.5 | 154 |

**With Rod Boot** (mm)

| Bore size | Symbol | Stroke | B <sub>3</sub> | e  | f  | h       |           |            |            |            |            |            |  |
|-----------|--------|--------|----------------|----|----|---------|-----------|------------|------------|------------|------------|------------|--|
|           |        |        |                |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |  |
| 20        |        |        | 30             | 36 | 25 | 68      | 81        | 93         | 106        | 131        | 156        | 181        |  |
| 25        |        |        | 32             | 36 | 25 | 72      | 85        | 97         | 110        | 135        | 160        | 185        |  |
| 32        |        |        | 32             | 36 | 25 | 72      | 85        | 97         | 110        | 135        | 160        | 185        |  |
| 40        |        |        | 41             | 46 | 26 | 77      | 90        | 102        | 115        | 140        | 165        | 190        |  |

**With Rod Boot** (mm)

| Bore size | Symbol | Stroke | ℓ       |           |            |            |            |            |            | Z       |           |            |            |            | ZZ         |            |     |     |     | JH  | JW  |     |     |      |      |
|-----------|--------|--------|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|-----|-----|-----|-----|-----|-----|-----|------|------|
|           |        |        | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |     |     |     |     |     |     |     |      |      |
| 20        |        |        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 63      | 76        | 88         | 101        | 126        | 151        | 176        | 143 | 156 | 168 | 181 | 206 | 231 | 256 | 23.5 | 10.5 |
| 25        |        |        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 67      | 80        | 92         | 105        | 130        | 155        | 180        | 147 | 160 | 172 | 185 | 210 | 235 | 260 | 23.5 | 10.5 |
| 32        |        |        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 67      | 80        | 92         | 105        | 130        | 155        | 180        | 149 | 162 | 174 | 187 | 212 | 237 | 262 | 23.5 | 10.5 |
| 40        |        |        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 71.5    | 84.5      | 96.5       | 109.5      | 134.5      | 159.5      | 184.5      | 181 | 194 | 206 | 219 | 244 | 269 | 294 | 27   | 10.5 |

**Boss-cut Style** (mm)

| Bore size | Without rod boot | ZZ      |           |            |            |            |            |            |
|-----------|------------------|---------|-----------|------------|------------|------------|------------|------------|
|           |                  | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |
| 20        | 103              | 130     | 143       | 155        | 168        | 193        | 218        | 243        |
| 25        | 107              | 134     | 147       | 159        | 172        | 197        | 222        | 247        |
| 32        | 109              | 136     | 149       | 161        | 174        | 199        | 224        | 249        |
| 40        | 138              | 165     | 178       | 190        | 203        | 228        | 253        | 278        |

**With Air Cushion** (mm)

| Bore size | N <sub>1</sub> | WA |
|-----------|----------------|----|
| 20        | 17.5           | 13 |
| 25        | 17.5           | 13 |
| 32        | 17.5           | 13 |
| 40        | 21.5           | 16 |

**Built-in One-touch Fittings** (mm)

| Bore size | G  | P | Q    |
|-----------|----|---|------|
| 20        | 8  | 6 | 21.5 |
| 25        | 8  | 6 | 24.5 |
| 32        | 8  | 6 | 27   |
| 40        | 11 | 8 | 32.5 |

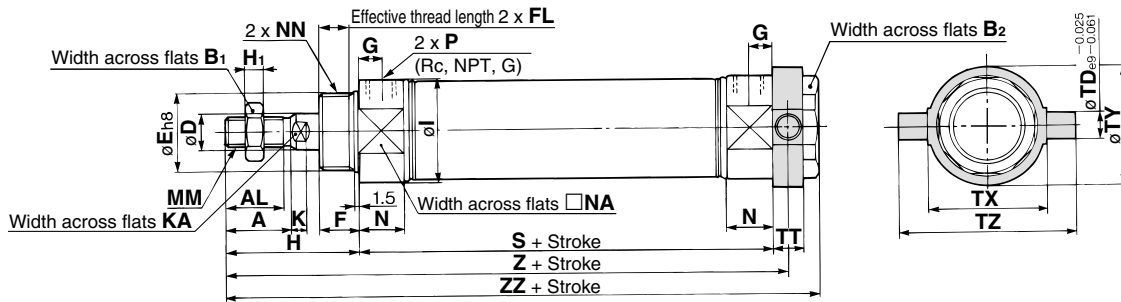
- D-□**
- X□**
- Individual -X□
- Technical data



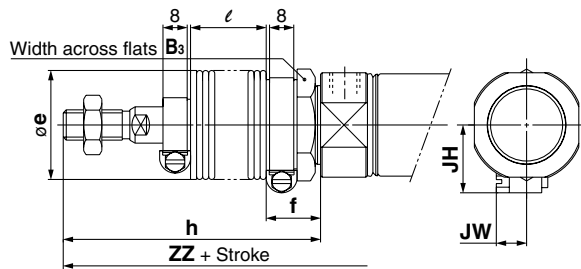
# Series CM2

## Head Side Trunnion Style (T)

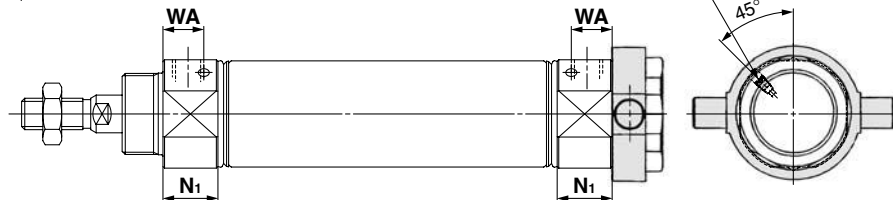
CM2T  —



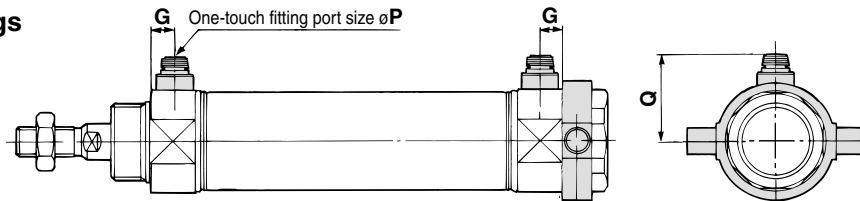
### With rod boot



### With air cushion



### Built-in One-touch fittings



| Bore size | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   |
|-----------|----|------|----------------|----------------|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|------------|------|------|-----------|-----|
| 20        | 18 | 15.5 | 13             | 26             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 |
| 25        | 22 | 19.5 | 17             | 32             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 |
| 32        | 22 | 19.5 | 17             | 32             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 |
| 40        | 24 | 21   | 22             | 41             | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 |

| Bore size | S  | TD | TT | TX | TY | TZ | Z     | ZZ  |
|-----------|----|----|----|----|----|----|-------|-----|
| 20        | 62 | 8  | 10 | 32 | 32 | 52 | 108   | 118 |
| 25        | 62 | 9  | 10 | 40 | 40 | 60 | 112   | 122 |
| 32        | 64 | 9  | 10 | 40 | 40 | 60 | 114   | 124 |
| 40        | 88 | 10 | 11 | 53 | 53 | 77 | 143.5 | 154 |

### With Rod Boot

| Bore size | Symbol | Stroke | B <sub>3</sub> | e  | f  | h       |           |            |            |            |            |            |  |
|-----------|--------|--------|----------------|----|----|---------|-----------|------------|------------|------------|------------|------------|--|
|           |        |        |                |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |  |
| 20        |        |        | 30             | 36 | 18 | 68      | 81        | 93         | 106        | 131        | 156        | 181        |  |
| 25        |        |        | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 160        | 185        |  |
| 32        |        |        | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 160        | 185        |  |
| 40        |        |        | 41             | 46 | 20 | 77      | 90        | 102        | 115        | 140        | 165        | 190        |  |

### With Rod Boot

| Bore size | Symbol | Stroke | l       |           |            |            |            |            |            | Z       |           |            |            |            |            |            | ZZ      |           |            |            |            |            |            | JH   | JW   |
|-----------|--------|--------|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|------|------|
|           |        |        | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |      |      |
| 20        |        |        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 135     | 148       | 160        | 173        | 198        | 223        | 248        | 145     | 158       | 170        | 183        | 208        | 233        | 258        | 23.5 | 10.5 |
| 25        |        |        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 139     | 152       | 164        | 177        | 202        | 227        | 252        | 149     | 162       | 174        | 187        | 212        | 237        | 262        | 23.5 | 10.5 |
| 32        |        |        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 141     | 154       | 166        | 179        | 204        | 229        | 254        | 151     | 164       | 176        | 189        | 214        | 239        | 264        | 23.5 | 10.5 |
| 40        |        |        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 170.5   | 183.5     | 195.5      | 208.5      | 233.5      | 258.5      | 283.5      | 181     | 194       | 206        | 219        | 244        | 269        | 294        | 27   | 10.5 |

### With Air Cushion

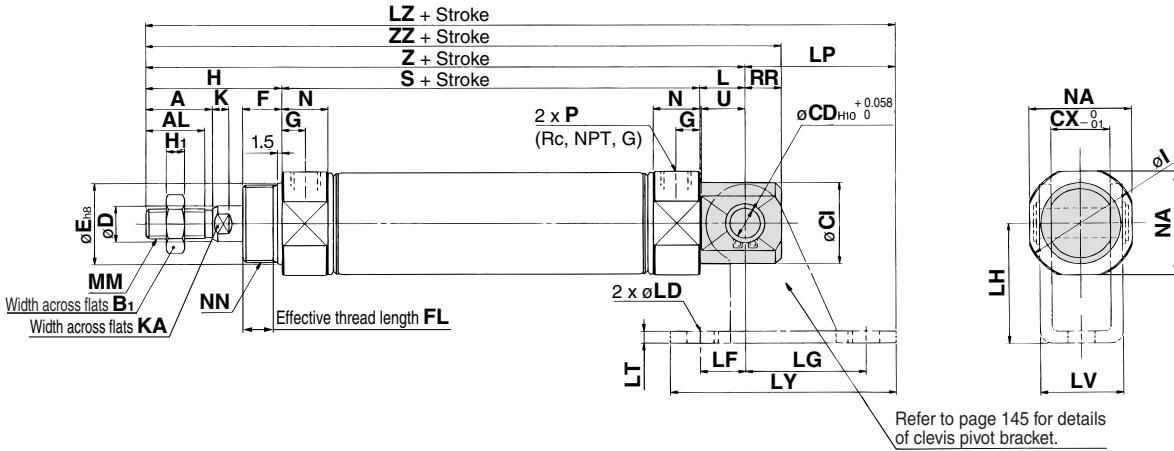
| Bore size | N <sub>1</sub> | WA |
|-----------|----------------|----|
| 20        | 17.5           | 13 |
| 25        | 17.5           | 13 |
| 32        | 17.5           | 13 |
| 40        | 21.5           | 16 |

### Built-in One-touch Fittings

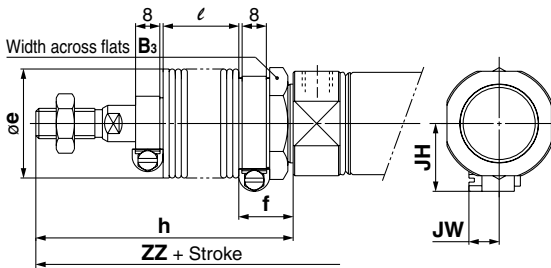
| Bore size | G  | P | Q    |
|-----------|----|---|------|
| 20        | 8  | 6 | 21.5 |
| 25        | 8  | 6 | 24.5 |
| 32        | 8  | 6 | 27   |
| 40        | 11 | 8 | 32.5 |

**Clevis Integrated Style (E)**

CM2E  —



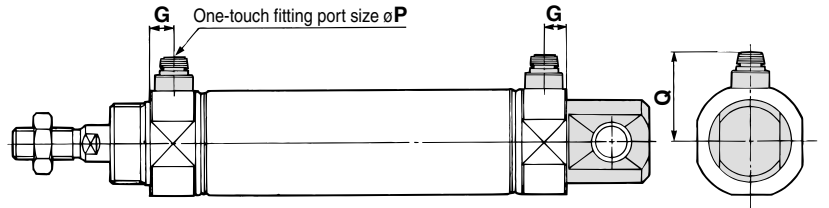
**With rod boot**



**With air cushion**



**Built-in One-touch fittings**



| Bore size | A  | AL   | B <sub>1</sub> | CD | CI | CX | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | L  | MM         | N    | NA   | NN        |
|-----------|----|------|----------------|----|----|----|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|----|------------|------|------|-----------|
| 20        | 18 | 15.5 | 13             | 8  | 20 | 12 | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | 12 | M8 x 1.25  | 15   | 24   | M20 x 1.5 |
| 25        | 22 | 19.5 | 17             | 8  | 22 | 12 | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | 12 | M10 x 1.25 | 15   | 30   | M26 x 1.5 |
| 32        | 22 | 19.5 | 17             | 10 | 27 | 20 | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | 15 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 |
| 40        | 24 | 21   | 22             | 10 | 33 | 20 | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | 15 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   |

(mm)

| Bore size | P   | RR | S  | U    | Z   | ZZ  |
|-----------|-----|----|----|------|-----|-----|
| 20        | 1/8 | 9  | 62 | 11.5 | 115 | 124 |
| 25        | 1/8 | 9  | 62 | 11.5 | 119 | 128 |
| 32        | 1/8 | 12 | 64 | 14.5 | 124 | 136 |
| 40        | 1/4 | 12 | 88 | 14.5 | 153 | 165 |

**With Rod Boot** (mm)

| Symbol<br>Stroke | B <sub>3</sub> | e  | f  | h       |           |            |            |            |            |            |  |
|------------------|----------------|----|----|---------|-----------|------------|------------|------------|------------|------------|--|
|                  |                |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |  |
| 20               | 30             | 36 | 18 | 68      | 81        | 93         | 106        | 131        | 156        | 181        |  |
| 25               | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 160        | 185        |  |
| 32               | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 160        | 185        |  |
| 40               | 41             | 46 | 20 | 77      | 90        | 102        | 115        | 140        | 165        | 190        |  |

**With Rod Boot**

(mm)

| Symbol<br>Stroke | ℓ       |           |            |            |            |            |            |         | Z         |            |            |            |            |            |         |           | ZZ         |            |            |            |            |      |      |  | JH | JW |
|------------------|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|------|------|--|----|----|
|                  | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |      |      |  |    |    |
| 20               | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 142     | 155       | 167        | 180        | 205        | 230        | 255        | 151     | 164       | 176        | 189        | 214        | 239        | 264        | 23.5 | 10.5 |  |    |    |
| 25               | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 146     | 159       | 171        | 184        | 209        | 234        | 259        | 155     | 168       | 180        | 193        | 218        | 243        | 268        | 23.5 | 10.5 |  |    |    |
| 32               | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 151     | 164       | 176        | 189        | 214        | 239        | 264        | 163     | 176       | 188        | 201        | 226        | 251        | 276        | 23.5 | 10.5 |  |    |    |
| 40               | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 180     | 193       | 205        | 218        | 243        | 268        | 293        | 192     | 205       | 217        | 230        | 255        | 280        | 319        | 27   | 10.5 |  |    |    |

**With Air Cushion** (mm)

| Bore size | N <sub>1</sub> | WA |
|-----------|----------------|----|
| 20        | 17.5           | 13 |
| 25        | 17.5           | 13 |
| 32        | 17.5           | 13 |
| 40        | 21.5           | 16 |

**Built-in One-touch Fittings** (mm)

| Bore size | G  | P | Q    |
|-----------|----|---|------|
| 20        | 8  | 6 | 21.5 |
| 25        | 8  | 6 | 24.5 |
| 32        | 8  | 6 | 27   |
| 40        | 11 | 8 | 32.5 |

**Clevis Pivot Bracket** (mm)

| Bore size | LD  | LF | LG | LH | LP | LT  | LV   | LY | LZ  |
|-----------|-----|----|----|----|----|-----|------|----|-----|
| 20        | 6.8 | 15 | 30 | 30 | 37 | 3.2 | 18.4 | 59 | 152 |
| 25        | 6.8 | 15 | 30 | 30 | 37 | 3.2 | 18.4 | 59 | 156 |
| 32        | 9   | 15 | 40 | 40 | 50 | 4   | 28   | 75 | 174 |
| 40        | 9   | 15 | 40 | 40 | 50 | 4   | 28   | 75 | 203 |

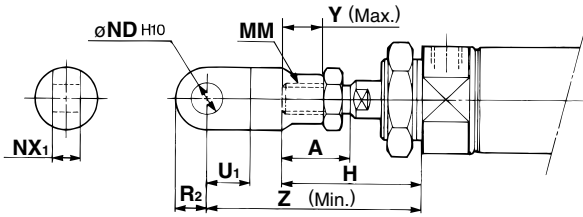
- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Individual
- X□
- Technical data

# Accessory Bracket Dimensions

## Single Knuckle Joint

(mm)

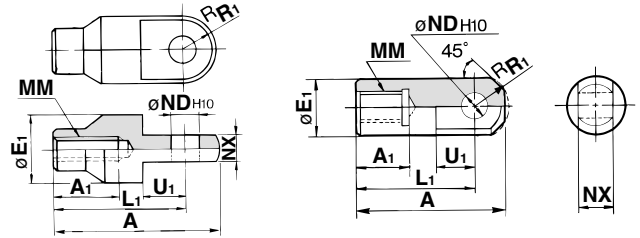


| Bore size | A  | H  | MM         | ND <sub>H10</sub>                 | NX <sub>1</sub>                    | U <sub>1</sub> | R <sub>2</sub> | Y  | Z  |
|-----------|----|----|------------|-----------------------------------|------------------------------------|----------------|----------------|----|----|
| 20        | 18 | 41 | M8 x 1.25  | 9 <sup>+0.058</sup> <sub>0</sub>  | 9 <sup>-0.1</sup> <sub>-0.2</sub>  | 14             | 10             | 11 | 66 |
| 25, 32    | 22 | 45 | M10 x 1.25 | 9 <sup>+0.058</sup> <sub>0</sub>  | 9 <sup>-0.1</sup> <sub>-0.2</sub>  | 14             | 10             | 14 | 69 |
| 40        | 24 | 50 | M14 x 1.5  | 12 <sup>+0.070</sup> <sub>0</sub> | 16 <sup>-0.1</sup> <sub>-0.3</sub> | 20             | 14             | 13 | 92 |

## Single Knuckle Joint

(mm)

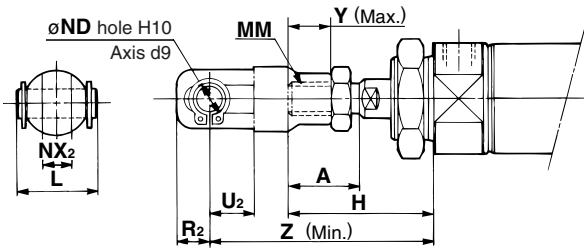
**I-020B/032B** Material: Rolled steel      **I-040B** Material: Free cutting sulfur steel



| Part no.      | Applicable bore size | A  | A <sub>1</sub> | E <sub>1</sub> | L <sub>1</sub> | MM         | ND <sub>H10</sub>                 | NX                                 | R <sub>1</sub> | U <sub>1</sub> |
|---------------|----------------------|----|----------------|----------------|----------------|------------|-----------------------------------|------------------------------------|----------------|----------------|
| <b>I-020B</b> | 20                   | 46 | 16             | 20             | 36             | M8 x 1.25  | 9 <sup>+0.058</sup> <sub>0</sub>  | 9 <sup>-0.1</sup> <sub>-0.2</sub>  | 10             | 14             |
| <b>I-032B</b> | 25, 32               | 48 | 18             | 20             | 38             | M10 x 1.25 | 9 <sup>+0.058</sup> <sub>0</sub>  | 9 <sup>-0.1</sup> <sub>-0.2</sub>  | 10             | 14             |
| <b>I-040B</b> | 40                   | 69 | 22             | 24             | 55             | M14 x 1.5  | 12 <sup>+0.070</sup> <sub>0</sub> | 16 <sup>-0.1</sup> <sub>-0.3</sub> | 15.5           | 20             |

## Double Knuckle Joint

(mm)

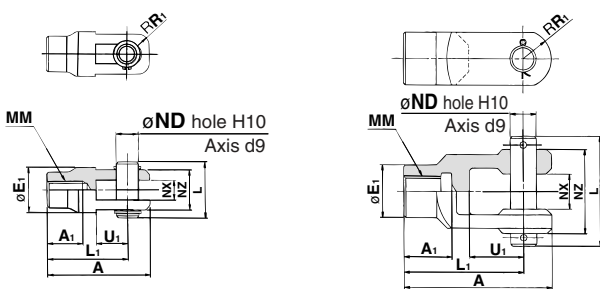


| Bore size | A  | H  | L    | MM         | ND | NX <sub>2</sub>                    | R <sub>2</sub> | U <sub>2</sub> | Y  | Z  |
|-----------|----|----|------|------------|----|------------------------------------|----------------|----------------|----|----|
| 20        | 18 | 41 | 25   | M8 x 1.25  | 9  | 9 <sup>+0.2</sup> <sub>+0.1</sub>  | 10             | 14             | 11 | 66 |
| 25, 32    | 22 | 45 | 25   | M10 x 1.25 | 9  | 9 <sup>+0.2</sup> <sub>+0.1</sub>  | 10             | 14             | 14 | 69 |
| 40        | 24 | 50 | 49.7 | M14 x 1.5  | 12 | 16 <sup>+0.3</sup> <sub>+0.1</sub> | 13             | 25             | 13 | 92 |

## Double Knuckle Joint

(mm)

**Y-020B/Y-032B** Material: Rolled steel      **Y-040B** Material: Cast iron



| Part no.      | Applicable bore size | A  | A <sub>1</sub> | E <sub>1</sub> | L    | L <sub>1</sub> | MM         | ND | NX                                 | NZ | R <sub>1</sub> | U <sub>1</sub> | Applicable pin part number | Retaining ring size |
|---------------|----------------------|----|----------------|----------------|------|----------------|------------|----|------------------------------------|----|----------------|----------------|----------------------------|---------------------|
| <b>Y-020B</b> | 20                   | 46 | 16             | 20             | 25   | 36             | M8 x 1.25  | 9  | 9 <sup>+0.2</sup> <sub>+0.1</sub>  | 18 | 5              | 14             | CDP-1                      | Type C 9 for axis   |
| <b>Y-032B</b> | 25, 32               | 48 | 18             | 20             | 25   | 38             | M10 x 1.25 | 9  | 9 <sup>+0.2</sup> <sub>+0.1</sub>  | 18 | 5              | 14             | CDP-1                      | Type C 9 for axis   |
| <b>Y-040B</b> | 40                   | 68 | 22             | 24             | 49.7 | 55             | M14 x 1.5  | 12 | 16 <sup>+0.3</sup> <sub>+0.1</sub> | 38 | 13             | 25             | CDP-3                      | ø3 x 18ℓ            |

\* Clevis pin and retaining ring (cotter pin for 40) are attached.

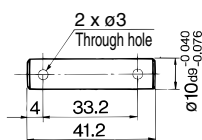
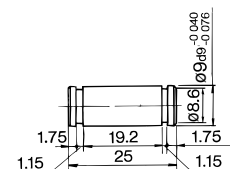
## Double Clevis Pin

Material: Carbon steel

(mm)

Bore size/ø20, ø25, ø32  
**CDP-1**

Bore size/ø40  
**CDP-2**



Retaining ring: Type C9 for axis

Cotter pin ø3 x 18ℓ

\* Retaining rings (cotter pins for ø40) are attached.

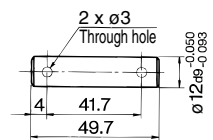
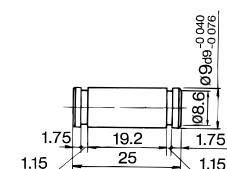
## Double Knuckle Pin

Material: Carbon steel

(mm)

Bore size/ø20, ø25, ø32  
**CDP-1**

Bore size/ø40  
**CDP-3**



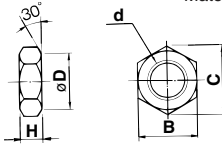
Retaining ring: Type C9 for axis

Cotter pin ø3 x 18ℓ

\* Retaining rings (cotter pins for ø40) are attached.

**Rod End Nut** (mm)

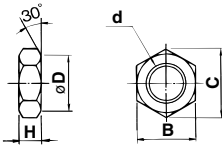
Material: Carbon steel



| Part no. | Applicable bore size | B  | C    | D    | d          | H |
|----------|----------------------|----|------|------|------------|---|
| NT-02    | 20                   | 13 | 15.0 | 12.5 | M8 x 1.25  | 5 |
| NT-03    | 25, 32               | 17 | 19.6 | 16.5 | M10 x 1.25 | 6 |
| NT-04    | 40                   | 22 | 25.4 | 21.0 | M14 x 1.5  | 8 |

**Mounting Nut** (mm)

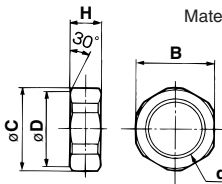
Material: Carbon steel



| Part no. | Applicable bore size | B  | C    | D    | d         | H  |
|----------|----------------------|----|------|------|-----------|----|
| SN-020B  | 20                   | 26 | 30   | 25.5 | M20 x 1.5 | 8  |
| SN-032B  | 25, 32               | 32 | 37   | 31.5 | M26 x 1.5 | 8  |
| SN-040B  | 40                   | 41 | 47.3 | 40.5 | M32 x 2.0 | 10 |

**Trunnion Nut** (mm)

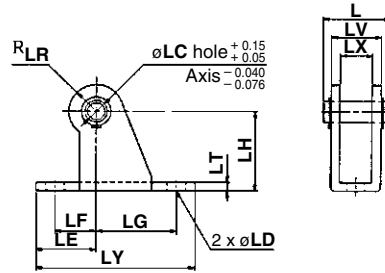
Material: Carbon steel



| Part no. | Applicable bore size | B  | C  | D    | d         | H  |
|----------|----------------------|----|----|------|-----------|----|
| TN-020B  | 20                   | 26 | 28 | 25.5 | M20 x 1.5 | 10 |
| TN-032B  | 25, 32               | 32 | 34 | 31.5 | M26 x 1.5 | 10 |
| TN-040B  | 40                   | 41 | 45 | 40.5 | M32 x 2   | 10 |

**Clevis Pivot Bracket (For CM2E)** (mm)

Material: Rolled steel plate

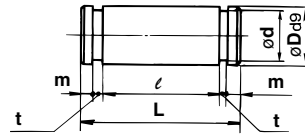


| Part no. | Applicable bore size | L    | LC | LD  | LE | LF | LG | LH | LR | LT  | LX | LY | LV   | Applicable pin part no. |
|----------|----------------------|------|----|-----|----|----|----|----|----|-----|----|----|------|-------------------------|
| CM-E020B | 20, 25               | 24.5 | 8  | 6.8 | 22 | 15 | 30 | 30 | 10 | 3.2 | 12 | 59 | 18.4 | CD-S02                  |
| CM-E032B | 32, 40               | 34   | 10 | 9   | 25 | 15 | 40 | 40 | 13 | 4   | 20 | 75 | 28   | CD-S03                  |

Note 1) Clevis pins and retaining rings (cotter pins for  $\phi 40$ ) are attached.  
Note 2) It cannot be used for single clevis style (CM2C) and double clevis style (CM2D).

**Clevis Pin (For CM2E)** (mm)

Material: Carbon steel



| Part no. | Applicable bore size | D <sub>d9</sub>                        | d   | L    | l    | m    | t    | Applicable retaining ring part no. |
|----------|----------------------|--|-----|------|------|------|------|------------------------------------|
| CD-S02   | 20, 25               | 8 <sup>-0.040</sup> <sub>-0.076</sub>  | 7.6 | 24.5 | 19.5 | 1.6  | 0.9  | Type C 8 for axis                  |
| CD-S03   | 32, 40               | 10 <sup>-0.040</sup> <sub>-0.076</sub> | 9.6 | 34   | 29   | 1.35 | 1.15 | Type C 10 for axis                 |

Note) Retaining rings are attached.

Regarding mounting bracket, accessory made of stainless steel (Some are not available.), refer to page 1408 for -XB12, External stainless steel cylinder.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

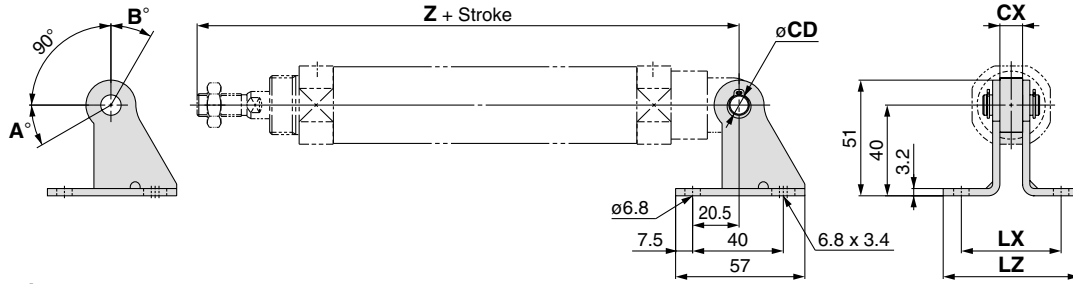
-X□

Individual  
-X□

Technical  
data

# Series CM2

## Single Clevis



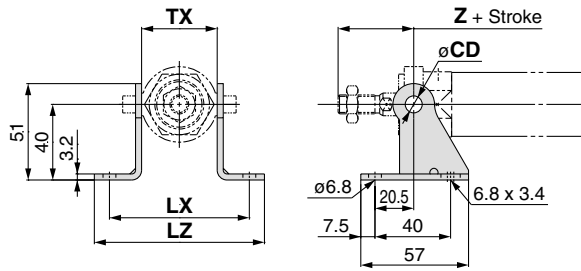
### Rotation Angle

| Bore size (mm) | A° | B° | A° + B° + 90° |
|----------------|----|----|---------------|
| 20             | 25 | 85 | 200           |
| 25, 32         | 21 | 81 | 192           |
| 40             | 26 | 86 | 202           |

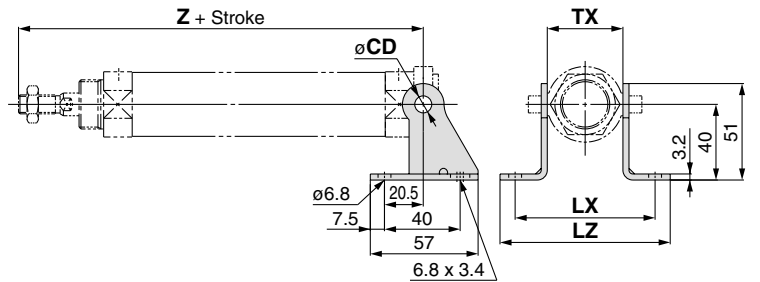
| Mounting                      | Part no. | Applicable bore size | CX | Z + Stroke | CD | LX | LZ |
|-------------------------------|----------|----------------------|----|------------|----|----|----|
| CM2C<br>(Single clevis style) | CM-B032  | 20                   | 10 | 133        | 9  | 44 | 60 |
|                               |          | 25                   |    | 137        |    |    |    |
|                               |          | 32                   |    | 139        |    |    |    |
|                               | CM-B040  | 40                   | 15 | 177        | 10 | 49 | 65 |

Note) Pivot brackets do not come with pivot bracket pins and retaining rings.

## Rod Side Trunnion



## Head Side Trunnion

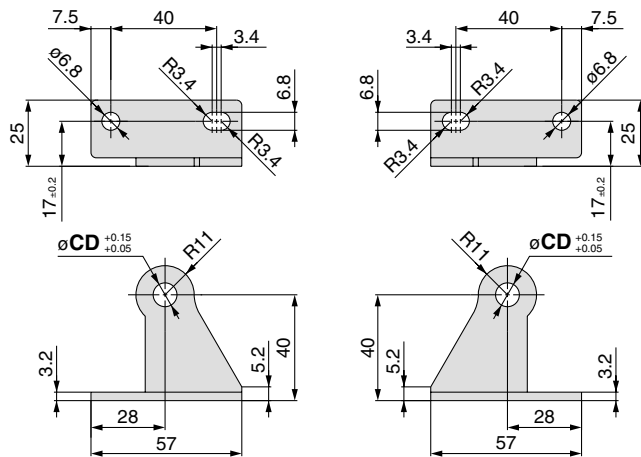


| Mounting                                   | Part no. | Applicable bore size | TX | Rod side trunnion | Head side trunnion | CD | LX | LZ  |
|--|----------|----------------------|----|-------------------|--------------------|----|----|-----|
|  |          |                      |    | Z + Stroke        | Z + Stroke         |    |    |     |
| CM2U/CM2T<br>(Rod side/Head side trunnion) | CM-B020  | 20                   | 32 | 36                | 108                | 8  | 66 | 82  |
|  | CM-B032  | 25                   | 40 | 40                | 112                | 9  | 74 | 90  |
|  |          | 32                   |    |                   | 114                |    |    |     |
|  | CM-B040  | 40                   | 53 | 44.5              | 143.5              | 10 | 87 | 103 |

Note) Pivot brackets do not come with pivot bracket pins and retaining rings.

## Pivot Bracket

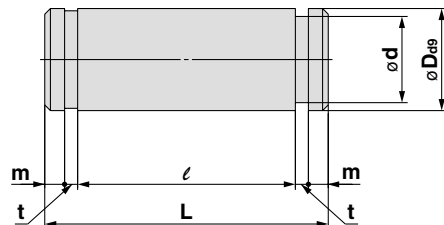
\* 2 brackets per set



| Part no.    | CD |
|-------------|----|
| CM-B020 (2) | 8  |
| CM-B032     | 9  |
| CM-B040     | 10 |

Note 1) Pivot brackets do not come with pivot bracket pins and retaining rings.  
Note 2) Only for trunnion type

## Pivot Bracket Pin (For CM2C)



| Applicable bore size | Part no. | Dø9                                    | d   | L  | ℓ    | m    | t    | Applicable retaining ring part no. |
|----------------------|----------|--|-----|----|------|------|------|------------------------------------|
| 20 to 32             | CDP-1    | 9 <sup>+0.040</sup> <sub>-0.076</sub>  | 8.6 | 25 | 19.2 | 1.75 | 1.15 | Type C 9 for axis                  |
| 40                   | CD-S03   | 10 <sup>+0.040</sup> <sub>-0.076</sub> | 9.6 | 34 | 29   | 1.75 | 1.15 | Type C 10 for axis                 |

Note) Pivot bracket pins come with retaining rings.

# Air Cylinder: Standard Type Double Acting, Double Rod Series **CM2W** ø20, ø25, ø32, ø40

## How to Order

**Mounting style**

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

**Type**

|            |           |
|------------|-----------|
| <b>Nil</b> | Pneumatic |
| <b>H</b>   | Air-hydro |

**Bore size**

|           |       |
|-----------|-------|
| <b>20</b> | 20 mm |
| <b>25</b> | 25 mm |
| <b>32</b> | 32 mm |
| <b>40</b> | 40 mm |

**Cushion**

|            |               |
|------------|---------------|
| <b>Nil</b> | Rubber bumper |
| <b>A</b>   | Air cushion   |

\* Air-hydro cylinder: Rubber bumper only

**Rod boot**

|            |                                      |
|------------|--------------------------------------|
| <b>Nil</b> | None                                 |
| <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) |

**Made to Order**  
(Refer to page 147 for details.)

**With auto switch** **CDM2W** **L** **40** **-** **150** **A** **-** **M9BW** **-**

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

**Built-in Magnet Cylinder Model**  
If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.  
(Example) CDM2WF32-100

**Port thread type**

|            |                            |
|------------|----------------------------|
| <b>Nil</b> | Rc                         |
| <b>TN</b>  | NPT                        |
| <b>TF</b>  | G                          |
| <b>F</b>   | Built-in one-touch fitting |

\* Air-hydro type: Rc only

**Cylinder stroke (mm)**  
(Refer to "Standard Stroke" on page 147.)

**Auto switch**

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

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

**Number of auto switches**

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

## Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

| Type               | Special function                           | Electrical entry                     | Indicator light | Wiring (Output)                             | Load voltage |             | Auto switch model | Lead wire length (m) |                |            |       |          | Pre-wired connector | Applicable load |            |            |            |
|--------------------|--|--------------------------------------|-----------------|---|--------------|-------------|-------------------|----------------------|----------------|------------|-------|----------|---------------------|-----------------|------------|------------|------------|
|                    |  |                                      |                 |   | DC           | AC          |                   | 0.5 (Nil)            | 1 (M)          | 3 (L)      | 5 (Z) | None (N) |                     |                 |            |            |            |
| Solid state switch |  | Grommet                              | Yes             | 3-wire (NPN)                                | 5V, 12V      |             | <b>M9N</b>        | ●                    | ●              | ●          | ○     | —        | ○                   | IC circuit      | Relay, PLC |            |            |
|                    |  |                                      |                 | 3-wire (PNP)                                |              |             | <b>M9P</b>        | ●                    | ●              | ●          | ○     | —        | ○                   |                 |            |            |            |
|                    |  | Connector                            |                 | 2-wire                                      | 12V          |             | <b>M9B</b>        | ●                    | ●              | ●          | ○     | —        | ○                   |                 |            | —          |            |
|                    |  |                                      |                 | Terminal conduit                            | 3-wire (NPN) | 5V, 12V     |                   | <b>H7C</b>           | ●              | —          | ●     | ●        | —                   |                 |            | —          | —          |
|                    | Diagnostic indication (2-color indication) | Grommet                              | Yes             |   | 2-wire       | 12V         |                   | <b>G39A</b> **       | —              | —          | —     | —        | ●                   | —               |            | IC circuit |            |
|                    |  |                                      |                 | 3-wire (NPN)                                | 5V, 12V      |             | <b>K39A</b> **    | —                    | —              | —          | —     | ●        | —                   | —               |            |            |            |
|                    |  | 3-wire (PNP)                         |                 | 5V, 12V                                     |              | <b>M9NW</b> | ●                 | ●                    | ●              | ○          | —     | ○        | IC circuit          |                 |            |            |            |
|                    |  | Water resistant (2-color indication) |                 | 2-wire                                      | 12V          |             | <b>M9PW</b>       | ●                    | ●              | ●          | ○     | —        | ○                   | —               |            |            |            |
|                    |  |                                      |                 | With diagnostic output (2-color indication) | 3-wire (NPN) | 5V, 12V     |                   | <b>M9BW</b>          | ●              | ●          | ●     | ○        | —                   | ○               |            | —          |            |
|                    |  | 4-wire (NPN)                         |                 |   | 5V, 12V      |             | <b>H7BA</b>       | —                    | —              | ●          | ○     | —        | ○                   | —               |            | —          |            |
| <b>H7NF</b>        | ●  | —                                    | ●               | ○   | —            | ○           | IC circuit        |                      |                |            |       |          |                     |                 |            |            |            |
| Reed switch        |  | Grommet                              | Yes             | 3-wire (NPN equivalent)                     | —            | 5V          | —                 | <b>A96</b>           | ●              | —          | ●     | —        | —                   | —               | IC circuit | —          |            |
|                    |  |                                      |                 | Connector                                   | 2-wire       | 24V         | 12V               | 100V                 |                | <b>A93</b> | ●     | —        | ●                   | —               | —          | —          | —          |
|                    |  | 100V or less                         |                 |   |              |             |                   |                      | <b>A90</b>     | ●          | —     | ●        | —                   | —               | —          | IC circuit |            |
|                    |  | 100V, 200V                           |                 |   |              |             |                   |                      | <b>B54</b> **  | ●          | —     | ●        | ●                   | —               | —          | —          | —          |
|                    |  | 200V or less                         |                 |   |              |             |                   |                      | <b>B64</b> **  | ●          | —     | ●        | —                   | —               | —          | —          | —          |
|                    |  | Terminal conduit                     |                 | 2-wire                                      | 24V          | 12V         | 24V or less       |                      | <b>C73C</b>    | ●          | —     | ●        | ●                   | ●               | —          | —          | IC circuit |
|                    |  |                                      |                 |   |              |             | —                 |                      | <b>C80C</b>    | ●          | —     | ●        | ●                   | ●               | —          | —          | IC circuit |
|                    |  | DIN terminal                         |                 | 2-wire                                      | 24V          | 12V         | 100V, 200V        |                      | <b>A33A</b> ** | —          | —     | —        | —                   | ●               | —          | —          | PLC        |
|                    |  |                                      |                 |   |              |             | —                 |                      | <b>A34A</b> ** | —          | —     | —        | —                   | ●               | —          | —          | —          |
|                    |  |                                      |                 |   |              |             | —                 |                      | <b>A44A</b> ** | —          | —     | —        | —                   | ●               | —          | —          | —          |
| —                  |  |                                      | <b>B59W</b>     |   |              |             | ●                 | —                    | ●              | —          | —     | —        | —                   | —               | Relay, PLC |            |            |

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW  
 1 m ..... M (Example) M9NWM  
 3 m ..... L (Example) M9NWL  
 5 m ..... Z (Example) M9NWZ  
 None ..... N (Example) H7CN

\* Solid state auto switches marked with "○" are produced upon receipt of order.  
 \* D-A9□V/M9□V/M9□WV and D-M9□A(V)L cannot be mounted.  
 \* Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.  
 \*\* D-A3□A/A44A/G39A/K39A/B54/B64 cannot be mounted on bore sizes ø20 and ø25 cylinder with air cushion.

\* Since there are other applicable auto switches than listed above, refer to page 218 for details.

\* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.

\* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

# Air Cylinder: Standard Type Double Acting, Double Rod *Series CM2W*



## Specifications

| Bore size (mm)                       |  | 20  | 25               | 32               | 40               |
|--------------------------------------|--|---|------------------|------------------|------------------|
| <b>Action</b>                        |  | Double acting, Double rod   |                  |                  |                  |
| <b>Fluid</b>                         |  | Air   |                  |                  |                  |
| <b>Proof pressure</b>                |  | 1.5 MPa   |                  |                  |                  |
| <b>Maximum operating pressure</b>    |  | 1.0 MPa   |                  |                  |                  |
| <b>Minimum operating pressure</b>    |  | 0.08 MPa  |                  |                  |                  |
| <b>Ambient and fluid temperature</b> |  | Without auto switch: -10 to 70°C (No freezing)<br>With auto switch: -10 to 60°C (No freezing) |                  |                  |                  |
| <b>Lubrication</b>                   |  | Not required (Non-lube)   |                  |                  |                  |
| <b>Stroke length tolerance</b>       |  | $^{+1.4}_0$ mm  |                  |                  |                  |
| <b>Piston speed</b>                  |  | Rubber bumper: 50 to 750 mm/s, Air cushion: 50 to 1000 mm/s                                   |                  |                  |                  |
| <b>Cushion</b>                       |  | Rubber bumper, Air cushion  |                  |                  |                  |
| <b>Allowable kinetic energy</b>      | <b>Rubber bumper</b>                                   | 0.27 J  | 0.4 J            | 0.65 J           | 1.2 J            |
|                                      | <b>Air cushion<br/>(Effective cushion length (mm))</b> | 0.54 J<br>(11.0)  | 0.78 J<br>(11.0) | 1.27 J<br>(11.0) | 2.35 J<br>(11.8) |

CJ1

CJP

CJ2

CM2

CG1

MB

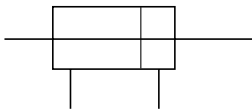
MB1

CA2

CS1

CS2

JIS Symbol  
Double acting



## Standard Stroke

| Bore size (mm) | Standard stroke <sup>(1)</sup> (mm)        | Maximum stroke (mm) |
|----------------|--|---------------------|
| 20             | 25, 50, 75, 100, 125, 150<br>200, 250, 300 | 500                 |
| 25             |  |                     |
| 32             |  |                     |
| 40             |  |                     |



Note 1) Other intermediate strokes can be manufactured upon receipt of order.  
Manufacture of intermediate strokes at 1 mm intervals is possible.  
(Spacers are not used.)

Note 2) When exceeding 300 strokes, the allowable maximum stroke length is determined by the stroke selection table (front matter 28).



**Made to Order Specifications**  
(For details, refer to pages 1373 to 1498.)

| Symbol | Specifications                                     |
|--------|--|
| —XA□   | Change of rod end shape                            |
| —XB6   | Heat resistant cylinder (150°C)                    |
| —XB7   | Cold resistant cylinder                            |
| —XB12  | External stainless steel cylinder                  |
| —XC3   | Special port location                              |
| —XC4   | With heavy duty scraper                            |
| —XC5   | Heat resistant cylinder (110°C)                    |
| —XC6   | Piston rod and rod end nut made of stainless steel |
| —XC13  | Auto switch mounting rail style                    |
| —XC22  | Fluororubber seals                                 |
| —XC25  | No fixed orifice of connecting port                |
| —XC29  | Double knuckle joint with spring pin               |
| —XC35  | With coil scraper                                  |
| —XC38  | Vacuum (Rod through-hole)                          |
| —XC52  | Mounting nut with set screw                        |

## Accessory Bracket

For mounting brackets, refer to pages 144 and 145.

## Rod Boot Material

| Symbol   |            | Rod boot material        | Maximum ambient temperature |
|----------|------------|--------------------------|-----------------------------|
| One side | Both sides |                          |                             |
| J        | JJ         | Nylon tarpaulin          | 70°C                        |
| K        | KK         | Heat resistant tarpaulin | 110°C *                     |

\* Maximum ambient temperature for the rod boot itself.

## Mounting Bracket/Part No.

| Mounting bracket     | Min. order | Bore size (mm) |          |          |    | Description (for min. order) |
|----------------------|------------|----------------|----------|----------|----|------------------------------|
|                      |            | 20             | 25       | 32       | 40 |                              |
| Axial foot           | 2          | CM-L020B       | CM-L032B | CM-L040B |    | 2 foot, 1 mounting nut       |
| Flange               | 1          | CM-F020B       | CM-F032B | CM-F040B |    | 1 flange                     |
| Trunnion (with nuts) | 1          | CM-T020B       | CM-T032B | CM-T040B |    | 1 trunnion, 1 trunnion nut   |

\* Order 2 foot brackets for each cylinder unit.

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

D-□

-X□

Individual  
-X□Technical  
data

# Series CM2W

## Mounting Style and Accessory

| Mounting \ Accessory | Standard equipment   |             | Option               |                                     |                  |
|----------------------|----------------------|-------------|----------------------|-------------------------------------|------------------|
|                      | Mounting nut         | Rod end nut | Single knuckle joint | Double knuckle joint <sup>(2)</sup> | Rod boot         |
| Basic style          | ● (1 pc.)            | ● (2 pcs.)  | ●                    | ●                                   | ●                |
| Axial foot style     | ● (2)                | ● (2)       | ●                    | ●                                   | ●                |
| Flange style         | ● (1)                | ● (2)       | ●                    | ●                                   | ●                |
| Trunnion style       | ● (1) <sup>(1)</sup> | ● (2)       | ●                    | ●                                   | ●                |
| Note                 |                      |             |                      |                                     | One/Both side(s) |



Note 1) Trunnion nuts are attached for trunnion style.  
 Note 2) Pin and retaining ring (cotter pin for bore size ø40) are shipped together with double knuckle joint.

## Mass

| Bore size (mm)                           |                                 | 20   | 25   | 32   | 40   |
|--|---------------------------------|------|------|------|------|
| Basic mass                               | Basic style                     | 0.16 | 0.25 | 0.32 | 0.65 |
|  | Axial foot style                | 0.31 | 0.41 | 0.48 | 0.92 |
|  | Flange style                    | 0.22 | 0.34 | 0.41 | 0.77 |
|  | Trunnion style                  | 0.20 | 0.32 | 0.38 | 0.75 |
| Additional mass per each 50 mm of stroke |                                 | 0.06 | 0.09 | 0.13 | 0.19 |
| Option bracket                           | Single knuckle joint            | 0.06 | 0.06 | 0.06 | 0.23 |
|  | Double knuckle joint (With pin) | 0.07 | 0.07 | 0.07 | 0.20 |

Calculation: (Example) **CM2WL32-100**

- Basic mass.....0.48 (Foot style, ø32)
- Additional mass.....0.13/50 st
- Cylinder stroke..... 100 st  
 $0.48 + 0.13 \times 100/50 = 0.74 \text{ kg}$



## Precautions

**Be sure to read before handling.**  
**Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.**

## Operating Precautions

### Warning

- Do not rotate the cover.**  
 If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.
- Do not operate with the cushion needle in a fully closed condition.**  
 Using it in the fully closed state will cause the cushion seal to be damaged. When adjusting the cushion needle, use the "Hexagon wrench key: nominal size 1.5".
- Do not open the cushion needle wide excessively.**  
 If the cushion needle were set to be completely wide (more than 3 turns from fully closed), it would be equivalent to the cylinder with no cushion, thus making the impacts extremely high. Do not use it in such a way. Besides, using with fully open could give damage to the piston or cover.

### Caution

- Not able to disassemble.**  
 Cover and cylinder tube are connected to each other by caulking method, thus making it impossible to disassemble. Therefore, internal parts of a cylinder other than rod seal are not replaceable.
- Use caution to the popping of a retaining ring.**  
 When replacing rod seals and removing and mounting a retaining ring, use a proper tool (retaining ring plier: tool for installing a type C retaining ring). Even if a proper tool is used, it is likely to inflict damage to a human body or peripheral equipment, as a retaining ring may be flown out of the tip of a plier. Be much careful with the popping of a retaining ring. Besides, be certain that a retaining ring is placed firmly into the groove of rod cover before supplying air at the time of installment.
- Do not touch the cylinder during operation.**  
 Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.
- Do not use an air cylinder as an air-hydro cylinder.**  
 If it uses turbine oil in place of fluids for cylinder, it may result in oil leakage.
- Combine the rod end section, so that a rod boot might not be twisted.**  
 If a rod boot is installed with being twisted when installing a cylinder, it will cause a rod boot to fail during operation.



## Air-hydro

CM2WH Mounting style Bore size Stroke Rod boot

↓  
Air-hydro

A low hydraulic pressure cylinder used at a pressures of 1.0 MPa or below.

Through the concurrent use of a CC series air-hydro unit, it is possible to operate at a constant or low speeds or to effect an intermediate stop, just like a hydraulic unit, while using pneumatic equipment such as a valve.



### Specifications

|                               |   |
|-------------------------------|---|
| Type                          | Air-hydro type  |
| Fluid                         | Turbine oil   |
| Action                        | Double acting, Double rod                                   |
| Bore size (mm)                | ø20, ø25, ø32, ø40  |
| Proof pressure                | 1.5 MPa   |
| Max. operating pressure       | 1.0 MPa   |
| Min. operating pressure       | 0.18 MPa  |
| Piston speed                  | 15 to 300 mm/s  |
| Ambient and fluid temperature | +5 to +60°C   |
| Thread tolerance              | +1.4  |
| Stroke length tolerance       | 0 mm  |
| Cushion                       | Rubber bumper (Standard equipment)                          |
| Mounting                      | Basic style, Axial foot style, Flange style, Trunnion style |

\* Auto switch can be mounted.

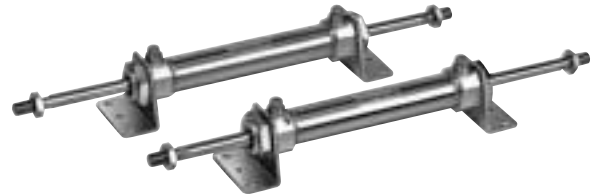
- For construction, refer to page 151.
- Since the dimensions of mounting style is the same as pages 153 to 155, refer to those pages.

## Built-in One-touch Fittings

CM2W Mounting style Bore size F Stroke

↓  
Built-in One-touch fittings

This type has the One-touch fitting integrated in a cylinder, which enables to reduce the piping labor and installing space dramatically.



### Specifications

|                         |   |
|-------------------------|---|
| Action                  | Double acting, Double rod                                   |
| Bore size (mm)          | ø20, ø25, ø32, ø40  |
| Max. operating pressure | 1.0 MPa   |
| Min. operating pressure | 0.08 MPa  |
| Cushion                 | Rubber bumper   |
| Piping                  | One-touch fitting   |
| Piston speed            | 50 to 750 mm/s  |
| Mounting                | Basic style, Axial foot style, Flange style, Trunnion style |

\* Auto switch can be mounted.

### Applicable Tubing O.D./I.D.

| Bore size (mm)                   | 20   | 25  | 32  | 40  |
|----------------------------------|--|-----|-----|-----|
| Applicable tubing O.D./I.D. (mm) | 6/4  | 6/4 | 6/4 | 8/6 |
| Applicable tubing material       | Can be used for either nylon, soft nylon or polyurethane tube. |     |     |     |

### ⚠ Caution

- One-touch fitting cannot be replaced.
  - One-touch fitting is press-fit into the cover, thus cannot be replaced.
- Refer to Fittings and Tubing Precautions (Best Pneumatics No. 6) for handling one-touch fittings.

- For construction, refer to page 151.
- For dimensions of each mounting style, refer to pages 153 to 155.
- For other specifications, refer to page 147.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual  
-X□

Technical  
data

# Series CM2W

## Clean Series

10-CM2W **Mounting style** **Bore size** — **Stroke**

### Clean Series (With relief port)

The type which is applicable for using inside the clean room graded Class 100 by making an actuator's rod section a double seal construction and discharging by relief port directly to the outside of clean room.

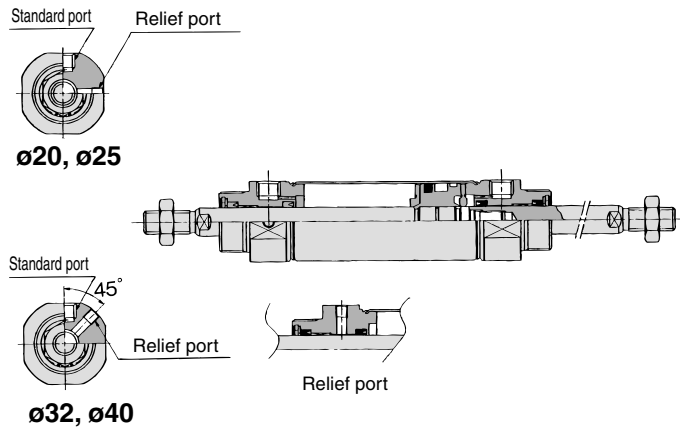


### Specifications

|                                |   |  |
|--------------------------------|---|--|
| <b>Action</b>                  | Double acting, Double rod                   |  |
| <b>Bore size (mm)</b>          | ø20, ø25, ø32, ø40                          |  |
| <b>Max. operating pressure</b> | 1.0 MPa                                     |  |
| <b>Min. operating pressure</b> | 0.08 MPa                                    |  |
| <b>Cushion</b>                 | Rubber bumper                               |  |
| <b>Relief port size</b>        | M5 x 0.8                                    |  |
| <b>Piston speed</b>            | 30 to 400 mm/s                              |  |
| <b>Mounting</b>                | Basic style, Axial foot style, Flange style |  |

\* Auto switch can be mounted.

## Construction



For details, refer to the separate catalog, "Pneumatic Clean Series".

## Copper/Fluorine-free

20-CM2W **Mounting style** **Bore size** — **Stroke**

### Copper/fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.

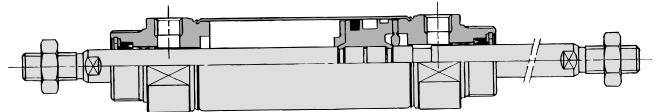


### Specifications

|                                |   |                 |
|--------------------------------|---|-----------------|
| <b>Action</b>                  | Double acting, Double rod                                   |                 |
| <b>Bore size (mm)</b>          | ø20, ø25, ø32, ø40  |                 |
| <b>Max. operating pressure</b> | 1.0 MPa   |                 |
| <b>Min. operating pressure</b> | 0.08 MPa  |                 |
| <b>Cushion</b>                 | Rubber bumper   | Air cushion     |
| <b>Piston speed</b>            | 50 to 750 mm/s  | 50 to 1000 mm/s |
| <b>Mounting</b>                | Basic style, Axial foot style, Flange style, Trunnion style |                 |

\* Auto switch can be mounted.

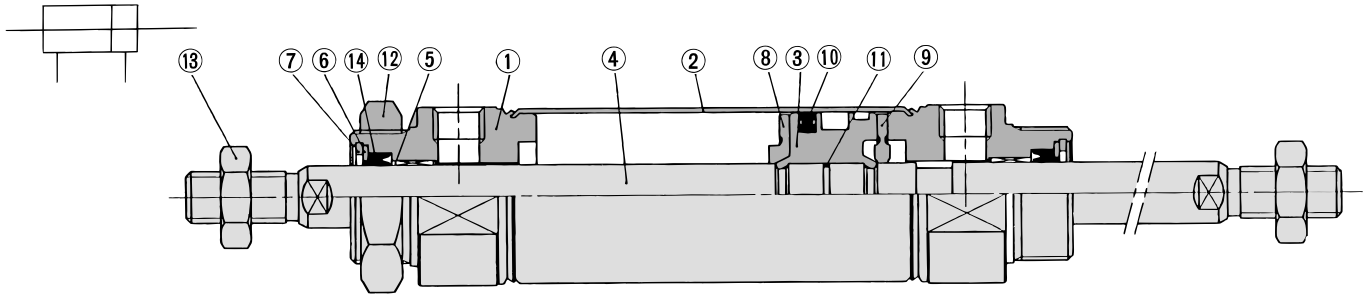
## Construction



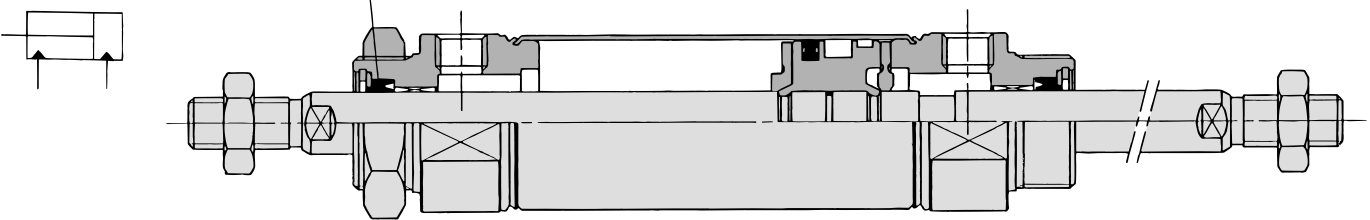
The above shows the case of rubber bumper.

## Construction

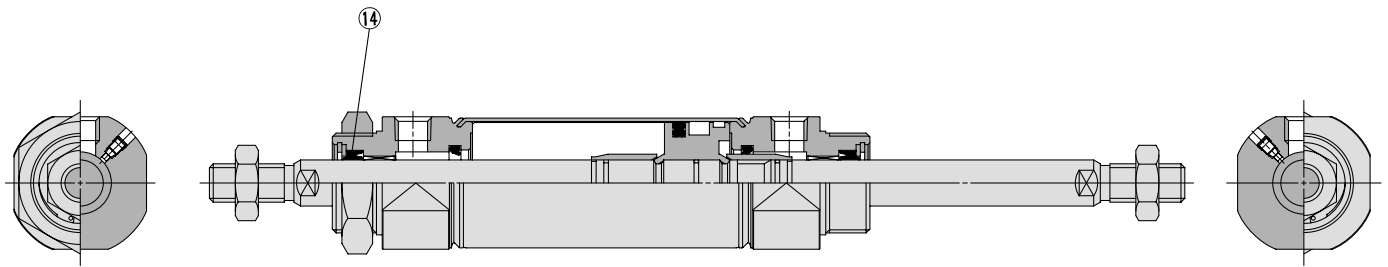
### Rubber bumper



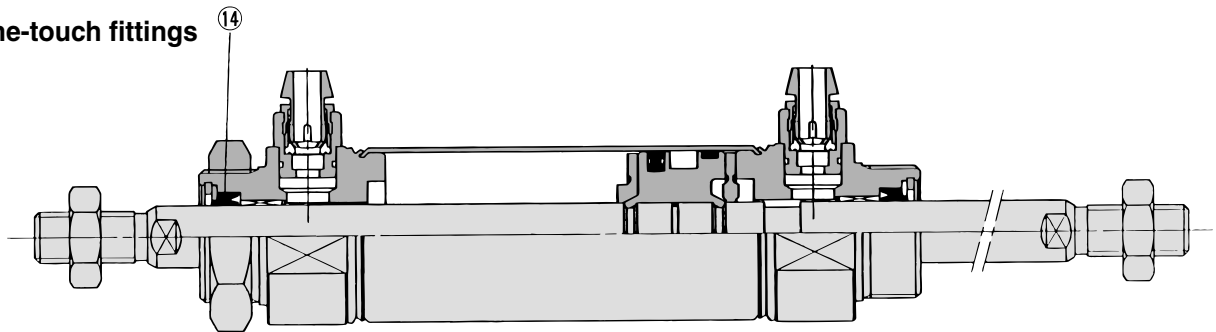
### Air-hydro



### With air cushion



### Built-in One-touch fittings



## Component Parts

| No. | Description    | Material                              | Note               |
|-----|----------------|---------------------------------------|--------------------|
| 1   | Rod cover      | Aluminum alloy                        | Clear anodized     |
| 2   | Cylinder tube  | Stainless steel                       |                    |
| 3   | Piston         | Aluminum alloy                        | Chromated          |
| 4   | Piston rod     | Carbon steel                          | Hard chrome plated |
| 5   | Bushing        | Copper oil-impregnated sintered alloy |                    |
| 6   | Seal retainer  | Stainless steel                       |                    |
| 7   | Retaining ring | Carbon steel                          | Phosphate coated   |
| 8   | Bumper A       | Urethane                              |                    |
| 9   | Bumper B       | Urethane                              |                    |
| 10  | Piston seal    | NBR                                   |                    |
| 11  | Piston gasket  | NBR                                   |                    |
| 12  | Mounting nut   | Carbon steel                          | Nickel plated      |
| 13  | Rod end nut    | Carbon steel                          | Nickel plated      |

## Replacement Part: Seal

### ●With rubber bumper/Air Cushion/Built-in One-touch Fittings

| No. | Description | Material | Part no. |         |          |          |
|-----|-------------|----------|----------|---------|----------|----------|
|     |             |          | 20       | 25      | 32       | 40       |
| 14  | Rod seal    | NBR      | PDU-8Z   | PDU-10Z | PDU-12LZ | PDU-14LZ |

### ●Air-hydro

| No. | Description | Material | Part no. |        |         |        |
|-----|-------------|----------|----------|--------|---------|--------|
|     |             |          | 20       | 25     | 32      | 40     |
| 14  | Rod seal    | NBR      | HDU-8    | HDU-10 | HDU-12L | HDU-14 |

\* Since the seal kit does not include a grease pack, order it separately.  
Grease pack part no.: GR-S-010 (10 g)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

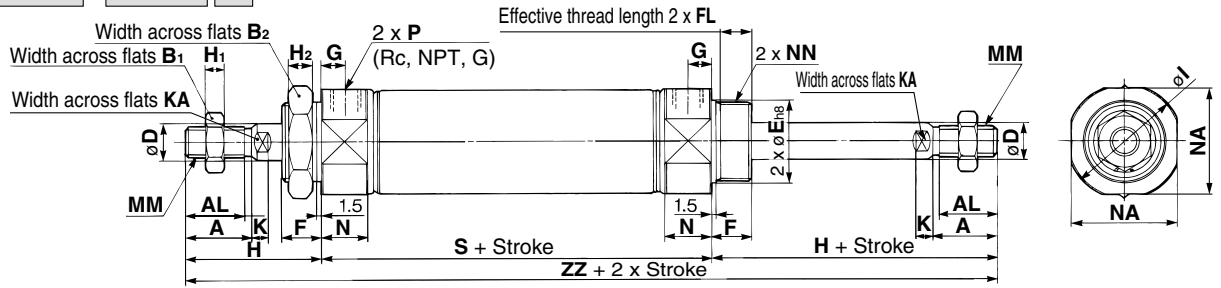
Individual  
-X□

Technical  
data

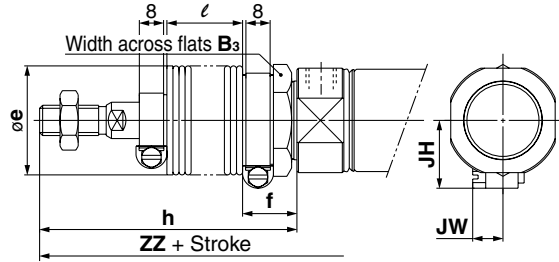
# Series CM2W

## Basic Style (B)

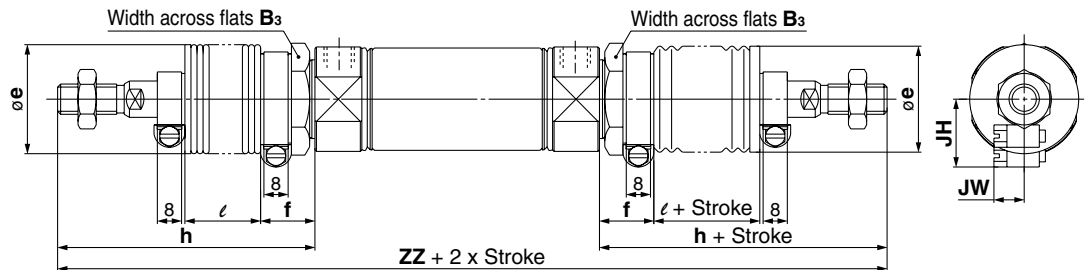
CM2WB Bore size  Stroke



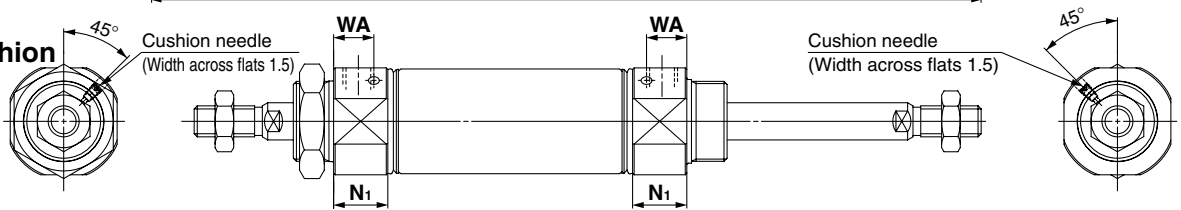
### With rod boot (One side)



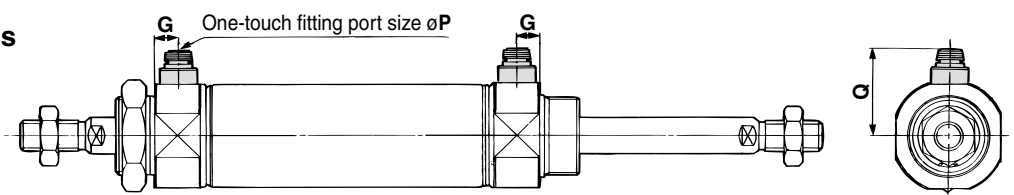
### With rod boot (Both sides)



### With air cushion



### Built-in One-touch fittings



| Bore size (mm) | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   | S  | ZZ  |
|----------------|----|------|----------------|----------------|----|-----------------------------------|----|------|----|----|----------------|----------------|------|-----|----|------------|------|------|-----------|-----|----|-----|
| 20             | 18 | 15.5 | 13             | 26             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 144 |
| 25             | 22 | 19.5 | 17             | 32             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 152 |
| 32             | 22 | 19.5 | 17             | 32             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 154 |
| 40             | 24 | 21   | 22             | 41             | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 188 |

### With Rod Boot

| Bore size (mm) | B <sub>3</sub> | e  | f  | h       |           |            |            |            | l       |           |            |            |            | ZZ (Both sides) |           |            |            |            |
|----------------|----------------|----|----|---------|-----------|------------|------------|------------|---------|-----------|------------|------------|------------|-----------------|-----------|------------|------------|------------|
|                |                |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 1 to 50         | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 |
| 20             | 30             | 36 | 18 | 68      | 81        | 93         | 106        | 131        | 12.5    | 25        | 37.5       | 50         | 75         | 198             | 224       | 248        | 274        | 324        |
| 25             | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 12.5    | 25        | 37.5       | 50         | 75         | 206             | 232       | 256        | 282        | 332        |
| 32             | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 12.5    | 25        | 37.5       | 50         | 75         | 208             | 234       | 258        | 284        | 334        |
| 40             | 41             | 46 | 20 | 77      | 90        | 102        | 115        | 140        | 12.5    | 25        | 37.5       | 50         | 75         | 242             | 268       | 292        | 318        | 368        |

### With Rod Boot

| Bore size (mm) | ZZ (One side) |           |            |            |            | JH   | JW   |
|----------------|---------------|-----------|------------|------------|------------|------|------|
|                | 1 to 50       | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 |      |      |
| 20             | 171           | 184       | 196        | 209        | 234        | 23.5 | 10.5 |
| 25             | 179           | 192       | 204        | 217        | 242        | 23.5 | 10.5 |
| 32             | 181           | 194       | 206        | 219        | 244        | 23.5 | 10.5 |
| 40             | 215           | 228       | 240        | 253        | 278        | 27   | 10.5 |

### With Air Cushion

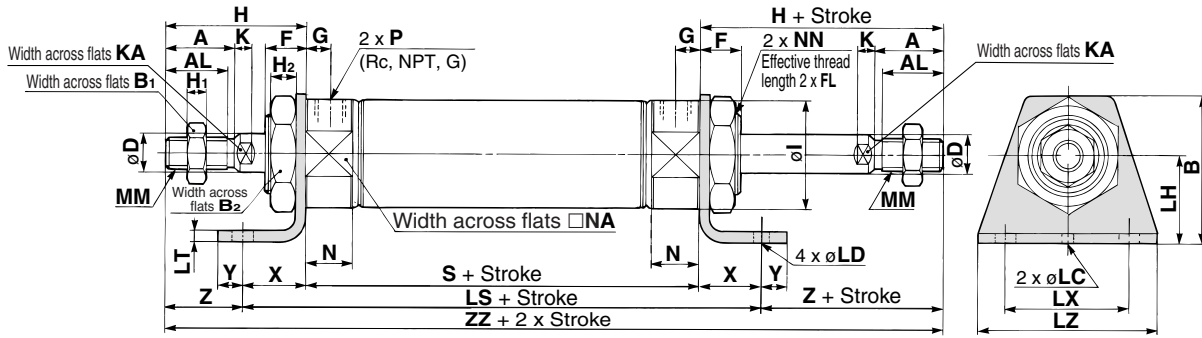
| Bore size (mm) | N <sub>1</sub> | WA |
|----------------|----------------|----|
| 20             | 17.5           | 13 |
| 25             | 17.5           | 13 |
| 32             | 17.5           | 13 |
| 40             | 21.5           | 16 |

### Built-in One-touch Fittings

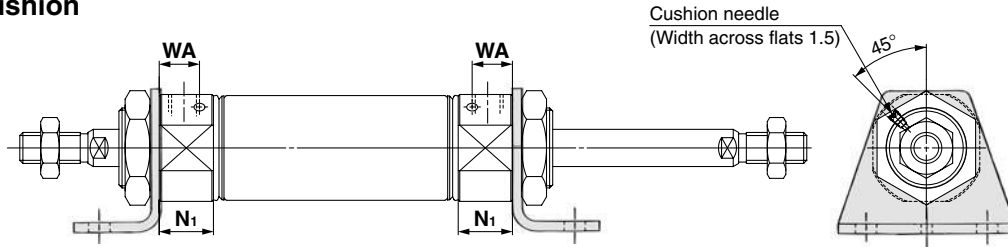
| Bore size (mm) | G  | P | Q    |
|----------------|----|---|------|
| 20             | 8  | 6 | 21.5 |
| 25             | 8  | 6 | 24.5 |
| 32             | 8  | 6 | 27   |
| 40             | 11 | 8 | 32.5 |

**Axial Foot Style (L)**

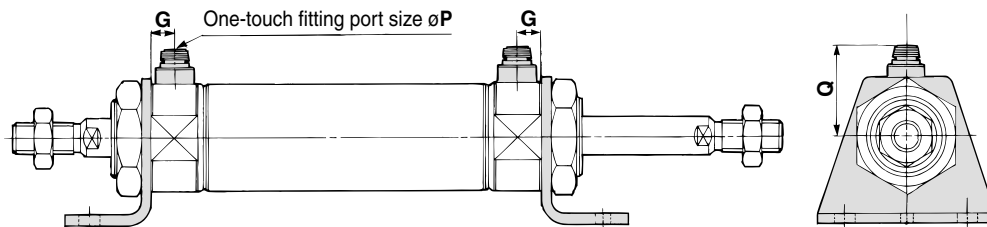
CM2WL



**With air cushion**



**Built-in One-touch fittings**



| Bore size (mm) | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | D  | F  | FL   | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | LC | LD  | LH | LS  | LT  | LX | LZ | MM         | N    | NA   | NN        | P   | S  | X  | Y  | Z  | ZZ  |
|----------------|----|------|----|----------------|----------------|----|----|------|----|----|----------------|----------------|------|-----|----|----|-----|----|-----|-----|----|----|------------|------|------|-----------|-----|----|----|----|----|-----|
| 20             | 18 | 15.5 | 40 | 13             | 26             | 8  | 13 | 10.5 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | 4  | 6.8 | 25 | 102 | 3.2 | 40 | 55 | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 20 | 8  | 21 | 144 |
| 25             | 22 | 19.5 | 47 | 17             | 32             | 10 | 13 | 10.5 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | 4  | 6.8 | 28 | 102 | 3.2 | 40 | 55 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 20 | 8  | 25 | 152 |
| 32             | 22 | 19.5 | 47 | 17             | 32             | 12 | 13 | 10.5 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | 4  | 6.8 | 28 | 104 | 3.2 | 40 | 55 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 20 | 8  | 25 | 154 |
| 40             | 24 | 21   | 54 | 22             | 41             | 14 | 16 | 13.5 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | 4  | 7   | 30 | 134 | 3.2 | 55 | 75 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 23 | 10 | 27 | 188 |

| <b>With Air Cushion</b> (mm) |                |
|------------------------------|----------------|
| Bore size (mm)               | N <sub>1</sub> |
| 20                           | 17.5           |
| 25                           | 17.5           |
| 32                           | 17.5           |
| 40                           | 21.5           |

| <b>Built-in One-touch Fittings</b> (mm) |    |   |
|---|----|---|
| Bore size (mm)                          | G  | P |
| 20                                      | 8  | 6 |
| 25                                      | 8  | 6 |
| 32                                      | 8  | 6 |
| 40                                      | 11 | 8 |

\* In the case of with rod boot, refer to basic style on page 152 and f dimension on page 136.

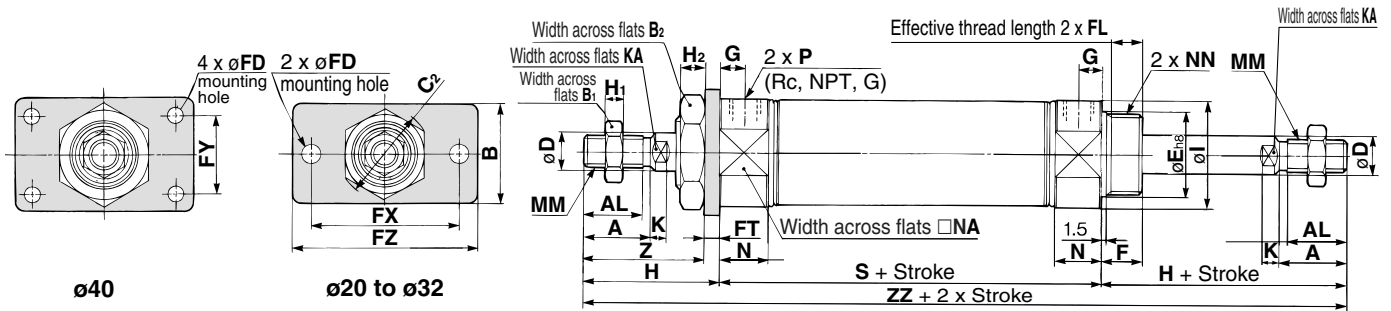
- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Individual
- X□
- Technical data

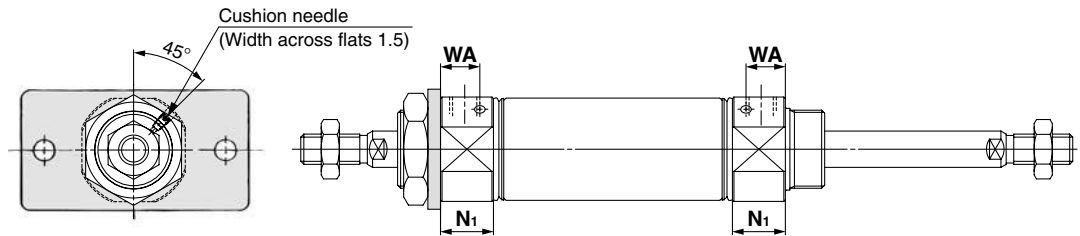
# Series CM2W

## Flange Style (F)

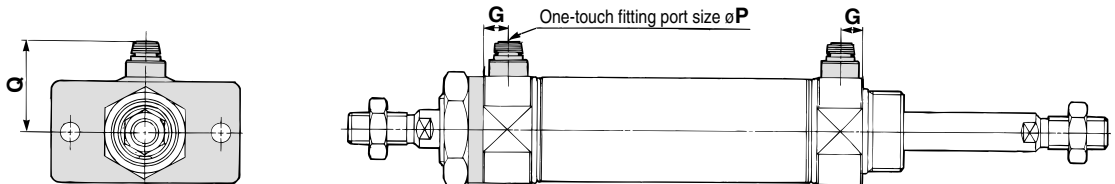
CM2WF



### With air cushion



### Built-in One-touch fittings



| Bore size (mm) | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | C <sub>2</sub> | D  | E                                 | F  | FD | FL   | FT | FX | FY | FZ | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | MM         |
|----------------|----|------|----|----------------|----------------|----------------|----|-----------------------------------|----|----|------|----|----|----|----|----|----|----------------|----------------|------|-----|----|------------|
| 20             | 18 | 15.5 | 34 | 13             | 26             | 30             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 10.5 | 4  | 60 | —  | 75 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | M8 x 1.25  |
| 25             | 22 | 19.5 | 40 | 17             | 32             | 37             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 10.5 | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | M10 x 1.25 |
| 32             | 22 | 19.5 | 40 | 17             | 32             | 37             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 10.5 | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | M10 x 1.25 |
| 40             | 24 | 21   | 52 | 22             | 41             | 47.3           | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 7  | 13.5 | 5  | 66 | 36 | 82 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | M14 x 1.5  |

| Bore size (mm) | N    | NA   | NN        | P   | S  | Z  | ZZ  |
|----------------|------|------|-----------|-----|----|----|-----|
| 20             | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 37 | 144 |
| 25             | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 41 | 152 |
| 32             | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 41 | 154 |
| 40             | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 45 | 188 |

| With Air Cushion (mm) |                   |
|-----------------------|-------------------|
| Bore size (mm)        | N <sub>1</sub> WA |
| 20                    | 17.5 13           |
| 25                    | 17.5 13           |
| 32                    | 17.5 13           |
| 40                    | 21.5 16           |

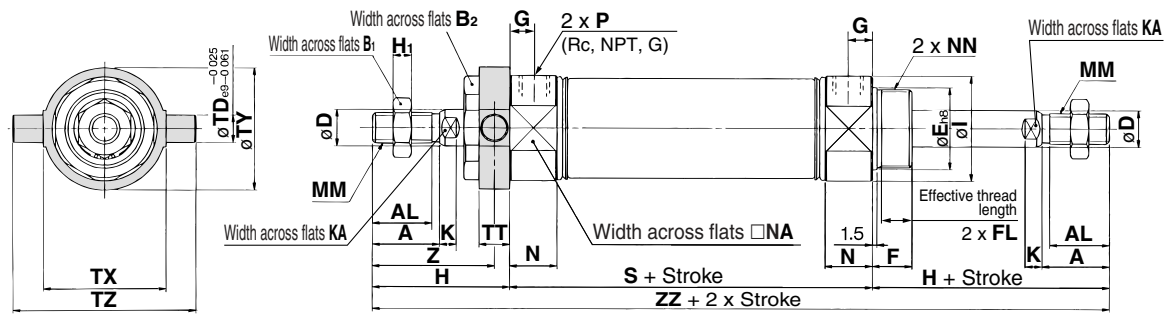
| Built-in One-touch Fittings (mm) |    |        |
|----------------------------------|----|--------|
| Bore size (mm)                   | G  | P Q    |
| 20                               | 8  | 6 21.5 |
| 25                               | 8  | 6 24.5 |
| 32                               | 8  | 6 27   |
| 40                               | 11 | 8 32.5 |



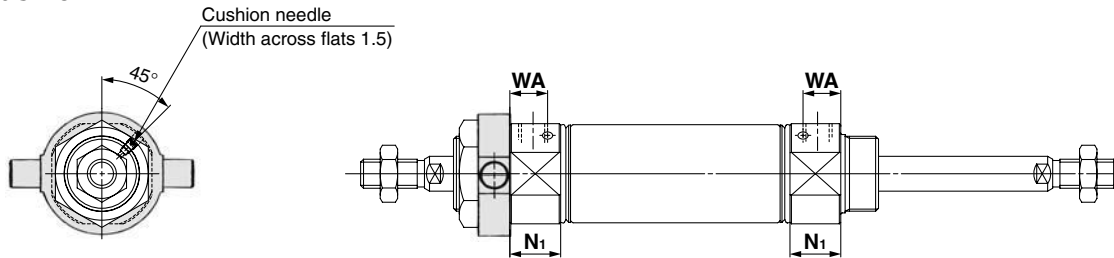
\* In the case of with rod boot, refer to basic style on page 152 and f dimension on page 137.

Trunnion Style (U)

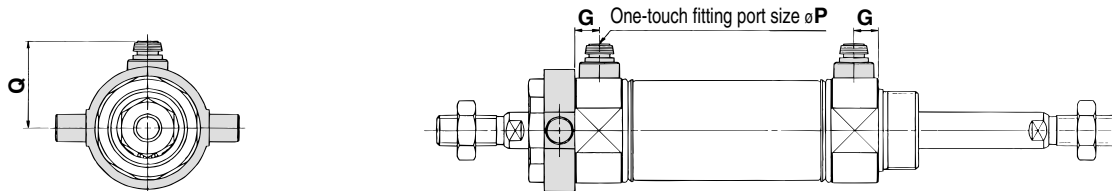
CM2WU Bore size — Stroke



With air cushion



Built-in One-touch fittings



| Bore size (mm) | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   | S  |
|----------------|----|------|----------------|----------------|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|------------|------|------|-----------|-----|----|
| 20             | 18 | 15.5 | 13             | 26             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 |
| 25             | 22 | 19.5 | 17             | 32             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 |
| 32             | 22 | 19.5 | 17             | 32             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 |
| 40             | 24 | 21   | 22             | 41             | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 |

| (mm)           |    |    |    |    |    |      |     |
|----------------|----|----|----|----|----|------|-----|
| Bore size (mm) | TD | TT | TX | TY | TZ | Z    | ZZ  |
| 20             | 8  | 10 | 32 | 32 | 52 | 36   | 144 |
| 25             | 9  | 10 | 40 | 40 | 60 | 40   | 152 |
| 32             | 9  | 10 | 40 | 40 | 60 | 40   | 154 |
| 40             | 10 | 11 | 53 | 53 | 77 | 44.5 | 188 |

| With Air Cushion (mm) |                |    |
|-----------------------|----------------|----|
| Bore size (mm)        | N <sub>1</sub> | WA |
| 20                    | 17.5           | 13 |
| 25                    | 17.5           | 13 |
| 32                    | 17.5           | 13 |
| 40                    | 21.5           | 16 |

| Built-in One-touch Fittings (mm) |    |   |      |
|----------------------------------|----|---|------|
| Bore size (mm)                   | G  | P | Q    |
| 20                               | 8  | 6 | 21.5 |
| 25                               | 8  | 6 | 24.5 |
| 32                               | 8  | 6 | 27   |
| 40                               | 11 | 8 | 32.5 |



\* In the case of with rod boot, refer to basic style on page 152 and f dimension on page 141.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual  
-X□

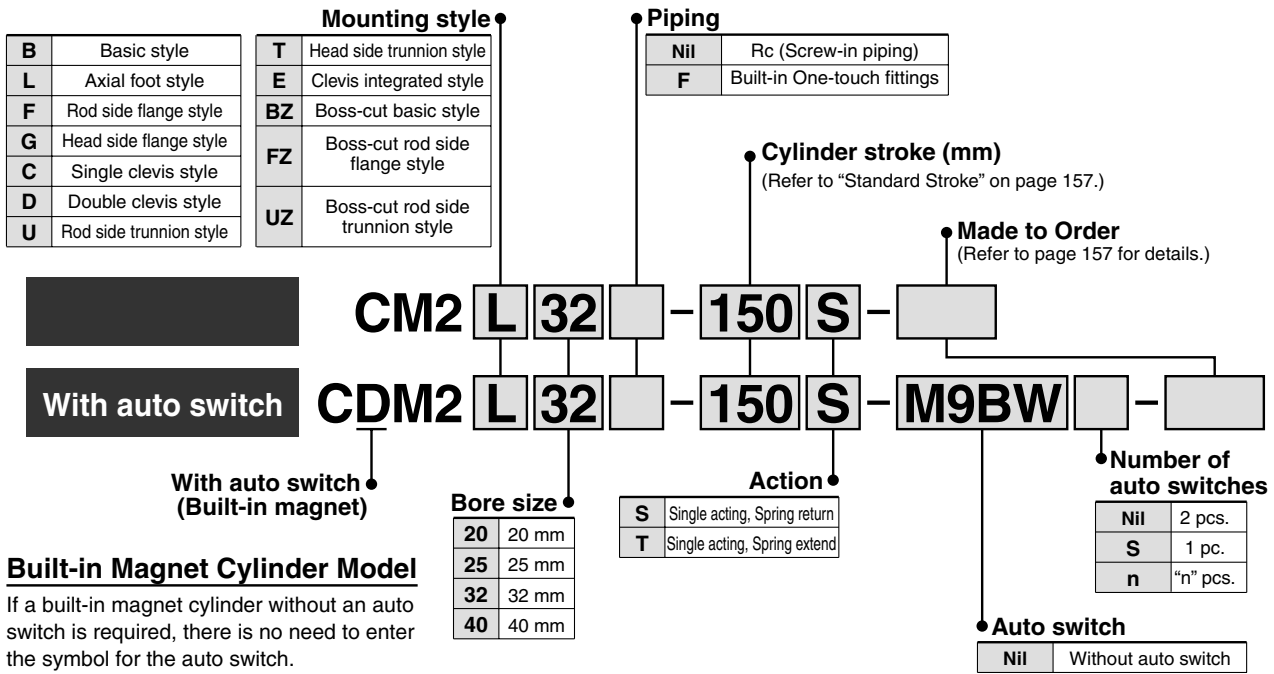
Technical  
data

# Air Cylinder: Standard Type Single Acting, Spring Return/Extend

## Series CM2

ø20, ø25, ø32, ø40

### How to Order



### Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.  
(Example) CDM2F40-100T

### Auto switch

|     |                     |
|-----|---------------------|
| Nil | Without auto switch |
|-----|---------------------|

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

### Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

| Type               | Special function                           | Electrical entry | Indicator light | Wiring (Output)                             | Load voltage |             | Auto switch model | Lead wire length (m) |       |       |       |            | Pre-wired connector | Applicable load |            |            |
|--------------------|--|------------------|-----------------|---|--------------|-------------|-------------------|----------------------|-------|-------|-------|------------|---------------------|-----------------|------------|------------|
|                    |  |                  |                 |   | DC           | AC          |                   | 0.5 (Nil)            | 1 (M) | 3 (L) | 5 (Z) | None (N)   |                     |                 |            |            |
| Solid state switch |  | Grommet          | Yes             | 3-wire (NPN)                                | 5V, 12V      |             | M9N               | ●                    | ●     | ●     | ○     | ○          | ○                   | IC circuit      | Relay, PLC |            |
|                    |  |                  |                 | 3-wire (PNP)                                |              |             | M9P               | ●                    | ●     | ●     | ○     | ○          |                     |                 |            |            |
|                    |  | Connector        |                 | 2-wire                                      | 12V          | M9B         | ●                 | ●                    | ●     | ○     | ○     | —          |                     |                 |            |            |
|                    |  |                  |                 | Terminal conduit                            | 3-wire (NPN) | 5V, 12V     | H7C               | ●                    | ●     | ●     | ●     | ●          | —                   |                 |            |            |
|                    | Diagnostic indication (2-color indication) | Grommet          | Yes             | 2-wire                                      | 24V          | 12V         | —                 | G39A                 | —     | —     | —     | —          | ●                   | —               |            | IC circuit |
|                    |  |                  |                 | 3-wire (NPN)                                |              |             |                   | K39A                 | —     | —     | —     | —          | ●                   | —               |            |            |
|                    |  |                  |                 | 3-wire (PNP)                                | M9NW         | ●           | ●                 | ●                    | ○     | ○     | ○     | IC circuit |                     |                 |            |            |
|                    |  |                  |                 | 2-wire                                      | M9PW         | ●           | ●                 | ●                    | ○     | ○     | ○     | —          |                     |                 |            |            |
|                    |  |                  |                 | Water resistant (2-color indication)        | M9BW         | ●           | ●                 | ●                    | ○     | ○     | ○     | —          |                     |                 |            |            |
|                    |  |                  |                 | With diagnostic output (2-color indication) | H7BA         | —           | —                 | ●                    | ○     | ○     | ○     | —          |                     |                 |            |            |
| Reed switch        |  | Grommet          | Yes             | 3-wire (NPN equivalent)                     | 24V          | 12V         | —                 | A96                  | ●     | —     | ●     | —          | —                   | —               | IC circuit |            |
|                    |  |                  |                 | Connector                                   |              |             |                   | 2-wire               | 100V  | A93   | ●     | —          | ●                   | —               | —          | —          |
|                    |  | 100V or less     |                 |   | A90          | ●           | —                 |                      | ●     | —     | —     | —          | IC circuit          |                 |            |            |
|                    |  | 100V, 200V       |                 |   | B54          | ●           | —                 |                      | ●     | ●     | —     | —          | —                   |                 |            |            |
|                    |  | 200V or less     |                 |   | B64          | ●           | —                 |                      | ●     | —     | —     | —          | —                   |                 |            |            |
|                    |  | Terminal conduit |                 | 2-wire                                      | 24V          | 24V or less | C73C              | ●                    | —     | ●     | ●     | ●          | —                   | —               | IC circuit |            |
|                    |  |                  |                 |   |              | —           | C80C              | ●                    | —     | ●     | ●     | ●          | —                   | —               |            |            |
|                    |  |                  |                 |   |              | —           | A33A              | —                    | —     | —     | —     | ●          | —                   | —               | PLC        |            |
|                    |  |                  |                 |   |              | 100V, 200V  | A34A              | —                    | —     | —     | —     | ●          | —                   | —               |            |            |
|                    |  | DIN terminal     |                 | Grommet                                     | Yes          | 2-wire      | 24V               | 12V                  | —     | —     | A44A  | —          | —                   | —               | —          | ●          |
| B59W               | ●  |                  | —               |   |              |             |                   |                      |       |       | ●     | —          | —                   | —               | —          | Relay, PLC |

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW  
 1 m ..... M (Example) M9NWM  
 3 m ..... L (Example) M9NWL  
 5 m ..... Z (Example) M9NWZ  
 None ..... N (Example) H7CN

\* Solid state auto switches marked with "○" are produced upon receipt of order.  
 \* D-A9□V/M9□V/M9□VV and D-M9□A(V)L cannot be mounted.  
 \* Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.

\* Since there are other applicable auto switches than listed above, refer to page 218 for details.  
 \* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.  
 \* D-A9□V/M9□V/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)



# Air Cylinder: Standard Type Single Acting, Spring Return/Extend **Series CM2**



## Specifications

| Bore size (mm)                       |                              | 20  | 25  | 32   | 40  |
|--------------------------------------|------------------------------|---|-----|------|-----|
| <b>Action</b>                        |                              | Single acting, Spring return/Single acting, Spring extend                                     |     |      |     |
| <b>Type</b>                          |                              | Pneumatic   |     |      |     |
| <b>Cushion</b>                       |                              | Rubber bumper   |     |      |     |
| <b>Fluid</b>                         |                              | Air   |     |      |     |
| <b>Proof pressure</b>                |                              | 1.5 MPa   |     |      |     |
| <b>Maximum operating pressure</b>    |                              | 1.0 MPa   |     |      |     |
| <b>Minimum operating pressure</b>    | Single acting, Spring return | 0.18 MPa  |     |      |     |
|                                      | Single acting, Spring extend | 0.23 MPa  |     |      |     |
| <b>Ambient and fluid temperature</b> |                              | Without auto switch: -10 to 70°C (No freezing)<br>With auto switch: -10 to 60°C (No freezing) |     |      |     |
| <b>Lubrication</b>                   |                              | Not required (Non-lube)   |     |      |     |
| <b>Stroke length tolerance</b>       |                              | $+1.4$<br>$0$ mm  |     |      |     |
| <b>Piston speed</b>                  |                              | 50 to 750 mm/s  |     |      |     |
| <b>Allowable kinetic energy (J)</b>  |                              | 0.27  | 0.4 | 0.65 | 1.2 |

## Standard Stroke

| Bore size (mm) | Standard stroke (mm) <sup>(1)</sup> |
|----------------|-------------------------------------|
| 20             | 25, 50, 75, 100, 125, 150           |
| 25             | 25, 50, 75, 100, 125, 150           |
| 32             | 25, 50, 75, 100, 125, 150, 200      |
| 40             | 25, 50, 75, 100, 125, 150, 200, 250 |

Note 1) Other intermediate strokes can be manufactured upon receipt of order.  
Manufacture of intermediate strokes at 1 mm intervals is possible.  
(Spacers are not used.)

Note 2) Please contact SMC for longer strokes.

## Mounting Bracket

For the mounting bracket part numbers other than basic style, refer to page 158.

## Theoretical Output

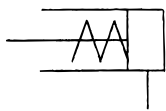
Refer to "Theoretical Output 1" on page 1573.

## Spring Reaction Force

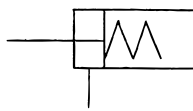
Refer to page 1570 (Table 3: Spring Reaction Force).

### JIS Symbol

Single acting,  
Spring return



Spring extend



**Made to Order Specifications**  
(For details, refer to pages 1373 to 1498.)

| Symbol | Specifications   |
|--------|--|
| -XA□   | Change of rod end shape  |
| -XB12  | External stainless steel cylinder                                |
| -XC3   | Special port location  |
| -XC6   | Piston rod and rod end nut made of stainless steel               |
| -XC13  | Auto switch mounting rail style                                  |
| -XC20  | Head cover axial port  |
| -XC25  | No fixed orifice of connecting port                              |
| -XC27  | Double clevis pin and double knuckle pin made of stainless steel |
| -XC29  | Double knuckle joint with spring pin                             |
| -XC52  | Mounting nut with set screw                                      |

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

## Boss-cut style

Boss for the head side cover bracket is eliminated and the total length of cylinder is shortened.



## Comparison of the Full Length Dimension (Versus standard type) (mm)

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

## Mounting style

- Boss-cut basic style (BZ)
- Boss-cut flange style (FZ)
- Boss-cut trunnion style (UZ)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual  
-X□

Technical  
data

# Series CM2

## Mounting Style and Accessory

| Mounting                           | Accessory            | Standard equipment |                  |                      | Option                              |                               |  |
|------------------------------------|----------------------|--------------------|------------------|----------------------|-------------------------------------|-------------------------------|--|
|                                    | Mounting nut         | Rod end nut        | Clevis pin       | Single knuckle joint | Double knuckle joint <sup>(3)</sup> | Clevis bracket <sup>(4)</sup> |  |
| Basic style                        | ● (1 pc.)            | ●                  | —                | ●                    | ●                                   | —                             |  |
| Axial foot style                   | ● (2)                | ●                  | —                | ●                    | ●                                   | —                             |  |
| Rod side flange style              | ● (1)                | ●                  | —                | ●                    | ●                                   | —                             |  |
| Head side flange style             | ● (1)                | ●                  | —                | ●                    | ●                                   | —                             |  |
| Clevis integrated style            | — <sup>(1)</sup>     | ●                  | —                | ●                    | ●                                   | ●                             |  |
| Single clevis style                | — <sup>(1)</sup>     | ●                  | —                | ●                    | ●                                   | —                             |  |
| Double clevis style <sup>(3)</sup> | — <sup>(1)</sup>     | ●                  | ● <sup>(5)</sup> | ●                    | ●                                   | —                             |  |
| Rod side trunnion style            | ● (1) <sup>(2)</sup> | ●                  | —                | ●                    | ●                                   | —                             |  |
| Head side trunnion style           | ● (1) <sup>(2)</sup> | ●                  | —                | ●                    | ●                                   | —                             |  |
| Boss-cut basic style               | ● (1)                | ●                  | —                | ●                    | ●                                   | —                             |  |
| Boss-cut flange style              | ● (1)                | ●                  | —                | ●                    | ●                                   | —                             |  |
| Boss-cut trunnion style            | ● (1)                | ●                  | —                | ●                    | ●                                   | —                             |  |



Note 1) Mounting nuts are not attached for clevis integrated style, single clevis, and double clevis styles.

Note 2) Trunnion nuts are attached for rod side trunnion and head side trunnion styles.

Note 3) Pin and retaining ring (cotter pin for bore size ø40) are shipped together with double clevis and double knuckle joint.

Note 4) Pin and retaining ring are shipped together with clevis pivot bracket.

Note 5) Clevis pins and retaining rings (cotter pins for ø40) are attached.

## Accessory Bracket

For mounting brackets, refer to pages 144 and 145

## Mounting Bracket/Part No.

| Mounting bracket                 | Min. order | Bore size (mm) |          |          |  | Description (for min. order) |
|----------------------------------|------------|----------------|----------|----------|--|------------------------------|
|                                  |            | 20             | 25       | 32       | 40   |                              |
| Axial foot *                     | 2          | CM-L020B       | CM-L032B | CM-L040B | 2 foot, 1 mounting nut   |                              |
| Flange                           | 1          | CM-F020B       | CM-F032B | CM-F040B | 1 flange   |                              |
| Single clevis                    | 1          | CM-C020B       | CM-C032B | CM-C040B | 1 single clevis, 3 liners                                      |                              |
| Double clevis ***<br>(with pins) | 1          | CM-D020B       | CM-D032B | CM-D040B | 1 double clevis, 3 liners,<br>1 clevis pins, 2 retaining rings |                              |
| Trunnion (with nuts)             | 1          | CM-T020B       | CM-T032B | CM-T040B | 1 trunnion, 1 trunnion nut                                     |                              |

\* Order 2 foot brackets for each cylinder unit.

\*\* 3 Liners are attached with a clevis bracket for adjusting the mounting angle.

\*\*\* Clevis pins and retaining rings (cotter pins for ø40) are attached.

## Mass

### Spring Return

| Bore size (mm)        |                                 | (kg)  |       |       |       |
|-----------------------|---------------------------------|-------|-------|-------|-------|
|                       |                                 | 20    | 25    | 32    | 40    |
| Basic mass            | 25 stroke                       | 0.20  | 0.30  | 0.42  | 0.77  |
|                       | 50 stroke                       | 0.22  | 0.33  | 0.46  | 0.84  |
|                       | 75 stroke                       | 0.27  | 0.42  | 0.58  | 1.03  |
|                       | 100 stroke                      | 0.29  | 0.45  | 0.63  | 1.09  |
|                       | 125 stroke                      | 0.35  | 0.54  | 0.76  | 1.29  |
|                       | 150 stroke                      | 0.37  | 0.57  | 0.80  | 1.36  |
|                       | 200 stroke                      | —     | —     | 0.97  | 1.61  |
|                       | 250 stroke                      | —     | —     | —     | 1.87  |
| Mounting bracket mass | Foot style                      | 0.15  | 0.16  | 0.16  | 0.27  |
|                       | Flange style                    | 0.06  | 0.09  | 0.09  | 0.12  |
|                       | Single clevis style             | 0.04  | 0.04  | 0.04  | 0.09  |
|                       | Double clevis style             | 0.05  | 0.06  | 0.06  | 0.13  |
|                       | Trunnion style                  | 0.04  | 0.07  | 0.07  | 0.10  |
|                       | Clevis integrated style         | -0.02 | -0.02 | -0.01 | -0.04 |
|                       | Boss-cut basic style            | -0.01 | -0.02 | -0.02 | -0.03 |
|                       | Boss-cut flange style           | 0.05  | 0.07  | 0.07  | 0.09  |
|                       | Boss-cut trunnion style         | 0.03  | 0.05  | 0.05  | 0.07  |
|                       | Pivot bracket (With pin)        | 0.07  | 0.07  | 0.14  | 0.14  |
| Option bracket        | Single knuckle joint            | 0.06  | 0.06  | 0.06  | 0.23  |
|                       | Double knuckle joint (With pin) | 0.07  | 0.07  | 0.07  | 0.20  |

Calculation: (Example) **CM2L32-100S** (Bore size ø32, Foot style, 100 stroke)  
0.63 (Basic mass) + 0.16 (Mounting bracket mass) = 0.79 kg

### Spring Extend

| Bore size (mm)        |                                 | (kg)  |       |       |       |
|-----------------------|---------------------------------|-------|-------|-------|-------|
|                       |                                 | 20    | 25    | 32    | 40    |
| Basic mass            | 25 stroke                       | 0.19  | 0.29  | 0.40  | 0.74  |
|                       | 50 stroke                       | 0.21  | 0.32  | 0.44  | 0.81  |
|                       | 75 stroke                       | 0.25  | 0.39  | 0.54  | 0.97  |
|                       | 100 stroke                      | 0.27  | 0.42  | 0.58  | 1.03  |
|                       | 125 stroke                      | 0.32  | 0.49  | 0.69  | 1.20  |
|                       | 150 stroke                      | 0.34  | 0.52  | 0.73  | 1.27  |
|                       | 200 stroke                      | —     | —     | 0.88  | 1.49  |
|                       | 250 stroke                      | —     | —     | —     | 1.72  |
| Mounting bracket mass | Foot style                      | 0.15  | 0.16  | 0.16  | 0.27  |
|                       | Flange style                    | 0.06  | 0.09  | 0.09  | 0.12  |
|                       | Single clevis style             | 0.04  | 0.04  | 0.04  | 0.09  |
|                       | Double clevis style             | 0.05  | 0.06  | 0.06  | 0.13  |
|                       | Trunnion style                  | 0.04  | 0.07  | 0.07  | 0.10  |
|                       | Clevis integrated style         | -0.02 | -0.02 | -0.01 | -0.04 |
|                       | Boss-cut basic style            | -0.01 | -0.02 | -0.02 | -0.03 |
|                       | Boss-cut flange style           | 0.05  | 0.07  | 0.07  | 0.09  |
|                       | Boss-cut trunnion style         | 0.03  | 0.05  | 0.05  | 0.07  |
|                       | Pivot bracket (With pin)        | 0.07  | 0.07  | 0.14  | 0.14  |
| Option bracket        | Single knuckle joint            | 0.06  | 0.06  | 0.06  | 0.23  |
|                       | Double knuckle joint (With pin) | 0.07  | 0.07  | 0.07  | 0.20  |

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

## Built-in One-touch Fitting

CM2 Mounting style Bore size **F** - Stroke Action

• Built-in One-touch fitting

This type has the One-touch fitting integrated in a cylinder, which enables to reduce the piping labor and installing space dramatically.



- For construction, refer to page 161.
- For dimensions of each mounting style, refer to pages 163 to 170.
- For other specifications, refer to page 157.

## Specifications

|                         |  |                              |
|-------------------------|--|------------------------------|
| Action                  | Single acting, Spring return   | Single acting, Spring extend |
| Bore size (mm)          | ø20, ø25, ø32, ø40   |                              |
| Max. operating pressure | 1.0 MPa  |                              |
| Min. operating pressure | 0.18 MPa   | 0.23 MPa                     |
| Cushion                 | Rubber bumper  |                              |
| Piping                  | Built-in One-touch fitting   |                              |
| Piston speed            | 50 to 750 mm/s   |                              |
| Mounting                | Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style, Clevis integrated style, Boss-cut style |                              |

\* Auto switch can be mounted.

## Applicable Tubing O.D./I.D.

| Bore size (mm)                   | 20   | 25  | 32  | 40  |
|----------------------------------|--|-----|-----|-----|
| Applicable tubing O.D./I.D. (mm) | 6/4  | 6/4 | 6/4 | 8/6 |
| Applicable tubing material       | Can be used for either nylon, soft nylon or polyurethane tubing. |     |     |     |

## ⚠ Caution

- One-touch fitting cannot be replaced.
  - One-touch fitting is press-fit into the cover, thus cannot be replaced.
- Refer to Fittings and Tubing Precautions (Best Pneumatics No. 6) for handling one-touch fittings.

D-□

-X□

Individual  
-X□Technical  
data

# Series CM2

## Copper/Fluorine-free

20-CM2 **Mounting style** **Bore size** **Stroke** **Action**

└ Copper/fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.



### Specifications

|                                |  |                              |
|--------------------------------|--|------------------------------|
| <b>Action</b>                  | Single acting, Spring return   | Single acting, Spring extend |
| <b>Bore size (mm)</b>          | ø20, ø25, ø32, ø40   |                              |
| <b>Max. operating pressure</b> | 1.0 MPa  |                              |
| <b>Min. operating pressure</b> | 0.18 MPa   | 0.23 MPa                     |
| <b>Cushion</b>                 | Rubber bumper  |                              |
| <b>Piston speed</b>            | 50 to 750 mm/s   |                              |
| <b>Mounting</b>                | Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style, Clevis integrated style, Boss-cut style |                              |

\* Auto switch can be mounted.

### Construction



\* The above shows the case of single acting, spring return type.

## ⚠ Precautions

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

### Operating Precautions

#### ⚠ Warning

##### 1. Do not rotate the cover.

If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.

#### ⚠ Caution

##### 1. Not able to disassemble.

Cover and cylinder tube are connected to each other by caulking method, thus making it impossible to disassemble. Therefore, internal parts of a cylinder other than rod seal are not replaceable.

##### 2. Use caution to the popping of a retaining ring.

When replacing rod seals and removing and mounting a retaining ring, use a proper tool (retaining ring plier: tool for installing a type C retaining ring). Even if a proper tool is used, it is likely to inflict damage to a human body or peripheral equipment, as a retaining ring may be flown out of the tip of a plier. Be much careful with the popping of a retaining ring. Besides, be certain that a retaining ring is placed firmly into the groove of rod cover before supplying air at the time of installment.

##### 3. Do not touch the cylinder during operation.

Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.

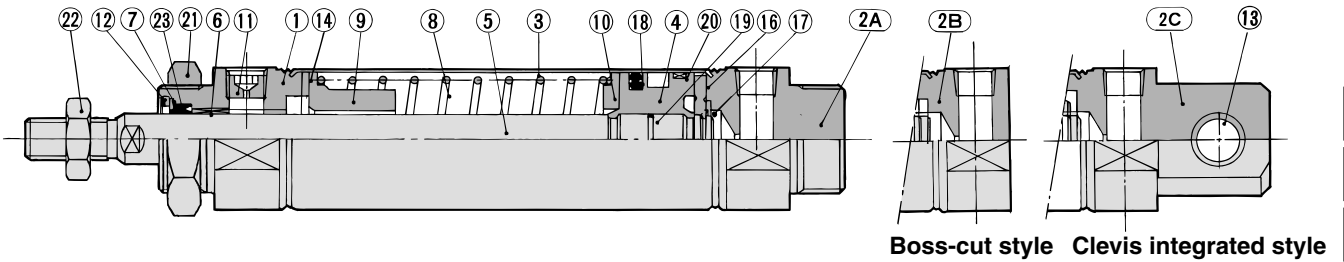
##### 4. One-touch fitting cannot be replaced.

One-touch fitting is press-fit into the cover, thus cannot be replaced.

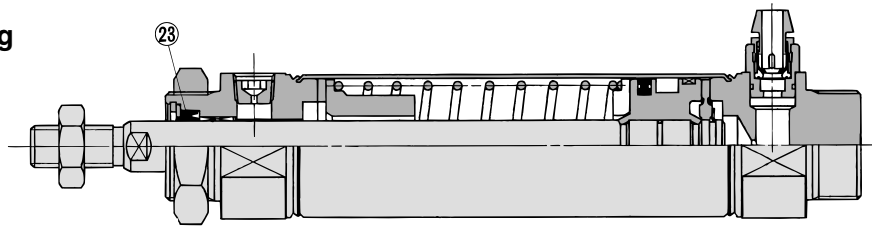
# Air Cylinder: Standard Type Single Acting, Spring Return/Extend **Series CM2**

## Construction

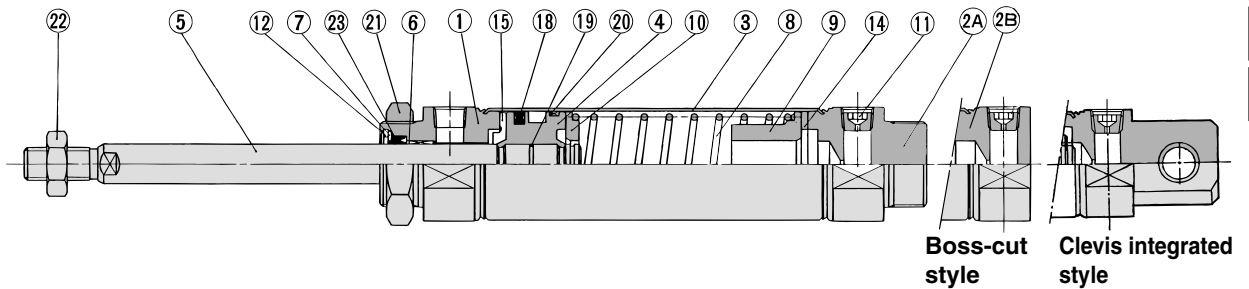
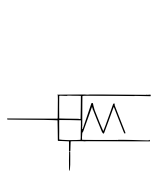
### Spring return



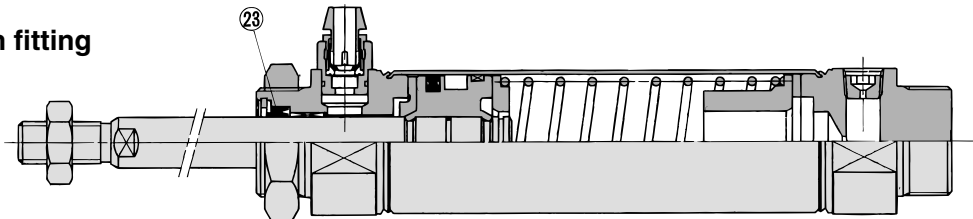
### Spring return, Built-in One-touch fitting



### Spring extend



### Spring extend, Built-in One-touch fitting



## Component Parts

| No. | Description             | Material                              | Note                        |
|-----|-------------------------|---------------------------------------|-----------------------------|
| 1   | Rod cover               | Aluminum alloy                        | Clear anodized              |
| 2A  | Head cover A            | Aluminum alloy                        | Clear anodized *            |
| 2B  | Head cover B            | Aluminum alloy                        | Clear anodized **           |
| 2C  | Head cover C            | Aluminum alloy                        | Clear anodized ***          |
| 3   | Cylinder tube           | Stainless steel                       |                             |
| 4   | Piston                  | Aluminum alloy                        | Chromated                   |
| 5   | Piston rod              | Carbon steel                          | Hard chromium electroplated |
| 6   | Bushing                 | Copper oil-impregnated sintered alloy |                             |
| 7   | Seal retainer           | Stainless steel                       |                             |
| 8   | Return spring           | Steel wire                            | Zinc chromated              |
| 9   | Spring guide            | Aluminum alloy                        | Chromated                   |
| 10  | Spring seat             | Aluminum alloy                        | Chromated                   |
| 11  | Plug with fixed orifice | Alloy steel                           | Black zinc chromated        |
| 12  | Retaining ring          | Carbon steel                          | Phosphate coated            |

\* Basic style, \*\* Boss-cut style, \*\*\* Clevis integrated style

| No. | Description    | Material                              | Note          |
|-----|----------------|---------------------------------------|---------------|
| 13  | Clevis bushing | Copper oil-impregnated sintered alloy |               |
| 14  | Bumper         | Urethane                              |               |
| 15  | Bumper A       | Urethane                              |               |
| 16  | Bumper B       | Urethane                              |               |
| 17  | Retaining ring | Stainless steel                       |               |
| 18  | Piston seal    | NBR                                   |               |
| 19  | Piston gasket  | NBR                                   |               |
| 20  | Wear ring      | Resin                                 |               |
| 21  | Mounting nut   | Carbon steel                          | Nickel plated |
| 22  | Rod end nut    | Carbon steel                          | Nickel plated |

### Replacement Part: Seal

#### ●With Rubber Bumper, Built-in One-touch Fitting

| No. | Description | Material | Part no. |         |          |          |
|-----|-------------|----------|----------|---------|----------|----------|
|     |             |          | 20       | 25      | 32       | 40       |
| 23  | Rod seal    | NBR      | PDU-8Z   | PDU-10Z | PDU-12LZ | PDU-14LZ |

\* Since the seal kit does not include a grease pack, order it separately.  
Grease pack part no.: GR-S-010 (10 g)

- CJ1
- CJP
- CJ2
- CM2**
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

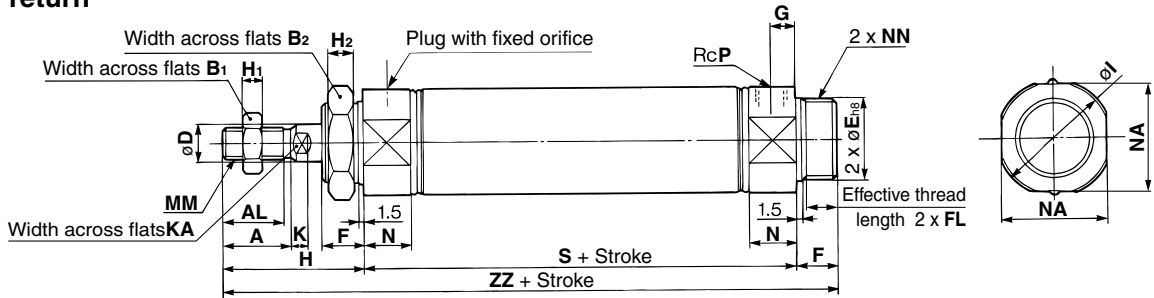
- D-□
- X□
- Individual -X□
- Technical data

# Series CM2

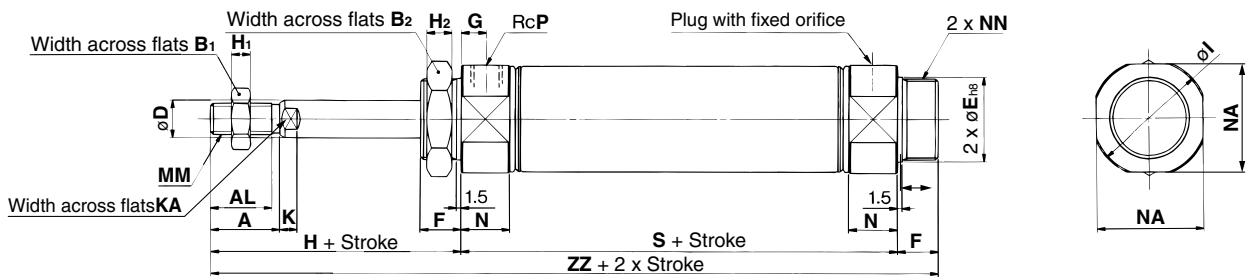
## Basic Style (B)

CM2B Bore size — Stroke  $\frac{S}{T}$

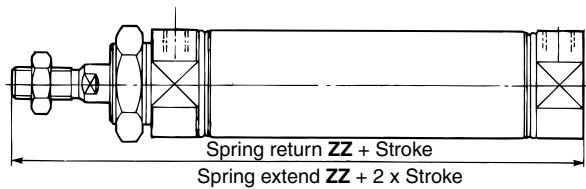
Spring return



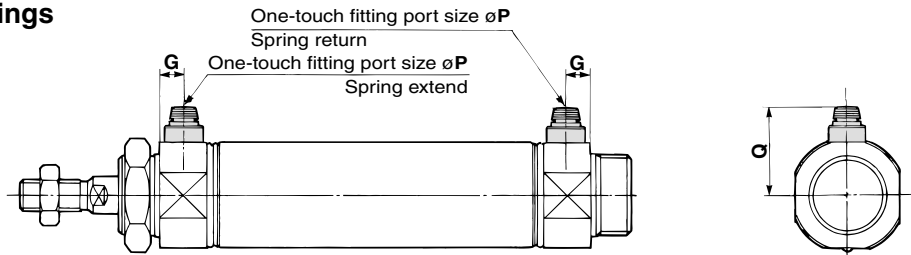
Spring extend



Boss-cut style



Built-in One-touch fittings



| Bore size (mm) | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   |
|----------------|----|------|----------------|----------------|----|-----------------------------------|----|------|----|----|----------------|----------------|------|-----|----|------------|------|------|-----------|-----|
| 20             | 18 | 15.5 | 13             | 26             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 |
| 25             | 22 | 19.5 | 17             | 32             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 |
| 32             | 22 | 19.5 | 17             | 32             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 |
| 40             | 24 | 21   | 22             | 41             | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 |

### Dimensions by Stroke

| Bore size (mm) | Stroke (mm) |     | Stroke (mm) |     | Stroke (mm) |     | Stroke (mm) |     | Stroke (mm) |     |
|----------------|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|
|                | S           | ZZ  | S           | ZZ  | S           | ZZ  | S           | ZZ  | S           | ZZ  |
| 20             | 87          | 141 | 112         | 166 | 137         | 191 | —           | —   | —           | —   |
| 25             | 87          | 145 | 112         | 170 | 137         | 195 | —           | —   | —           | —   |
| 32             | 89          | 147 | 114         | 172 | 139         | 197 | 164         | 222 | —           | —   |
| 40             | 113         | 179 | 138         | 204 | 163         | 229 | 188         | 254 | 213         | 279 |

### Boss-cut Style

| Bore size (mm) | Stroke (mm) |     | Stroke (mm) |     | Stroke (mm) |    |
|----------------|-------------|-----|-------------|-----|-------------|----|
|                | ZZ          | ZZ  | ZZ          | ZZ  | ZZ          | ZZ |
| 20             | 128         | 153 | 178         | —   | —           | —  |
| 25             | 132         | 157 | 182         | —   | —           | —  |
| 32             | 134         | 159 | 184         | 209 | —           | —  |
| 40             | 163         | 188 | 213         | 238 | 263         | —  |

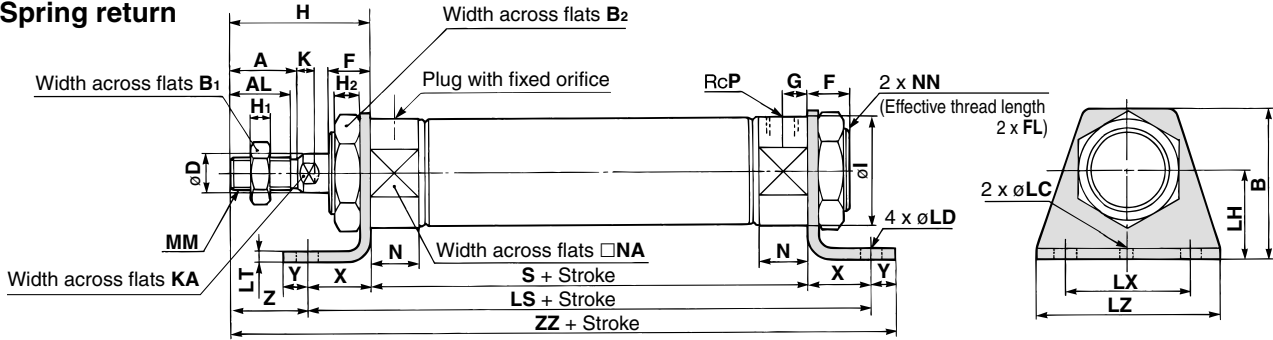
### Built-in One-touch Fittings (mm)

| Bore size (mm) | G  | P | Q    |
|----------------|----|---|------|
| 20             | 8  | 6 | 21.5 |
| 25             | 8  | 6 | 24.5 |
| 32             | 8  | 6 | 27   |
| 40             | 11 | 8 | 32.5 |

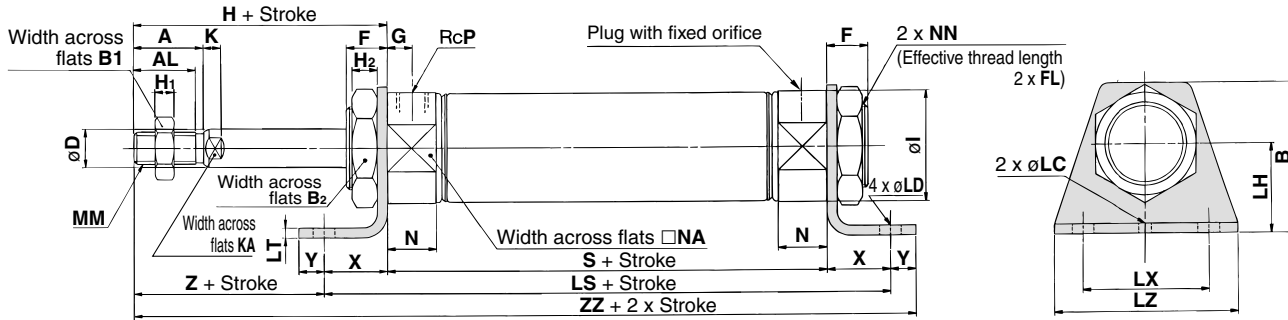
**Axial Foot Style (L)**

CM2L Bore size — Stroke  $\frac{S}{T}$

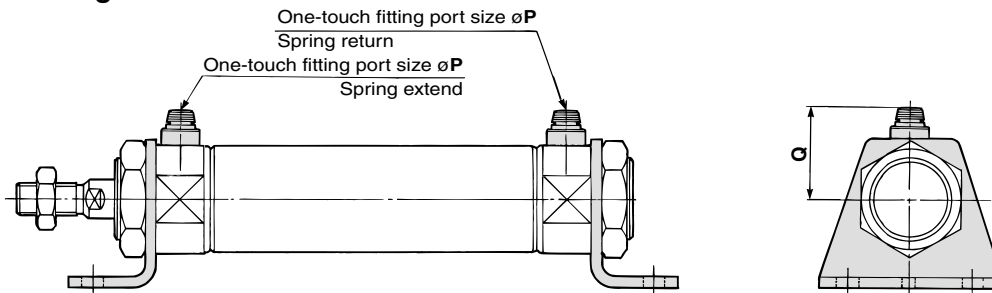
**Spring return**



**Spring extend**



**Built-in One-touch fittings**



| Bore size (mm) | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | D  | F  | FL   | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | LC | LD  | LH | LT  | LX | LZ | MM         | N    | NA   | NN        | P   | X  | Y  | Z  |
|----------------|----|------|----|----------------|----------------|----|----|------|----|----|----------------|----------------|------|-----|----|----|-----|----|-----|----|----|------------|------|------|-----------|-----|----|----|----|
| 20             | 18 | 15.5 | 40 | 13             | 26             | 8  | 13 | 10.5 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | 4  | 6.8 | 25 | 3.2 | 40 | 55 | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 20 | 8  | 21 |
| 25             | 22 | 19.5 | 47 | 17             | 32             | 10 | 13 | 10.5 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | 4  | 6.8 | 28 | 3.2 | 40 | 55 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 20 | 8  | 25 |
| 32             | 22 | 19.5 | 47 | 17             | 32             | 12 | 13 | 10.5 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | 4  | 6.8 | 28 | 3.2 | 40 | 55 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 20 | 8  | 25 |
| 40             | 24 | 21   | 54 | 22             | 41             | 14 | 16 | 13.5 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | 4  | 7   | 30 | 3.2 | 55 | 75 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 23 | 10 | 27 |

**Dimensions by Stroke**

| Bore size (mm) | 1 to 50 |     | 51 to 100 |     |     | 101 to 150 |     |     | 151 to 200 |     |     | 201 to 250 |     |     |     |
|----------------|---------|-----|-----------|-----|-----|------------|-----|-----|------------|-----|-----|------------|-----|-----|-----|
|                | LS      | S   | ZZ        | LS  | S   | ZZ         | LS  | S   | ZZ         | LS  | S   | ZZ         | LS  | S   | ZZ  |
| 20             | 127     | 87  | 156       | 152 | 112 | 181        | 177 | 137 | 206        | —   | —   | —          | —   | —   | —   |
| 25             | 127     | 87  | 160       | 152 | 112 | 185        | 177 | 137 | 210        | —   | —   | —          | —   | —   | —   |
| 32             | 129     | 89  | 162       | 154 | 114 | 187        | 179 | 139 | 212        | 204 | 164 | 237        | —   | —   | —   |
| 40             | 159     | 113 | 196       | 184 | 138 | 221        | 209 | 163 | 246        | 234 | 188 | 271        | 259 | 213 | 296 |

**Built-in One-touch Fittings (mm)**

| Bore size (mm) | P | Q    |
|----------------|---|------|
| 20             | 6 | 21.5 |
| 25             | 6 | 24.5 |
| 32             | 6 | 27   |
| 40             | 8 | 32.5 |

- CJ1
- CJP
- CJ2
- CM2**
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

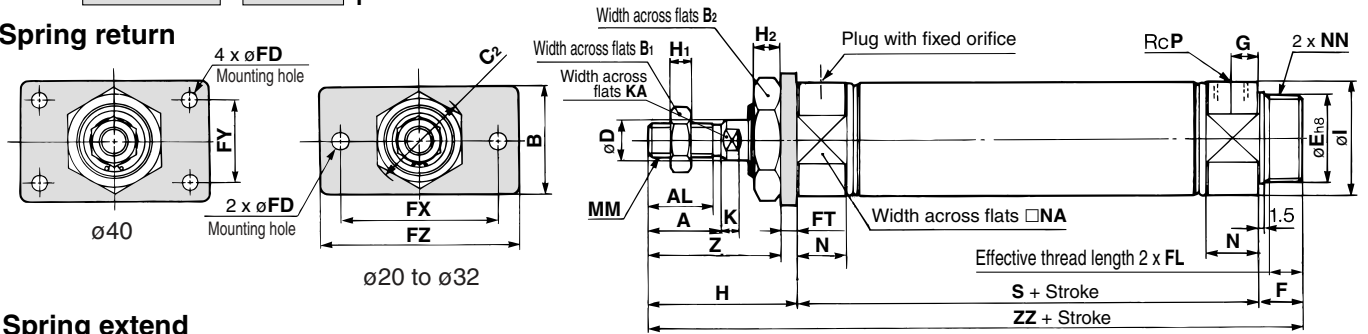
- D-□
- X□
- Individual -X□
- Technical data

# Series CM2

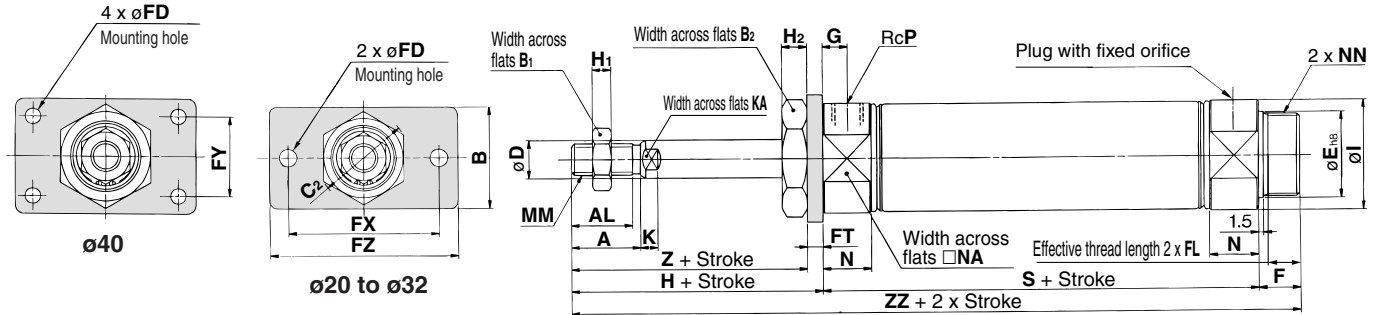
## Rod Side Flange Style (F)

CM2F Bore size — Stroke  $\frac{S}{T}$

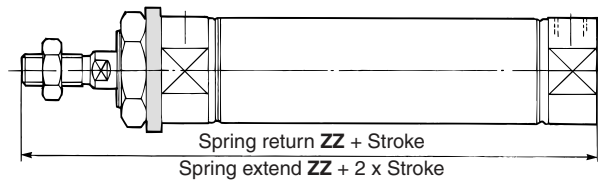
### Spring return



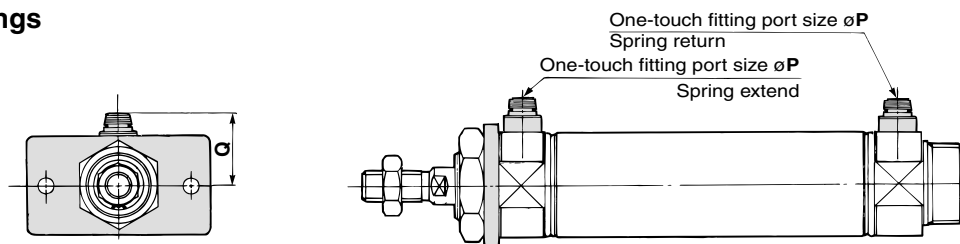
### Spring extend



### Boss-cut style



### Built-in One-touch fittings



| Bore size (mm) | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | C <sub>2</sub> | D  | E                                 | F  | FD | FL   | FT | FX | FY | FZ | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   | Z  |
|----------------|----|------|----|----------------|----------------|----------------|----|-----------------------------------|----|----|------|----|----|----|----|----|----|----------------|----------------|------|-----|----|------------|------|------|-----------|-----|----|
| 20             | 18 | 15.5 | 34 | 13             | 26             | 30             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 10.5 | 4  | 60 | —  | 75 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 37 |
| 25             | 22 | 19.5 | 40 | 17             | 32             | 37             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 10.5 | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 41 |
| 32             | 22 | 19.5 | 40 | 17             | 32             | 37             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 10.5 | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 41 |
| 40             | 24 | 21   | 52 | 22             | 41             | 47.3           | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 7  | 13.5 | 5  | 66 | 36 | 82 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 45 |

### Dimensions by Stroke

| Bore size (mm) | Stroke |     | 1 to 50 |     | 51 to 100 |     | 101 to 150 |     | 151 to 200 |     | 201 to 250 |  |
|----------------|--------|-----|---------|-----|-----------|-----|------------|-----|------------|-----|------------|--|
|                | Symbol | S   | ZZ      | S   | ZZ        | S   | ZZ         | S   | ZZ         | S   | ZZ         |  |
| 20             |        | 87  | 141     | 112 | 166       | 137 | 191        | —   | —          | —   | —          |  |
| 25             |        | 87  | 145     | 112 | 170       | 137 | 195        | —   | —          | —   | —          |  |
| 32             |        | 89  | 147     | 114 | 172       | 139 | 197        | 164 | 222        | —   | —          |  |
| 40             |        | 113 | 179     | 138 | 204       | 163 | 229        | 188 | 254        | 213 | 279        |  |

### Boss-cut Style

| Bore size (mm) | Stroke |     | 1 to 50 |     | 51 to 100 |     | 101 to 150 |  | 151 to 200 |  | 201 to 250 |  |
|----------------|--------|-----|---------|-----|-----------|-----|------------|--|------------|--|------------|--|
|                | Symbol | ZZ  | ZZ      | ZZ  | ZZ        | ZZ  | ZZ         |  |            |  |            |  |
| 20             |        | 128 | 153     | 178 | —         | —   |            |  |            |  |            |  |
| 25             |        | 132 | 157     | 182 | —         | —   |            |  |            |  |            |  |
| 32             |        | 134 | 159     | 184 | 209       | —   |            |  |            |  |            |  |
| 40             |        | 163 | 188     | 213 | 238       | 263 |            |  |            |  |            |  |

### Built-in One-touch Fittings (mm)

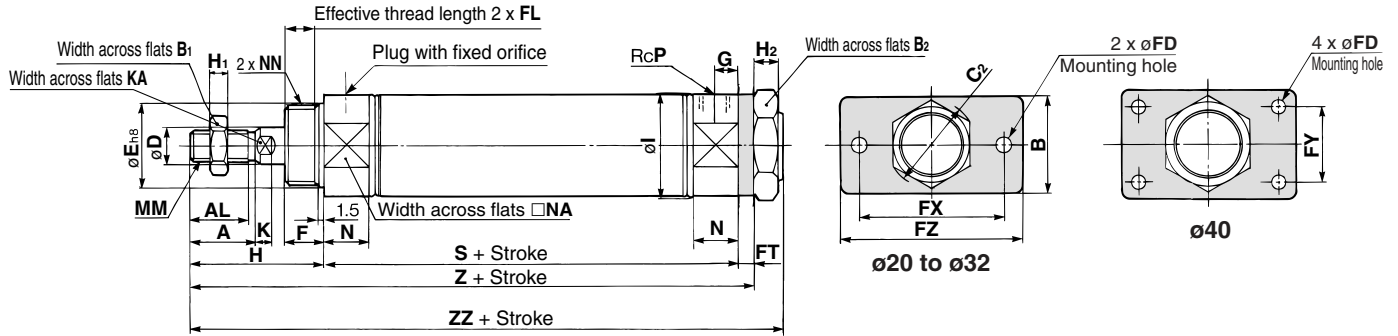
| Bore size (mm) | P | Q    |
|----------------|---|------|
| 20             | 6 | 21.5 |
| 25             | 6 | 24.5 |
| 32             | 6 | 27   |
| 40             | 8 | 32.5 |



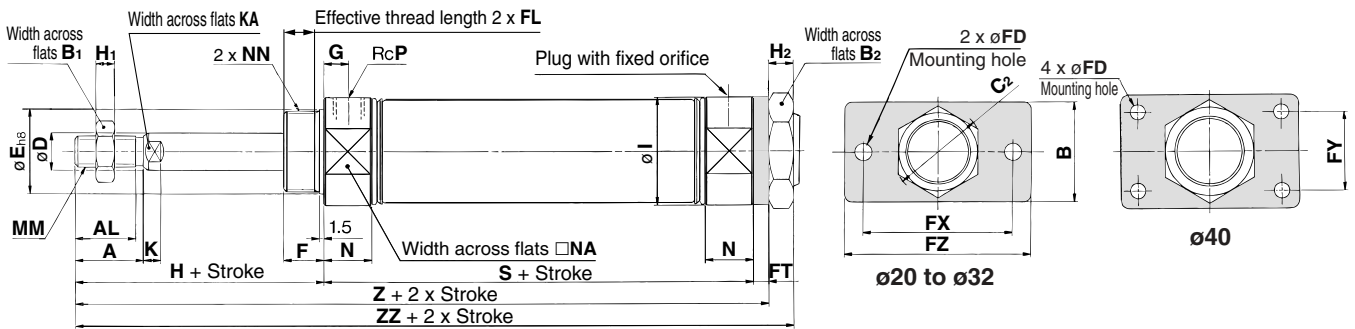
**Head Side Flange Style (G)**

CM2G Bore size — Stroke  $\frac{S}{T}$

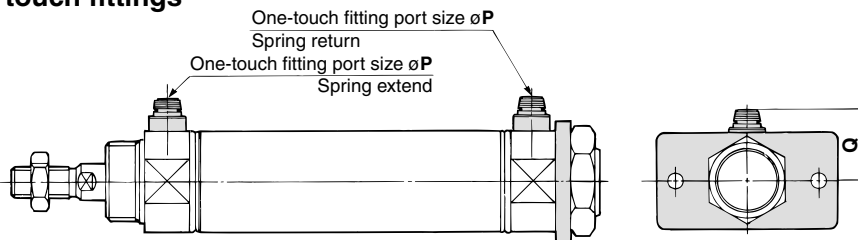
**Spring return**



**Spring extend**



**Built-in One-touch fittings**



| Bore size (mm) | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | C <sub>2</sub> | D  | E                                 | F  | FD | FL   | FT | FX | FY | FZ | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   |
|----------------|----|------|----|----------------|----------------|----------------|----|-----------------------------------|----|----|------|----|----|----|----|----|----|----------------|----------------|------|-----|----|------------|------|------|-----------|-----|
| 20             | 18 | 15.5 | 34 | 13             | 26             | 30             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 10.5 | 4  | 60 | —  | 75 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 |
| 25             | 22 | 19.5 | 40 | 17             | 32             | 37             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 10.5 | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 |
| 32             | 22 | 19.5 | 40 | 17             | 32             | 37             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 10.5 | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 |
| 40             | 24 | 21   | 52 | 22             | 41             | 47.3           | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 7  | 13.5 | 5  | 66 | 36 | 82 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 |

**Dimensions by Stroke**

| Bore size (mm) | Stroke Symbol |     |     | 1 to 50 |     |     | 51 to 100 |     |     | 101 to 150 |     |     | 151 to 200 |     |     | 201 to 250 |   |    |
|----------------|---------------|-----|-----|---------|-----|-----|-----------|-----|-----|------------|-----|-----|------------|-----|-----|------------|---|----|
|                | S             | Z   | ZZ  | S       | Z   | ZZ  | S         | Z   | ZZ  | S          | Z   | ZZ  | S          | Z   | ZZ  | S          | Z | ZZ |
| 20             | 87            | 132 | 141 | 112     | 157 | 166 | 137       | 182 | 191 | —          | —   | —   | —          | —   | —   | —          | — | —  |
| 25             | 87            | 136 | 145 | 112     | 161 | 170 | 137       | 186 | 195 | —          | —   | —   | —          | —   | —   | —          | — | —  |
| 32             | 89            | 138 | 147 | 114     | 163 | 172 | 139       | 188 | 197 | 164        | 213 | 222 | —          | —   | —   | —          | — | —  |
| 40             | 113           | 168 | 179 | 138     | 193 | 204 | 163       | 218 | 229 | 188        | 243 | 254 | 213        | 268 | 279 | —          | — | —  |

**Built-in One-touch Fittings**

| Bore size (mm) | P | Q    |
|----------------|---|------|
| 20             | 6 | 21.5 |
| 25             | 6 | 24.5 |
| 32             | 6 | 27   |
| 40             | 8 | 32.5 |

- CJ1
- CJP
- CJ2
- CM2**
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

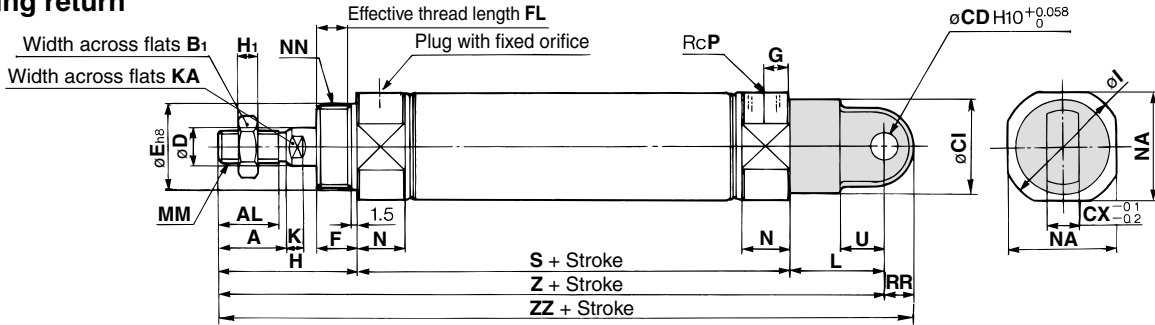
- D-□
- X□
- Individual -X□
- Technical data

# Series CM2

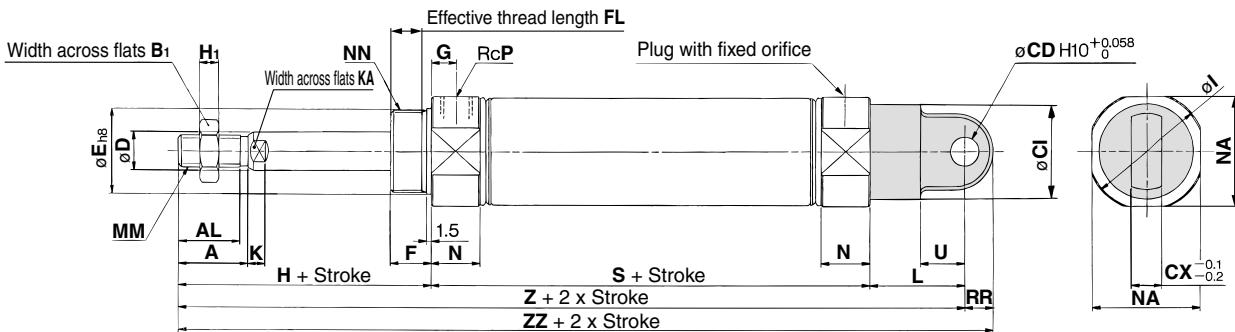
## Single Clevis Style (C)

CM2C Bore size — Stroke  $\frac{S}{T}$

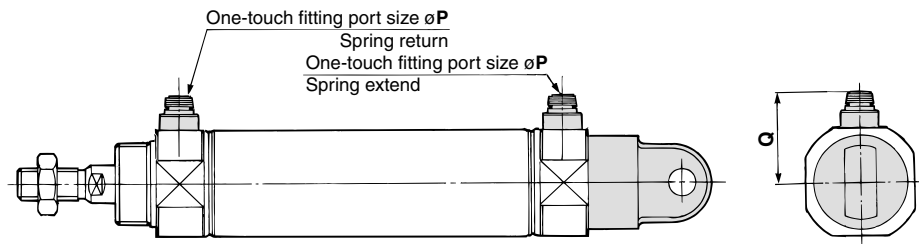
### Spring return



### Spring extend



### Built-in One-touch fittings



| Bore size (mm) | A  | AL   | B <sub>1</sub> | CD | CI | CX | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | L  | MM         | N    | NA   | NN        | P   | RR | U  |
|----------------|----|------|----------------|----|----|----|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|----|------------|------|------|-----------|-----|----|----|
| 20             | 18 | 15.5 | 13             | 9  | 24 | 10 | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | 30 | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 9  | 14 |
| 25             | 22 | 19.5 | 17             | 9  | 30 | 10 | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | 30 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 9  | 14 |
| 32             | 22 | 19.5 | 17             | 9  | 30 | 10 | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | 30 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 9  | 14 |
| 40             | 24 | 21   | 22             | 10 | 38 | 15 | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | 39 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 11 | 18 |

### Dimensions by Stroke

| Bore size (mm) | Stroke Symbol | (mm)    |     |     |           |     |     |            |     |     |            |     |     |            |     |     |   |   |    |   |   |    |
|----------------|---------------|---------|-----|-----|-----------|-----|-----|------------|-----|-----|------------|-----|-----|------------|-----|-----|---|---|----|---|---|----|
|                |               | 1 to 50 |     |     | 51 to 100 |     |     | 101 to 150 |     |     | 151 to 200 |     |     | 201 to 250 |     |     |   |   |    |   |   |    |
|                |               | S       | Z   | ZZ  | S         | Z   | ZZ  | S          | Z   | ZZ  | S          | Z   | ZZ  | S          | Z   | ZZ  | S | Z | ZZ | S | Z | ZZ |
| 20             |               | 87      | 158 | 167 | 112       | 183 | 192 | 137        | 208 | 217 | —          | —   | —   | —          | —   | —   | — | — | —  | — | — | —  |
| 25             |               | 87      | 162 | 171 | 112       | 187 | 196 | 137        | 212 | 221 | —          | —   | —   | —          | —   | —   | — | — | —  | — | — | —  |
| 32             |               | 89      | 164 | 173 | 114       | 189 | 198 | 139        | 214 | 223 | 164        | 239 | 248 | —          | —   | —   | — | — | —  | — | — | —  |
| 40             |               | 113     | 202 | 213 | 138       | 227 | 238 | 163        | 252 | 263 | 188        | 277 | 288 | 213        | 302 | 313 | — | — | —  | — | — | —  |

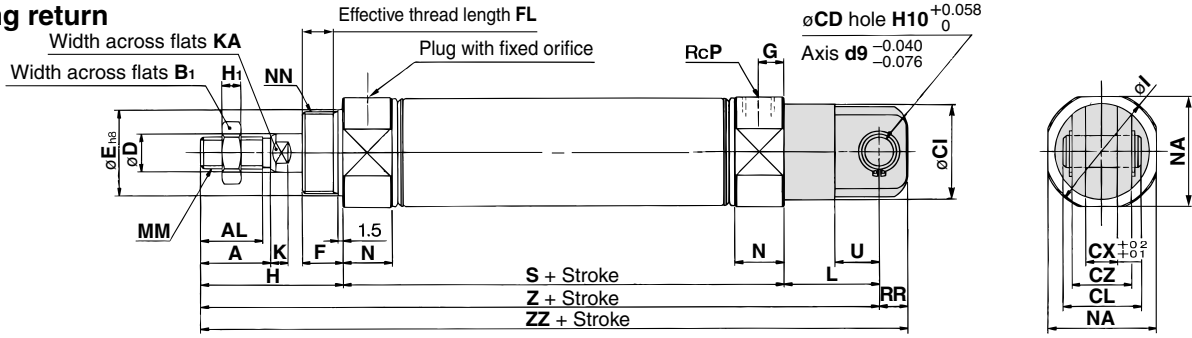
### Built-in One-touch Fittings (mm)

| Bore size (mm) | P | Q    |
|----------------|---|------|
| 20             | 6 | 21.5 |
| 25             | 6 | 24.5 |
| 32             | 6 | 27   |
| 40             | 8 | 32.5 |

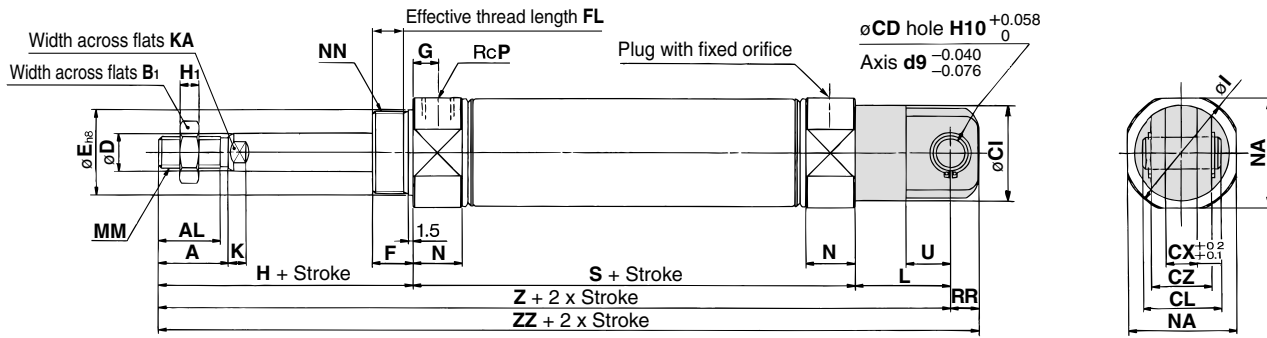
**Double Clevis Style (D)**

CM2D Bore size — Stroke  $\frac{S}{T}$

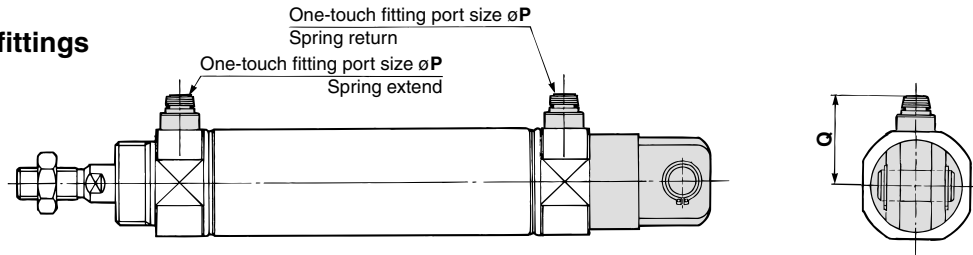
**Spring return**



**Spring extend**



**Built-in One-touch fittings**



| Bore size (mm) | A  | AL   | B <sub>1</sub> | CD | CI | CL   | CX | CZ | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | L  | MM         | N    | NA   | NN        | P   | RR | U  |
|----------------|----|------|----------------|----|----|------|----|----|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|----|------------|------|------|-----------|-----|----|----|
| 20             | 18 | 15.5 | 13             | 9  | 24 | 25   | 10 | 19 | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | 30 | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 9  | 14 |
| 25             | 22 | 19.5 | 17             | 9  | 30 | 25   | 10 | 19 | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | 30 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 9  | 14 |
| 32             | 22 | 19.5 | 17             | 9  | 30 | 25   | 10 | 19 | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | 30 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 9  | 14 |
| 40             | 24 | 21   | 22             | 10 | 38 | 41.2 | 15 | 30 | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | 39 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 11 | 18 |

**Dimensions by Stroke**

| Bore size (mm) | Stroke |     | 1 to 50 |     |     | 51 to 100 |     |     | 101 to 150 |     |     | 151 to 200 |     |     | 201 to 250 |     |  |
|----------------|--------|-----|---------|-----|-----|-----------|-----|-----|------------|-----|-----|------------|-----|-----|------------|-----|--|
|                | Symbol | S   | Z       | ZZ  | S   | Z         | ZZ  | S   | Z          | ZZ  | S   | Z          | ZZ  | S   | Z          | ZZ  |  |
| 20             |        | 87  | 158     | 167 | 112 | 183       | 192 | 137 | 208        | 217 | —   | —          | —   | —   | —          | —   |  |
| 25             |        | 87  | 162     | 171 | 112 | 187       | 196 | 137 | 212        | 221 | —   | —          | —   | —   | —          | —   |  |
| 32             |        | 89  | 164     | 173 | 114 | 189       | 198 | 139 | 214        | 223 | 164 | 239        | 248 | —   | —          | —   |  |
| 40             |        | 113 | 202     | 213 | 138 | 227       | 238 | 163 | 252        | 263 | 188 | 277        | 288 | 213 | 302        | 313 |  |

**Built-in One-touch Fittings (mm)**

| Bore size (mm) | P | Q    |
|----------------|---|------|
| 20             | 6 | 21.5 |
| 25             | 6 | 24.5 |
| 32             | 6 | 27   |
| 40             | 8 | 32.5 |

- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

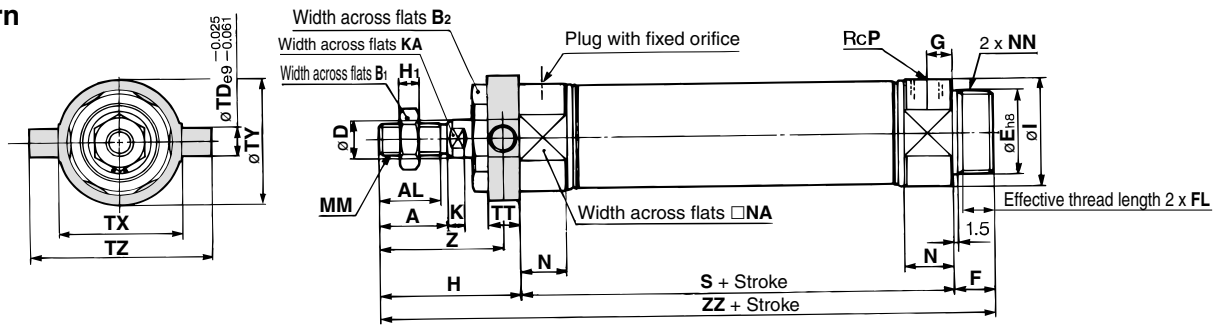
- D-□
- X□
- Individual
- X□
- Technical data

# Series CM2

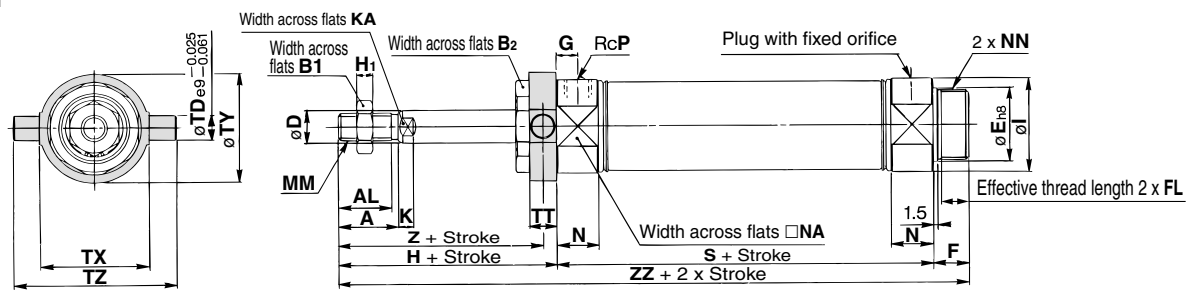
## Rod Side Trunnion Style (U)

CM2U Bore size — Stroke  $\begin{matrix} S \\ T \end{matrix}$

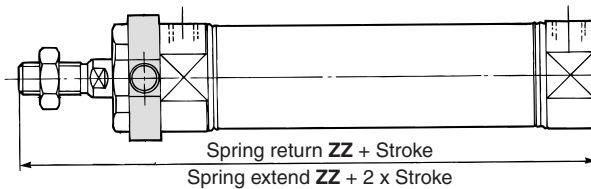
### Spring return



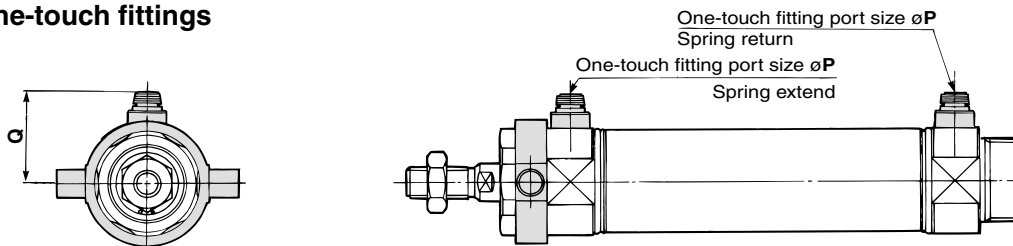
### Spring extend



### Boss-cut style



### Built-in One-touch fittings



| Bore size (mm) | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   | TD | TT | TX | TY | TZ | Z    |
|----------------|----|------|----------------|----------------|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|------------|------|------|-----------|-----|----|----|----|----|----|------|
| 20             | 18 | 15.5 | 13             | 26             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 8  | 10 | 32 | 32 | 52 | 36   |
| 25             | 22 | 19.5 | 17             | 32             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 9  | 10 | 40 | 40 | 60 | 40   |
| 32             | 22 | 19.5 | 17             | 32             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 9  | 10 | 40 | 40 | 60 | 40   |
| 40             | 24 | 21   | 22             | 41             | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 10 | 11 | 53 | 53 | 77 | 44.5 |

### Dimensions by Stroke

| Bore size (mm) | Stroke (mm) |     | 1 to 50 |     | 51 to 100 |     | 101 to 150 |     | 151 to 200 |     | 201 to 250 |  |
|----------------|-------------|-----|---------|-----|-----------|-----|------------|-----|------------|-----|------------|--|
|                | S           | ZZ  | S       | ZZ  | S         | ZZ  | S          | ZZ  | S          | ZZ  |            |  |
| 20             | 87          | 141 | 112     | 166 | 137       | 191 | —          | —   | —          | —   |            |  |
| 25             | 87          | 145 | 112     | 170 | 137       | 195 | —          | —   | —          | —   |            |  |
| 32             | 89          | 147 | 114     | 172 | 139       | 197 | 164        | 222 | —          | —   |            |  |
| 40             | 113         | 179 | 138     | 204 | 163       | 229 | 188        | 254 | 213        | 279 |            |  |

### Boss-cut Style

| Bore size (mm) | Stroke (mm) |     | 1 to 50 |     | 51 to 100 |    | 101 to 150 |    | 151 to 200 |  | 201 to 250 |  |
|----------------|-------------|-----|---------|-----|-----------|----|------------|----|------------|--|------------|--|
|                | ZZ          | ZZ  | ZZ      | ZZ  | ZZ        | ZZ | ZZ         | ZZ |            |  |            |  |
| 20             | 128         | 153 | 178     | —   | —         | —  | —          |    |            |  |            |  |
| 25             | 132         | 157 | 182     | —   | —         | —  | —          |    |            |  |            |  |
| 32             | 134         | 159 | 184     | 209 | —         | —  | —          |    |            |  |            |  |
| 40             | 163         | 188 | 213     | 238 | 263       | —  | —          |    |            |  |            |  |

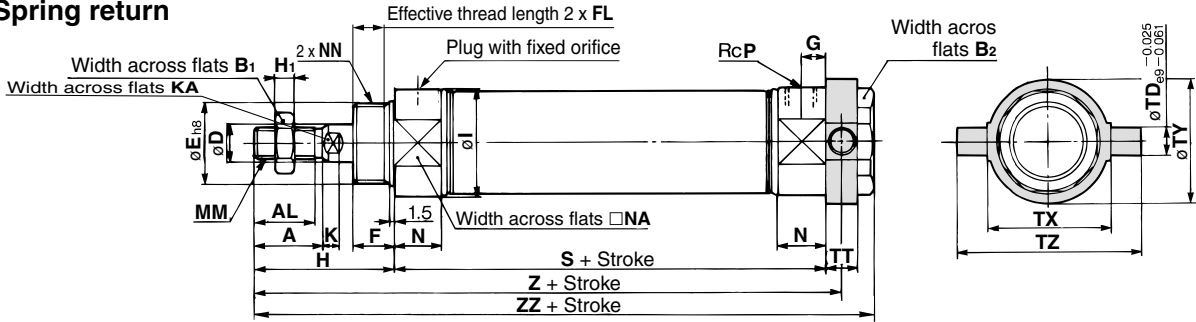
### Built-in One-touch Fittings

| Bore size (mm) | Stroke (mm) |      | 1 to 50 |      | 51 to 100 |      | 101 to 150 |      | 151 to 200 |  | 201 to 250 |  |
|----------------|-------------|------|---------|------|-----------|------|------------|------|------------|--|------------|--|
|                | P           | Q    | P       | Q    | P         | Q    | P          | Q    |            |  |            |  |
| 20             | 6           | 21.5 | 6       | 21.5 | 6         | 21.5 | 6          | 21.5 |            |  |            |  |
| 25             | 6           | 24.5 | 6       | 24.5 | 6         | 24.5 | 6          | 24.5 |            |  |            |  |
| 32             | 6           | 27   | 6       | 27   | 6         | 27   | 6          | 27   |            |  |            |  |
| 40             | 8           | 32.5 | 8       | 32.5 | 8         | 32.5 | 8          | 32.5 |            |  |            |  |

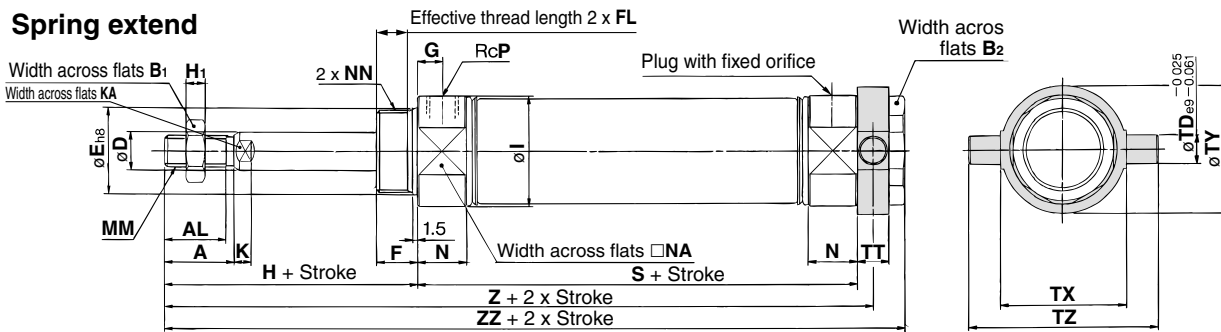
**Head Side Trunnion Style (T)**

CM2T Bore size — Stroke <sup>S</sup>/<sub>T</sub>

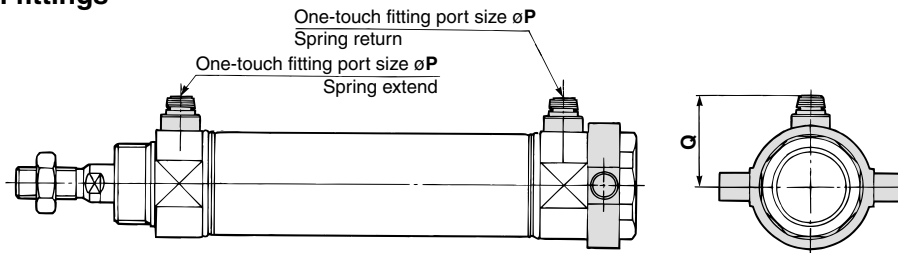
**Spring return**



**Spring extend**



**Built-in One-touch fittings**



| Bore size (mm) | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   | TD | TT | TX | TY | TZ |
|----------------|----|------|----------------|----------------|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|------------|------|------|-----------|-----|----|----|----|----|----|
| 20             | 18 | 15.5 | 13             | 26             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 8  | 10 | 32 | 32 | 52 |
| 25             | 22 | 19.5 | 17             | 32             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 9  | 10 | 40 | 40 | 60 |
| 32             | 22 | 19.5 | 17             | 32             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 9  | 10 | 40 | 40 | 60 |
| 40             | 24 | 21   | 22             | 41             | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 10 | 11 | 53 | 53 | 77 |

**Dimensions by Stroke**

| Bore size (mm) | Stroke (mm) |       |     |           |       |     |            |       |     |            |       |     |            |       |     |
|----------------|-------------|-------|-----|-----------|-------|-----|------------|-------|-----|------------|-------|-----|------------|-------|-----|
|                | 1 to 50     |       |     | 51 to 100 |       |     | 101 to 150 |       |     | 151 to 200 |       |     | 201 to 250 |       |     |
| Symbol         | S           | Z     | ZZ  | S         | Z     | ZZ  | S          | Z     | ZZ  | S          | Z     | ZZ  | S          | Z     | ZZ  |
| 20             | 87          | 133   | 143 | 112       | 158   | 168 | 137        | 183   | 193 | —          | —     | —   | —          | —     | —   |
| 25             | 87          | 137   | 147 | 112       | 162   | 172 | 137        | 187   | 197 | —          | —     | —   | —          | —     | —   |
| 32             | 89          | 139   | 149 | 114       | 164   | 174 | 139        | 189   | 199 | 164        | 214   | 224 | —          | —     | —   |
| 40             | 113         | 168.5 | 179 | 138       | 193.5 | 204 | 163        | 218.5 | 229 | 188        | 243.5 | 254 | 213        | 268.5 | 279 |

**Built-in One-touch Fittings**

| Bore size (mm) | P | Q    |
|----------------|---|------|
| 20             | 6 | 21.5 |
| 25             | 6 | 24.5 |
| 32             | 6 | 27   |
| 40             | 8 | 32.5 |

- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

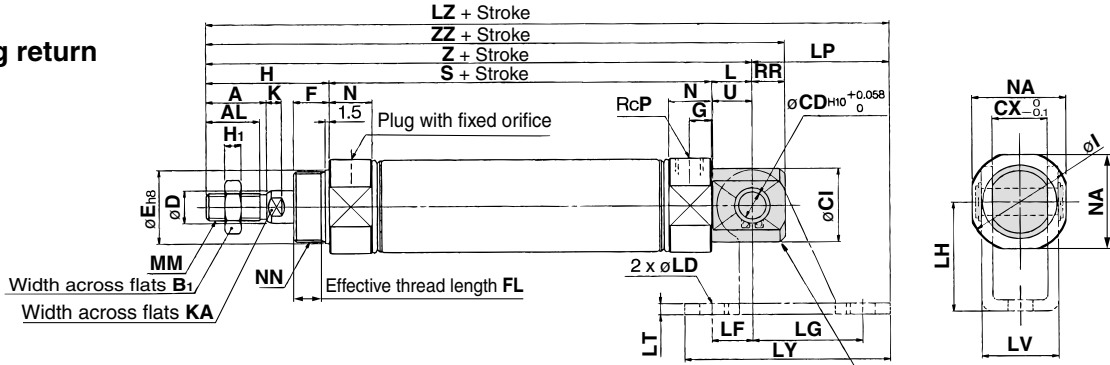
- D-□
- X□
- Individual -X□
- Technical data

# Series CM2

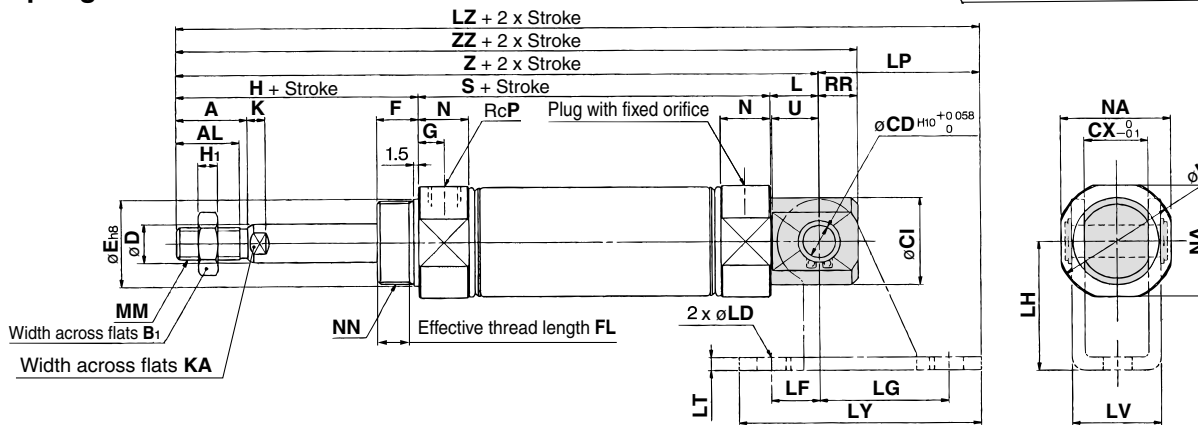
## Clevis Integrated Style (E)

CM2E Bore size — Stroke  $\frac{S}{T}$

### Spring return

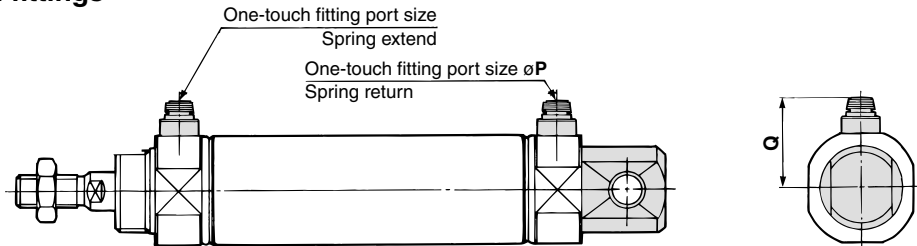


### Spring extend



Refer to page 145 for the details of clevis pivot brackets.

### Built-in One-touch fittings



| Bore size (mm) | A  | AL   | B <sub>1</sub> | CD | CI | CX | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | L  | MM         | N    | NA   | NN        | P   | RR | U    |
|----------------|----|------|----------------|----|----|----|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|----|------------|------|------|-----------|-----|----|------|
| 20             | 18 | 15.5 | 13             | 8  | 20 | 12 | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | 12 | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 9  | 11.5 |
| 25             | 22 | 19.5 | 17             | 8  | 22 | 12 | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | 12 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 9  | 11.5 |
| 32             | 22 | 19.5 | 17             | 10 | 27 | 20 | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | 15 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 12 | 14.5 |
| 40             | 24 | 21   | 22             | 10 | 33 | 20 | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | 15 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 12 | 14.5 |

### Dimensions by Stroke

| Stroke Symbol | 1 to 50 |     |     | 51 to 100 |     |     | 101 to 150 |     |     | 151 to 200 |     |     | 201 to 250 |     |     |
|---------------|---------|-----|-----|-----------|-----|-----|------------|-----|-----|------------|-----|-----|------------|-----|-----|
|               | S       | Z   | ZZ  | S         | Z   | ZZ  | S          | Z   | ZZ  | S          | Z   | ZZ  | S          | Z   | ZZ  |
| 20            | 87      | 140 | 149 | 112       | 165 | 174 | 137        | 190 | 199 | —          | —   | —   | —          | —   | —   |
| 25            | 87      | 144 | 153 | 112       | 169 | 178 | 137        | 194 | 203 | —          | —   | —   | —          | —   | —   |
| 32            | 89      | 149 | 161 | 114       | 174 | 186 | 139        | 199 | 211 | 164        | 224 | 236 | —          | —   | —   |
| 40            | 113     | 178 | 190 | 138       | 203 | 215 | 163        | 228 | 240 | 188        | 253 | 265 | 213        | 278 | 290 |

### Clevis Pivot Bracket

| Bore size (mm) | LD  | LF | LG | LH | LP | LT  | LV   | LY | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 250 |
|----------------|-----|----|----|----|----|-----|------|----|---------|-----------|------------|------------|------------|
|                |     |    |    |    |    |     |      |    | LZ      | LZ        | LZ         | LZ         | LZ         |
| 20             | 6.8 | 15 | 30 | 30 | 37 | 3.2 | 18.4 | 59 | 177     | 202       | 227        | —          | —          |
| 25             | 6.8 | 15 | 30 | 30 | 37 | 3.2 | 18.4 | 59 | 181     | 206       | 231        | —          | —          |
| 32             | 9   | 15 | 40 | 40 | 50 | 4   | 28   | 75 | 199     | 224       | 249        | 274        | —          |
| 40             | 9   | 15 | 40 | 40 | 50 | 4   | 28   | 75 | 228     | 253       | 278        | 303        | 328        |

### Built-in One-touch Fittings

| Bore size (mm) | P | Q    |
|----------------|---|------|
| 20             | 6 | 21.5 |
| 25             | 6 | 24.5 |
| 32             | 6 | 27   |
| 40             | 8 | 32.5 |

# Air Cylinder: Non-rotating Rod Type Double Acting, Single Rod Series **CM2K** ø20, ø25, ø32, ø40

## How to Order



**Mounting style**

|          |                         |
|----------|-------------------------|
| <b>B</b> | Basic style             |
| <b>L</b> | Axial foot style        |
| <b>F</b> | Rod side flange style   |
| <b>G</b> | Head side flange style  |
| <b>C</b> | Single clevis style     |
| <b>D</b> | Double clevis style     |
| <b>U</b> | Rod side trunnion style |

**T** Head side trunnion style  
**E** Clevis integrated style  
**BZ** Boss-cut basic style  
**FZ** Boss-cut rod side flange style  
**UZ** Boss-cut rod side trunnion style

**Bore size**

|           |       |
|-----------|-------|
| <b>20</b> | 20 mm |
| <b>25</b> | 25mm  |
| <b>32</b> | 32 mm |
| <b>40</b> | 40 mm |

**Cylinder stroke (mm)**  
(Refer to "Standard Stroke" on page 172.)

**Cushion**

|            |               |
|------------|---------------|
| <b>Nil</b> | Rubber bumper |
| <b>A</b>   | Air cushion   |

**Made to Order**  
(Refer to page 172 for details.)

**With auto switch**

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

**Built-in Magnet Cylinder Model**

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.  
(Example) CDM2KF32-100

**Auto switch**

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

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

- CJ1
- CJP
- CJ2
- CM2**
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

## Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

| Type               | Special function                           | Electrical entry | Indicator light | Wiring (Output)                             | Load voltage |            | Auto switch model | Lead wire length (m) |       |       |       |            | Pre-wired connector | Applicable load |            |            |             |                |              |               |   |   |   |   |   |   |            |            |
|--------------------|--|------------------|-----------------|---|--------------|------------|-------------------|----------------------|-------|-------|-------|------------|---------------------|-----------------|------------|------------|-------------|----------------|--------------|---------------|---|---|---|---|---|---|------------|------------|
|                    |  |                  |                 |   | DC           | AC         |                   | 0.5 (Nil)            | 1 (M) | 3 (L) | 5 (Z) | None (N)   |                     |                 |            |            |             |                |              |               |   |   |   |   |   |   |            |            |
| Solid state switch |  | Grommet          | Yes             | 3-wire (NPN)                                | 5V, 12V      |            | <b>M9N</b>        | ●                    | ●     | ●     | ○     | —          | ○                   | IC circuit      | Relay, PLC |            |             |                |              |               |   |   |   |   |   |   |            |            |
|                    |  |                  |                 | 3-wire (PNP)                                |              |            | <b>M9P</b>        | ●                    | ●     | ●     | ○     | —          | ○                   |                 |            |            |             |                |              |               |   |   |   |   |   |   |            |            |
|                    |  | Connector        |                 | 2-wire                                      | 12V          | <b>M9B</b> | ●                 | ●                    | ●     | ○     | —     | ○          | —                   |                 |            |            |             |                |              |               |   |   |   |   |   |   |            |            |
|                    |  |                  |                 | Terminal conduit                            | 3-wire (NPN) | 5V, 12V    | <b>G39A</b> **    | —                    | —     | —     | —     | ●          | —                   | —               |            | IC circuit |             |                |              |               |   |   |   |   |   |   |            |            |
|                    | Diagnostic indication (2-color indication) | Grommet          | Yes             | 2-wire                                      | 12V          | —          | <b>K39A</b> **    | —                    | —     | —     | —     | ●          | —                   | —               |            |            |             |                |              |               |   |   |   |   |   |   |            |            |
|                    |  |                  |                 | 3-wire (NPN)                                | 5V, 12V      |            | <b>M9NW</b>       | ●                    | ●     | ●     | ○     | —          | ○                   | IC circuit      |            |            |             |                |              |               |   |   |   |   |   |   |            |            |
|                    |  |                  |                 | 3-wire (PNP)                                | 5V, 12V      |            | <b>M9PW</b>       | ●                    | ●     | ●     | ○     | —          | ○                   | —               |            |            |             |                |              |               |   |   |   |   |   |   |            |            |
|                    |  |                  |                 | 2-wire                                      | 12V          |            | <b>M9BW</b>       | ●                    | ●     | ●     | ○     | —          | ○                   | —               |            |            |             |                |              |               |   |   |   |   |   |   |            |            |
|                    |  |                  |                 | Water resistant (2-color indication)        | 12V          |            | <b>H7BA</b>       | —                    | —     | ●     | ○     | —          | ○                   | —               |            |            |             |                |              |               |   |   |   |   |   |   |            |            |
|                    |  |                  |                 | With diagnostic output (2-color indication) | 5V, 12V      |            | <b>H7NF</b>       | ●                    | —     | ●     | ○     | —          | ○                   | IC circuit      |            |            |             |                |              |               |   |   |   |   |   |   |            |            |
| Reed switch        |  | Grommet          | Yes             | 3-wire (NPN equivalent)                     | 24V          | 12V        | —                 | 5V                   | —     | —     | —     | —          | —                   | IC circuit      | —          |            |             |                |              |               |   |   |   |   |   |   |            |            |
|                    |  |                  |                 |   |              |            |                   |                      |       |       |       |            |                     |                 |            | Connector  | No          | 2-wire         | 100V         | <b>A93</b>    | ● | — | ● | — | — | — | —          | —          |
|                    |  |                  |                 |   |              |            |                   |                      |       |       |       |            |                     |                 |            |            |             |                | 100V or less | <b>A90</b>    | ● | — | ● | — | — | — | —          | IC circuit |
|                    |  |                  |                 |   |              |            |                   |                      |       |       |       |            |                     |                 |            |            |             |                | 100V, 200V   | <b>B54</b> ** | ● | — | ● | ● | — | — | —          | —          |
|                    |  |                  |                 |   |              |            |                   |                      |       |       |       |            |                     |                 |            |            |             |                | 200V or less | <b>B64</b> ** | ● | — | ● | — | — | — | —          | —          |
|                    |  | Terminal conduit |                 | No  |              |            |                   |                      |       |       |       |            |                     |                 |            | 2-wire     | 24V or less | <b>C73C</b>    | ●            | —             | ● | ● | ● | — | — | — | IC circuit |            |
|                    |  |                  |                 |   |              |            |                   |                      |       |       |       |            |                     |                 |            |            | —           | <b>C80C</b>    | ●            | —             | ● | ● | ● | — | — | — | IC circuit |            |
|                    |  |                  |                 |   |              |            |                   |                      |       |       |       |            |                     |                 |            |            | —           | <b>A33A</b> ** | —            | —             | — | — | — | ● | — | — | PLC        |            |
|                    |  |                  |                 |   |              |            |                   |                      |       |       |       |            |                     |                 |            |            | 100V, 200V  | <b>A34A</b> ** | —            | —             | — | — | — | ● | — | — | —          |            |
|                    |  |                  |                 |   |              |            |                   |                      |       |       |       |            |                     |                 |            |            | —           | <b>A44A</b> ** | —            | —             | — | — | — | ● | — | — | —          |            |
| DIN terminal       | Yes  | —                | <b>B59W</b>     | ●   | —            | ●          | —                 | —                    | —     | —     | —     | Relay, PLC |                     |                 |            |            |             |                |              |               |   |   |   |   |   |   |            |            |

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW  
1 m ..... M (Example) M9NWM  
3 m ..... L (Example) M9NWL  
5 m ..... Z (Example) M9NWZ  
None ..... N (Example) H7CN

\* Solid state auto switches marked with "○" are produced upon receipt of order.  
\* D-A9□V/M9□V/M9□WV and D-M9□A(V)L cannot be mounted.  
\* Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.  
\* D-A3□A/A44A/G39A/K39A/B54/B64 cannot be mounted on bore sizes ø20 and ø25 cylinder with air cushion.

\* Since there are other applicable auto switches than listed above, refer to page 218 for details.  
\* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.  
\* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

- D-□
- X□
- Individual -X□
- Technical data

# Series CM2K

**A cylinder which rod does not rotate because of the hexagonal rod shape.**

## Non-rotating accuracy

ø20, ø25 — ±0.7°

ø32, ø40 — ±0.5°

**Can operate without lubrication.**

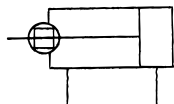
**The same installation dimensions as the standard cylinder.**

**Auto switches can also be mounted.**

It can be installed with auto switches to simplify the detection of the stroke position of the cylinder.

## JIS Symbol

Double acting,  
Single rod



**Made to Order Specifications**  
(For details, refer to pages 1373 to 1498.)

| Symbol | Specifications   |
|--------|--|
| —XA□   | Change of rod end shape  |
| —XB6   | Heat resistant cylinder (150°C)                                  |
| —XB12  | External stainless steel cylinder                                |
| —XC3   | Special port location  |
| —XC6   | Piston rod and rod end nut made of stainless steel               |
| —XC8   | Adjustable stroke cylinder/Adjustable extension type             |
| —XC9   | Adjustable stroke cylinder/Adjustable retraction type            |
| —XC10  | Dual stroke cylinder/Double rod type                             |
| —XC11  | Dual stroke cylinder/Single rod type                             |
| —XC13  | Auto switch mounting rail style                                  |
| —XC20  | Head cover axial port  |
| —XC22  | Fluororubber seals   |
| —XC25  | No fixed orifice of connecting port                              |
| —XC27  | Double clevis pin and double knuckle pin made of stainless steel |
| —XC52  | Mounting nut with set screw                                      |

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

## Specifications

| Bore size (mm)                       | 20  | 25               | 32               | 40               |                  |
|--------------------------------------|---|------------------|------------------|------------------|------------------|
| <b>Rod non-rotating accuracy</b>     | ±0.7°   |                  | ±0.5°            |                  |                  |
| <b>Type</b>                          | Pneumatic   |                  |                  |                  |                  |
| <b>Action</b>                        | Double acting, Single rod   |                  |                  |                  |                  |
| <b>Fluid</b>                         | Air   |                  |                  |                  |                  |
| <b>Cushion</b>                       | Rubber bumper   |                  |                  |                  |                  |
| <b>Proof pressure</b>                | 1.5 MPa   |                  |                  |                  |                  |
| <b>Maximum operating pressure</b>    | 1.0 MPa   |                  |                  |                  |                  |
| <b>Minimum operating pressure</b>    | 0.05 MPa  |                  |                  |                  |                  |
| <b>Ambient and fluid temperature</b> | Without auto switch: -10 to 70°C (No freezing)<br>With auto switch: -10 to 60°C (No freezing) |                  |                  |                  |                  |
| <b>Lubrication</b>                   | Not required (Non-lube)   |                  |                  |                  |                  |
| <b>Stroke length tolerance</b>       | +1.4<br>0 mm  |                  |                  |                  |                  |
| <b>Piston speed</b>                  | 50 to 500 mm/s  |                  |                  |                  |                  |
| <b>Cusion</b>                        | Rubber bumper, Air cushion  |                  |                  |                  |                  |
| <b>Allowable kinetic energy</b>      | <b>Rubber bumper</b>  | 0.27 J           | 0.4 J            | 0.65 J           | 1.2 J            |
|                                      | <b>Air cushion</b><br>(Effective cushion length (mm))   | 0.54 J<br>(11.0) | 0.78 J<br>(11.0) | 1.27 J<br>(11.0) | 2.35 J<br>(11.8) |

## Standard Stroke

| Bore size (mm) | Standard stroke <sup>Note)</sup> (mm)      |
|----------------|--|
| 20             | 25, 50, 75, 100, 125, 150<br>200, 250, 300 |
| 25             |  |
| 32             |  |
| 40             |  |



Note 1) Other intermediate strokes can be manufactured upon receipt of order. Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Note 2) The maximum limit is 1000 stroke, but the products that exceed the standard stroke might not be able to fulfill the specifications.

## Rod Boot Material

| Symbol   | Rod boot material        | Max. ambient temperature |
|----------|--------------------------|--------------------------|
| <b>J</b> | Nylon tarpaulin          | 70°C                     |
| <b>K</b> | Heat resistant tarpaulin | 110°C*                   |

\* Maximum ambient temperature for the rod boot itself.

## Mounting Bracket/Part No.

| Mounting bracket                | Min. order | Bore size (mm) |          |          |    | Description (for min. order)                                   |
|---------------------------------|------------|----------------|----------|----------|----|--|
|                                 |            | 20             | 25       | 32       | 40 |  |
| Axial foot *                    | 2          | CM-L020B       | CM-L032B | CM-L040B |    | 2 foot, 1 mounting nut   |
| Flange                          | 1          | CM-F020B       | CM-F032B | CM-F040B |    | 1 flange   |
| Single clevis**                 | 1          | CM-C020B       | CM-C032B | CM-C040B |    | 1 single clevis, 3 liners                                      |
| Double clevis***<br>(with pins) | 1          | CM-D020B       | CM-D032B | CM-D040B |    | 1 double clevis, 3 liners,<br>1 clevis pins, 2 retaining rings |
| Trunnion (with nuts)            | 1          | CM-T020B       | CM-T032B | CM-T040B |    | 1 trunnion, 1 trunnion nut                                     |

\* Order 2 foot brackets for each cylinder unit.

\*\* 3 Liners are attached with a clevis bracket for adjusting the mounting angle.

\*\*\* Clevis pins and retaining rings (cotter pins for ø40) are attached.

## Boss-cut style

Boss for the head side cover bracket is eliminated and the total length of cylinder is shortened.



## Comparison of the Full Length Dimension (Versus standard type) (mm)

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

## Mounting style

- Boss-cut basic style (BZ)
- Boss-cut flange style (FZ)
- Boss-cut trunnion style (UZ)





## Copper/Fluorine-free

20-CM2K Mounting style Bore size Stroke

● **Copper/fluorine-free**

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.



### Specifications

|                                |  |
|--------------------------------|--|
| <b>Action</b>                  | Double acting, Single rod  |
| <b>Bore size (mm)</b>          | ø20, ø25, ø32, ø40   |
| <b>Max. operating pressure</b> | 1.0 MPa  |
| <b>Min. operating pressure</b> | 0.05 MPa   |
| <b>Cushion</b>                 | Rubber bumper  |
| <b>Piston speed</b>            | 50 to 500 mm/s   |
| <b>Mounting</b>                | Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Head side trunnion style, Rod side trunnion style, Clevis integrated style, Boss-cut style |

### Mounting Style and Accessory

| Accessory                          | Standard equipment   |             |                  | Option               |                                     |                               |          |
|------------------------------------|----------------------|-------------|------------------|----------------------|-------------------------------------|-------------------------------|----------|
|                                    | Mounting nut         | Rod end nut | Clevis pin       | Single knuckle joint | Double knuckle joint <sup>(3)</sup> | Clevis bracket <sup>(4)</sup> | Rod boot |
| Basic style                        | ● (1 pc.)            | ●           | —                | ●                    | ●                                   | —                             | ●        |
| Axial foot style                   | ● (2)                | ●           | —                | ●                    | ●                                   | —                             | ●        |
| Rod side flange style              | ● (1)                | ●           | —                | ●                    | ●                                   | —                             | ●        |
| Head side flange style             | ● (1)                | ●           | —                | ●                    | ●                                   | —                             | ●        |
| Clevis integrated style            | — <sup>(1)</sup>     | ●           | —                | ●                    | ●                                   | ●                             | ●        |
| Single clevis style                | — <sup>(1)</sup>     | ●           | —                | ●                    | ●                                   | —                             | ●        |
| Double clevis style <sup>(3)</sup> | — <sup>(1)</sup>     | ●           | ● <sup>(5)</sup> | ●                    | ●                                   | —                             | ●        |
| Rod side trunnion style            | ● (1) <sup>(2)</sup> | ●           | —                | ●                    | ●                                   | —                             | ●        |
| Head side trunnion style           | ● (1) <sup>(2)</sup> | ●           | —                | ●                    | ●                                   | —                             | ●        |
| Boss-cut basic style               | ● (1)                | ●           | —                | ●                    | ●                                   | —                             | ●        |
| Boss-cut flange style              | ● (1)                | ●           | —                | ●                    | ●                                   | —                             | ●        |
| Boss-cut trunnion style            | ● (1)                | ●           | —                | ●                    | ●                                   | —                             | ●        |

- 🔍 Note 1) Mounting nuts are not attached for clevis integrated style, single clevis, and double clevis styles.  
 Note 2) Trunnion nuts are attached for rod side trunnion and head side trunnion styles.  
 Note 3) Pin and retaining ring (cotter pin for bore size ø40) are shipped together with double clevis and double knuckle joint.  
 Note 4) Pin and retaining ring are shipped together with clevis pivot bracket.  
 Note 5) Clevis pins come with retaining rings (cotter pins for ø40).

### Mass

|  |                                 | (kg) |      |      |      |
|--|---------------------------------|------|------|------|------|
| Bore size (mm)                           |                                 | 20   | 25   | 32   | 40   |
| Basic mass                               | Basic style                     | 0.14 | 0.21 | 0.28 | 0.57 |
|  | Axial foot style                | 0.29 | 0.37 | 0.44 | 0.84 |
|  | Flange style                    | 0.20 | 0.30 | 0.37 | 0.69 |
|  | Clevis integrated style         | 0.12 | 0.19 | 0.27 | 0.53 |
|  | Single clevis style             | 0.18 | 0.25 | 0.32 | 0.66 |
|  | Double clevis style             | 0.19 | 0.27 | 0.33 | 0.70 |
|  | Trunnion style                  | 0.18 | 0.28 | 0.34 | 0.67 |
|  | Boss-cut basic style            | 0.13 | 0.19 | 0.26 | 0.53 |
|  | Boss-cut flange style           | 0.19 | 0.28 | 0.35 | 0.66 |
| Boss-cut trunnion style                  | 0.17                            | 0.26 | 0.32 | 0.63 |      |
| Additional mass per each 50 mm of stroke |                                 | 0.04 | 0.07 | 0.09 | 0.14 |
| Option bracket                           | Clevis bracket (With pin)       | 0.07 | 0.07 | 0.14 | 0.14 |
|  | Single knuckle joint            | 0.06 | 0.06 | 0.06 | 0.23 |
|  | Double knuckle joint (With pin) | 0.07 | 0.07 | 0.07 | 0.20 |

Calculation: (Example) **CM2KL32-100**

- Basic mass.....0.44 (Foot style, ø32)
- Additional mass.....0.09/0.50 stroke
- Cylinder stroke..... 100 stroke  
 $0.44 + 0.09 \times 100/50 = 0.62 \text{ kg}$

## ⚠️ Precautions

**Be sure to read before handling.**  
**Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.**

### Operating Precautions

#### ⚠️ Warning

- Do not rotate the cover.**  
If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.
- Do not operate with the cushion needle in a fully closed condition.**  
Using it in the fully closed state will cause the cushion seal to be damaged. When adjusting the cushion needle, use the "Hexagon wrench key: nominal size 1.5".
- Do not open the cushion needle wide excessively.**  
If the cushion needle were set to be completely wide (more than 3 turns from fully closed), it would be equivalent to the cylinder with no cushion, thus making the impacts extremely high. Do not use it in such a way. Besides, using with fully open could give damage to the piston or cover.

#### ⚠️ Caution

- Avoid using the air cylinder in such a way that rotational torque would be applied to the piston rod.**  
If rotational torque is applied, the non-rotating guide will become deformed, thus affecting the non-rotating accuracy. Refer to the table below for the approximate values of the allowable range of rotational torque.

| Allowable rotational torque (N·m or less) | ø20 | ø25  | ø32  | ø40  |
|---|-----|------|------|------|
|   | 0.2 | 0.25 | 0.25 | 0.44 |

To screw a bracket or a nut onto the threaded portion at the tip of the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes. Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.



- When replacing rod seals, please contact SMC.**  
Air leakage may be happened, depending on the position in which a rod seal is fitted. Thus, please contact SMC when replacing them.
- Not able to disassemble.**  
Cover and cylinder tube are connected to each other by caulking method, thus making it impossible to disassemble. Therefore, internal parts of a cylinder other than rod seal are not replaceable.
- Do not touch the cylinder during operation.**  
Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.
- Combine the rod end section, so that a rod boot might not be twisted.**  
If a rod boot is installed with being twisted when installing a cylinder, it will cause a rod boot to fail during operation.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

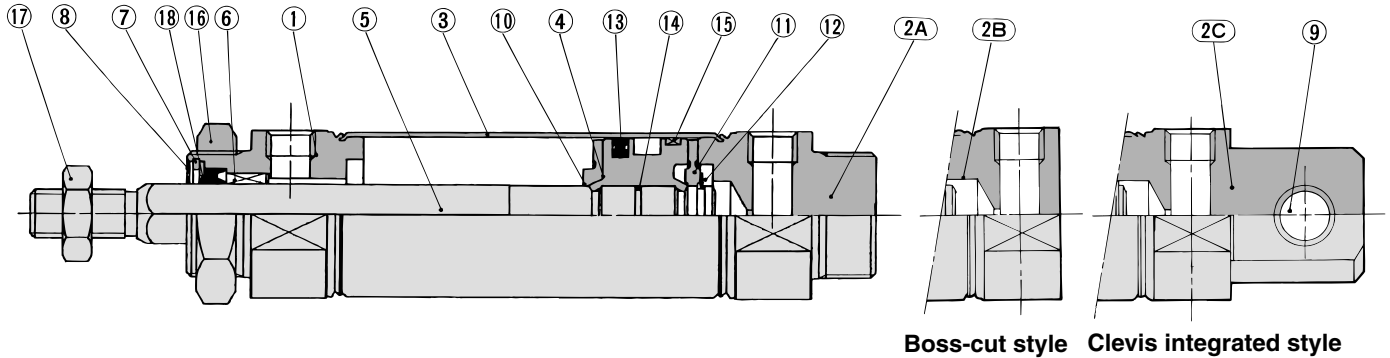
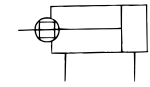
-X□

Technical data

# Series CM2K

## Construction

### Rubber bumper

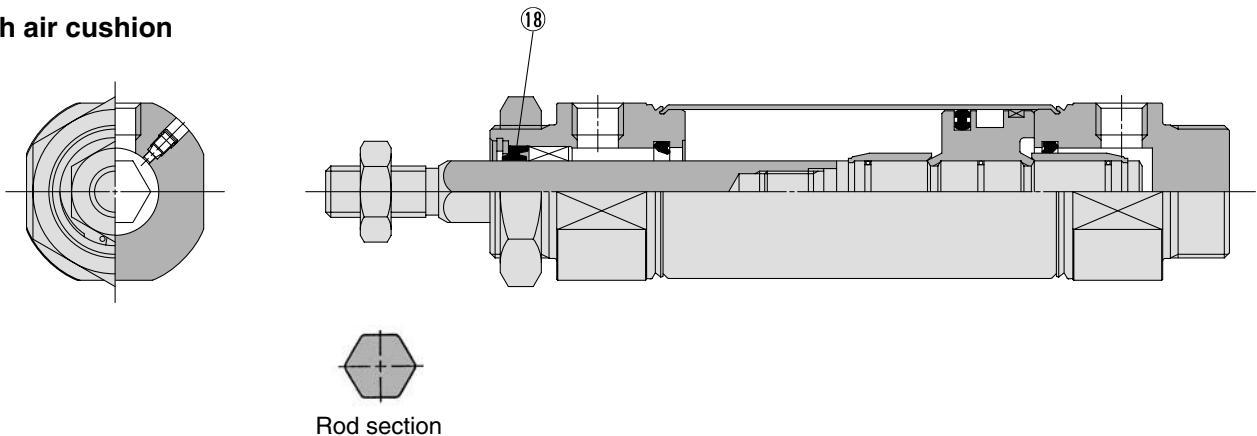


Boss-cut style Clevis integrated style



Rod section

### With air cushion



Rod section

### Component Parts

| No. | Description        | Material                              | Note               |
|-----|--------------------|---------------------------------------|--------------------|
| 1   | Rod cover          | Aluminum alloy                        | Clear anodized     |
| 2A  | Head cover A       | Aluminum alloy                        | Clear anodized *   |
| 2B  | Head cover B       | Aluminum alloy                        | Clear anodized **  |
| 2C  | Head cover C       | Aluminum alloy                        | Clear anodized *** |
| 3   | Cylinder tube      | Stainless steel                       |                    |
| 4   | Piston             | Aluminum alloy                        | Chromated          |
| 5   | Piston rod         | Stainless steel                       |                    |
| 6   | Non-rotating guide | Copper oil-impregnated sintered alloy |                    |
| 7   | Seal retainer      | Carbon steel                          | Nickel plated      |
| 8   | Retaining ring     | Carbon steel                          | Phosphate coated   |
| 9   | Clevis bushing     | Copper oil-impregnated sintered alloy |                    |
| 10  | Bumper A           | Urethane                              |                    |
| 11  | Bumper B           | Urethane                              |                    |

\* Basic style, \*\* Boss-cut style, \*\*\* Clevis integrated style

| No. | Description    | Material        | Note          |
|-----|----------------|-----------------|---------------|
| 12  | Retaining ring | Stainless steel |               |
| 13  | Piston seal    | NBR             |               |
| 14  | Piston gasket  | NBR             |               |
| 15  | Wear ring      | Resin           |               |
| 16  | Mounting nut   | Carbon steel    | Nickel plated |
| 17  | Rod end nut    | Carbon steel    | Nickel plated |

### Replacement Part: Seal

#### With rubber bumper / With air cushion

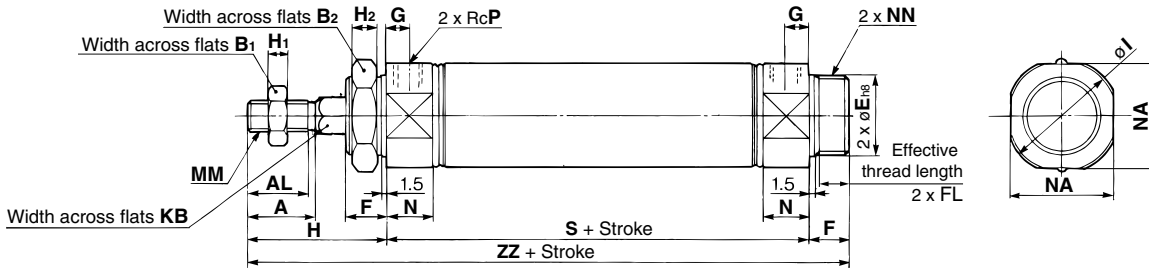
| No. | Description | Material | Part no. |         |         |         |
|-----|-------------|----------|----------|---------|---------|---------|
|     |             |          | 20       | 25      | 32      | 40      |
| 18  | Rod seal    | NBR      | PDR-8W   | PDR-10W | PDR-12W | PDR-14W |

\* Since the seal kit does not include a grease pack, order it separately.  
Grease pack part no.: GR-S-010 (10 g)

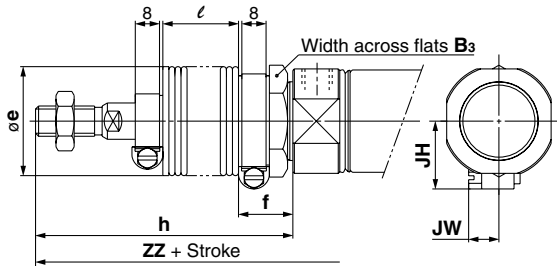
# Air Cylinder: Non-rotating Road Type Double Acting, Single Rod *Series CM2K*

## Basic Style (B)

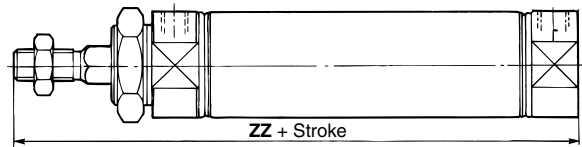
CM2KB



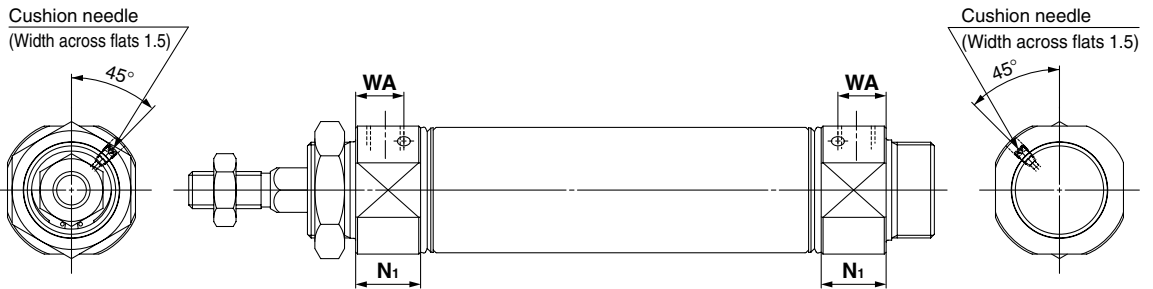
### With rod boot



### Boss-cut style



### With air cushion



| Bore size (mm) | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | KB   | MM         | N    | NA   | NN        | P   | S  | ZZ  |
|----------------|----|------|----------------|----------------|-----------------------------------|----|------|----|----|----------------|----------------|------|------|------------|------|------|-----------|-----|----|-----|
| 20             | 18 | 15.5 | 13             | 26             | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 8              | 28   | 8.2  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 116 |
| 25             | 22 | 19.5 | 17             | 32             | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 8              | 33.5 | 10.2 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 120 |
| 32             | 22 | 19.5 | 17             | 32             | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 8              | 37.5 | 12.2 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 122 |
| 40             | 24 | 21   | 22             | 41             | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 10             | 46.5 | 14.2 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 154 |

### With Rod Boot

| Bore size (mm) | Symbol | Stroke | B <sub>3</sub> | e  | f  | h       |           |            |            |            | l       |           |            |            |            | ZZ      |           |            |            |            | JH   | JW   |
|----------------|--------|--------|----------------|----|----|---------|-----------|------------|------------|------------|---------|-----------|------------|------------|------------|---------|-----------|------------|------------|------------|------|------|
|                |        |        |                |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 |      |      |
| 20             |        |        | 30             | 36 | 18 | 68      | 81        | 93         | 106        | 131        | 12.5    | 25        | 37.5       | 50         | 75         | 143     | 156       | 168        | 181        | 206        | 23.5 | 10.5 |
| 25             |        |        | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 12.5    | 25        | 37.5       | 50         | 75         | 147     | 160       | 172        | 185        | 210        | 23.5 | 10.5 |
| 32             |        |        | 32             | 36 | 18 | 72      | 85        | 97         | 110        | 135        | 12.5    | 25        | 37.5       | 50         | 75         | 149     | 162       | 174        | 187        | 212        | 23.5 | 10.5 |
| 40             |        |        | 41             | 46 | 20 | 77      | 90        | 102        | 115        | 140        | 12.5    | 25        | 37.5       | 50         | 75         | 181     | 194       | 206        | 219        | 244        | 27   | 10.5 |

### Boss-cut Style

| Bore size (mm) | Without rod boot | ZZ (mm) |           |            |            |            |
|----------------|------------------|---------|-----------|------------|------------|------------|
|                |                  | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 |
| 20             | 103              | 130     | 143       | 155        | 168        | 193        |
| 25             | 107              | 134     | 147       | 159        | 172        | 197        |
| 32             | 109              | 136     | 149       | 161        | 174        | 199        |
| 40             | 138              | 165     | 178       | 190        | 203        | 228        |

### With Air Cushion

| Bore size (mm) | N <sub>1</sub> | WA |
|----------------|----------------|----|
| 20             | 17.5           | 13 |
| 25             | 17.5           | 13 |
| 32             | 17.5           | 13 |
| 40             | 21.5           | 16 |



### Dimensions of Each Mounting Bracket

The dimensions are the same as standard type, double acting, single rod, except the configuration of the piston rod. Refer to pages 136 to 143. Specifications for the auto switch equipped type are the same as Series CDM2 standard type.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

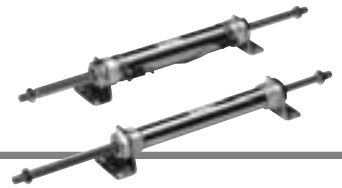
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-X□

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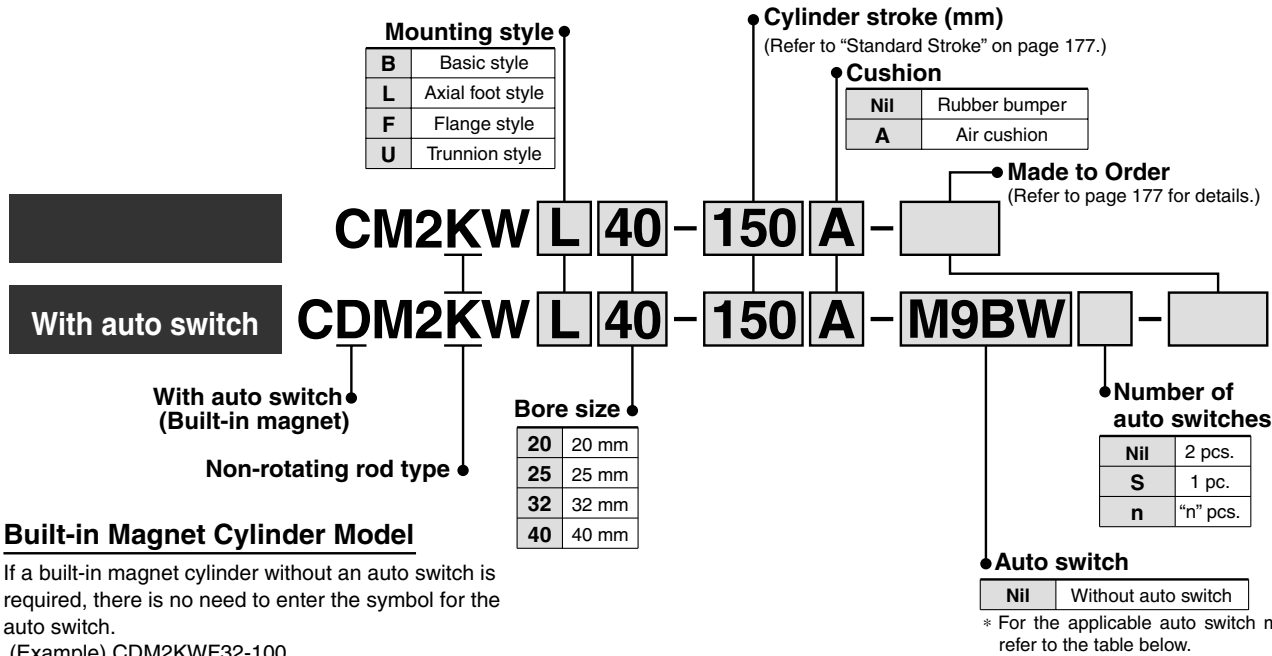
# Air Cylinder: Non-rotating Rod Type Double Acting, Double Rod

## Series **CM2KW**

ø20, ø25, ø32, ø40



### How to Order



### Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.

(Example) CDM2KWF32-100

### Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

| Type                                       | Special function                           | Electrical entry  | Indicator light  | Wiring (Output)         | Load voltage |         | Auto switch model | Lead wire length (m) |              |        |       |          | Pre-wired connector | Applicable load |            |            |            |   |   |            |
|--|--|---|------------------|-------------------------|--------------|---------|-------------------|----------------------|--------------|--------|-------|----------|---------------------|-----------------|------------|------------|------------|---|---|------------|
|  |  |   |                  |                         | DC           | AC      |                   | 0.5 (Nil)            | 1 (M)        | 3 (L)  | 5 (Z) | None (N) |                     |                 |            |            |            |   |   |            |
| Solid state switch                         | —  | Grommet   | —                | 3-wire (NPN)            | 24V          | 5V, 12V | —                 | M9N                  | ●            | ●      | ●     | ○        | —                   | ○               | IC circuit | Relay, PLC |            |   |   |            |
|  |  |   |                  | 3-wire (PNP)            |              |         |                   | M9P                  | ●            | ●      | ●     | ○        | —                   | ○               |            |            |            |   |   |            |
|  |  | Connector   | 2-wire           | M9B                     | ●            | ●       | ●                 | ○                    | —            | ○      | —     |          |                     |                 |            |            |            |   |   |            |
|  |  |   | Terminal conduit | 3-wire (NPN)            | 5V, 12V      | G39A ** | —                 | —                    | —            | —      | ●     | —        | —                   | IC circuit      |            |            |            |   |   |            |
|  | Diagnostic indication (2-color indication) | Grommet   | —                | 2-wire                  | 24V          | 12V     | —                 | K39A **              | —            | —      | —     | —        | ●                   | —               | —          |            |            |   |   |            |
|  |  |   |                  | 3-wire (NPN)            |              |         |                   | 5V, 12V              | M9NW         | ●      | ●     | ●        | ○                   | —               | ○          |            | IC circuit |   |   |            |
|  |  | Grommet   | 3-wire (PNP)     | 5V, 12V                 | M9PW         | ●       | ●                 | ●                    | ○            | —      | ○     | —        |                     |                 |            |            |            |   |   |            |
|  |  |   | 2-wire           | 12V                     | M9BW         | ●       | ●                 | ●                    | ○            | —      | ○     | —        |                     |                 |            |            |            |   |   |            |
|  |  | Water resistant (2-color indication)<br>With diagnostic output (2-color indication) | Grommet          | —                       | 4-wire (NPN) | 24V     | 5V, 12V           | —                    | H7BA         | —      | —     | ●        | ○                   | —               | ○          |            | —          |   |   |            |
|  |  |   |                  |                         | H7NF         |         |                   |                      | ●            | —      | ●     | ○        | —                   | ○               | IC circuit |            |            |   |   |            |
| Reed switch                                | —  | Grommet   | —                | 3-wire (NPN equivalent) | 24V          | 12V     | —                 | A96                  | ●            | —      | ●     | —        | —                   | —               | IC circuit | —          |            |   |   |            |
|  |  |   |                  |                         |              |         |                   | Connector            | 100V         | A93    | ●     | —        | ●                   | —               | —          |            | —          | — | — | —          |
|  |  |   |                  |                         |              |         |                   |                      | 100V or less | A90    | ●     | —        | ●                   | —               | —          |            | —          | — | — | IC circuit |
|  |  |   |                  |                         |              |         |                   |                      | 100V, 200V   | B54 ** | ●     | —        | ●                   | ●               | —          |            | —          | — | — | —          |
|  |  |   |                  |                         |              |         |                   |                      | 200V or less | B64 ** | ●     | —        | ●                   | —               | —          |            | —          | — | — | —          |
|  |  | Terminal conduit  | 2-wire           | 24V or less             | C73C         | ●       | —                 | ●                    | ●            | ●      | —     | —        | —                   | —               |            |            |            |   |   |            |
|  |  |   | DIN terminal     | 24V or less             | C80C         | ●       | —                 | ●                    | ●            | —      | —     | —        | —                   | IC circuit      |            |            |            |   |   |            |
|  |  |   |                  | —                       | A33A **      | —       | —                 | —                    | —            | ●      | —     | —        | —                   | PLC             |            |            |            |   |   |            |
|  |  |   |                  | 100V, 200V              | A34A **      | —       | —                 | —                    | —            | ●      | —     | —        | —                   | —               |            |            |            |   |   |            |
|  |  |   |                  | —                       | A44A **      | —       | —                 | —                    | —            | ●      | —     | —        | —                   | Relay, PLC      |            |            |            |   |   |            |
| Diagnostic indication (2-color indication) | Grommet                                    | —   | —                | —                       | —            | B59W    | ●                 | —                    | ●            | —      | —     | —        |                     |                 |            |            |            |   |   |            |

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW  
 1 m ..... M (Example) M9NWM  
 3 m ..... L (Example) M9NWL  
 5 m ..... Z (Example) M9NWZ  
 None ..... N (Example) H7CN

\* Solid state auto switches marked with "○" are produced upon receipt of order.  
 \* D-A9□V/M9□V/M9□WV and D-M9□A(V)L cannot be mounted.  
 \* Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.  
 \* D-A3□A/A44A/G39A/K39A/B54/B64 cannot be mounted on bore sizes ø20 and ø25 cylinder with air cushion.

\* Since there are other applicable auto switches than listed above, refer to page 218 for details.  
 \* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.  
 \* D-A9□M/M9□M/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

# Air Cylinder: Non-rotating Rod Type Double Acting, Double Rod Series CM2KW

**A cylinder which rod does not rotate because of the hexagonal rod shape.**

### Non-rotating accuracy

$\phi 20, \phi 25$ — $\pm 0.7^\circ$   
 $\phi 32, \phi 40$ — $\pm 0.5^\circ$

**Can operate without lubrication.**

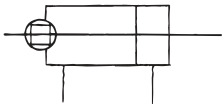
**The same installation dimensions as the standard cylinder.**

**Auto switches can also be mounted.**

It can be installed with auto switches to simplify the detection of the stroke position of the cylinder.

### JIS Symbol

Double acting,  
Double rod



**Made to Order Specifications**  
(For details, refer to pages 1395 to 1498.)

| Symbol | Specifications                                     |
|--------|--|
| —XB6   | Heat resistant cylinder (150°C)                    |
| —XC3   | Special port location                              |
| —XC6   | Piston rod and rod end nut made of stainless steel |
| —XC13  | Auto switch mounting rail style                    |
| —XC22  | Fluororubber seals                                 |
| —XC52  | Mounting nut with set screw                        |

### Specifications

| Bore size (mm)                       | 20  | 25    | 32              | 40    |
|--------------------------------------|---|-------|-----------------|-------|
| <b>Rod non-rotating accuracy</b>     | $\pm 0.7^\circ$   |       | $\pm 0.5^\circ$ |       |
| <b>Action</b>                        | Pneumatic   |       |                 |       |
| <b>Cushion</b>                       | Rubber bumper   |       |                 |       |
| <b>Action</b>                        | Double acting, Double rod   |       |                 |       |
| <b>Fluid</b>                         | Air   |       |                 |       |
| <b>Proof pressure</b>                | 1.5 MPa   |       |                 |       |
| <b>Maximum operating pressure</b>    | 1.0 MPa   |       |                 |       |
| <b>Minimum operating pressure</b>    | 0.08 MPa  |       |                 |       |
| <b>Ambient and fluid temperature</b> | Without auto switch: $-10$ to $+70^\circ\text{C}$ (No freezing)<br>With auto switch: $-10$ to $+60^\circ\text{C}$ (No freezing) |       |                 |       |
| <b>Lubrication</b>                   | Not required (Non-lube)   |       |                 |       |
| <b>Stroke length tolerance</b>       | $^{+1.4}_0$ mm  |       |                 |       |
| <b>Piston speed</b>                  | 50 to 500 mm/s  |       |                 |       |
| <b>Allowable kinetic energy</b>      | 0.27 J  | 0.4 J | 0.65 J          | 1.2 J |

### Standard Stroke

| Bore size (mm) | Standard stroke <sup>(Note)</sup> (mm)     |
|----------------|--|
| 20             | 25, 50, 75, 100, 125, 150<br>200, 250, 300 |
| 25             |  |
| 32             |  |
| 40             |  |



### Accessory Bracket

Refer to pages 144 and 145 for accessory bracket, since it is the same as standard type, double acting, single rod.

Note 1) Other intermediate strokes can be manufactured upon receipt of order. Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Note 2) The maximum limit is 500 stroke, but the products that exceed the standard stroke might not be able to fulfill the specifications.

### Mounting Style and Accessory

| Mounting \ Accessory | Standard equipment   |             | Option               |                                     |
|----------------------|----------------------|-------------|----------------------|-------------------------------------|
|                      | Mounting nut         | Rod end nut | Single knuckle joint | Double knuckle joint <sup>(2)</sup> |
| Basic style          | ● (1 pc.)            | ● (2 pcs.)  | ●                    | ●                                   |
| Axial foot style     | ● (2)                | ● (2)       | ●                    | ●                                   |
| Flange style         | ● (1)                | ● (2)       | ●                    | ●                                   |
| Trunnion style       | ● (1) <sup>(1)</sup> | ● (2)       | ●                    | ●                                   |

Note 1) Trunnion nuts are attached for trunnion style.

Note 2) Pin and retaining ring (cotter pin for bore size  $\phi 40$ ) are shipped together with double knuckle joint.

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual  
-X□

Technical  
data

# Series CM2KW

## Mass

(kg)

| Bore size (mm)                           |                                 | 20   | 25   | 32   | 40   |
|--|---------------------------------|------|------|------|------|
| Basic mass                               | Basic style                     | 0.16 | 0.25 | 0.32 | 0.66 |
|  | Axial foot style                | 0.31 | 0.41 | 0.48 | 0.93 |
|  | Flange style                    | 0.22 | 0.34 | 0.41 | 0.78 |
|  | Trunnion style                  | 0.20 | 0.32 | 0.38 | 0.76 |
| Additional mass per each 50 mm of stroke |                                 | 0.06 | 0.1  | 0.14 | 0.20 |
| Option bracket                           | Single knuckle joint            | 0.06 | 0.06 | 0.06 | 0.23 |
|  | Double knuckle joint (With pin) | 0.07 | 0.07 | 0.07 | 0.20 |

Calculation: (Example) **CM2KWL32-100**

- Basic mass ————— 0.48 (Foot, ø32)
- Additional mass ————— 0.14/50 st
- Cylinder stroke: 100 st  
 $0.48 + 0.14 \times 100/50 = 0.76 \text{ kg}$

## Mounting Bracket/Part No.

| Mounting bracket     | Min. order | Bore size (mm) |          |          |    | Description (for min. order) |
|----------------------|------------|----------------|----------|----------|----|------------------------------|
|                      |            | 20             | 25       | 32       | 40 |                              |
| Axial foot *         | 2          | CM-L020B       | CM-L032B | CM-L040B |    | 2 foot, 1 mounting nut       |
| Flange               | 1          | CM-F020B       | CM-F032B | CM-F040B |    | 1 flange                     |
| Trunnion (with nuts) | 1          | CM-T020B       | CM-T032B | CM-T040B |    | 1 trunnion, 1 trunnion nut   |

\* Order 2 foot brackets for each cylinder unit.

## ⚠ Precautions

**Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.**

### Operating Precautions

#### ⚠ Warning

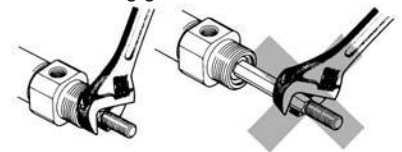
- Do not rotate the cover.**  
If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.
- Do not operate with the cushion needle in a fully closed condition.**  
Using it in the fully closed state will cause the cushion seal to be damaged. When adjusting the cushion needle, use the "Hexagon wrench key: nominal size 1.5".
- Do not open the cushion needle wide excessively.**  
If the cushion needle were set to be completely wide (more than 3 turns from fully closed), it would be equivalent to the cylinder with no cushion, thus making the impacts extremely high. Do not use it in such a way. Besides, using with fully open could give damage to the piston or cover.

#### ⚠ Caution

- Avoid using the air cylinder in such a way that rotational torque would be applied to the piston rod.**  
If rotational torque is applied, the non-rotating guide will become deformed, thus affecting the non-rotating accuracy. Refer to the table below for the approximate values of the allowable range of rotational torque.

| Allowable rotational torque (N·m or less) | ø20 | ø25  | ø32  | ø40  |
|---|-----|------|------|------|
|   | 0.2 | 0.25 | 0.25 | 0.44 |

To screw a bracket or a nut onto the threaded portion at the tip of the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes. Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.



- When replacing rod seals, please contact SMC.**  
Air leakage may be happened, depending on the position in which a rod seal is fitted. Thus, please contact SMC when replacing them.
- Not able to disassemble.**  
Cover and cylinder tube are connected to each other by caulking method, thus making it impossible to disassemble. Therefore, internal parts of a cylinder other than rod seal are not replaceable.
- Do not touch the cylinder during operation.**  
Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.
- Combine the rod end section, so that a rod boot might not be twisted.**  
If a rod boot is installed with being twisted when installing a cylinder, it will cause a rod boot to fail during operation.

# Air Cylinder: Non-rotating Rod Type Double Acting, Double Rod **Series CM2KW**

## With Air Cushion

CM2KW Mounting style Bore size Stroke A Rod boot

↓  
With air cushion

The cushion mechanism is provided for covers in both sides to absorb the impacts when operating at a high speed, thus giving no vibrations to a surrounding area and a long service life brought to cylinder.

Refer to page 147 for the specifications and allowable kinetic energy since this cylinder has the same specification as the double acting double rod model.

## Copper/Fluorine-free

20-CM2KW Mounting style Bore size Stroke

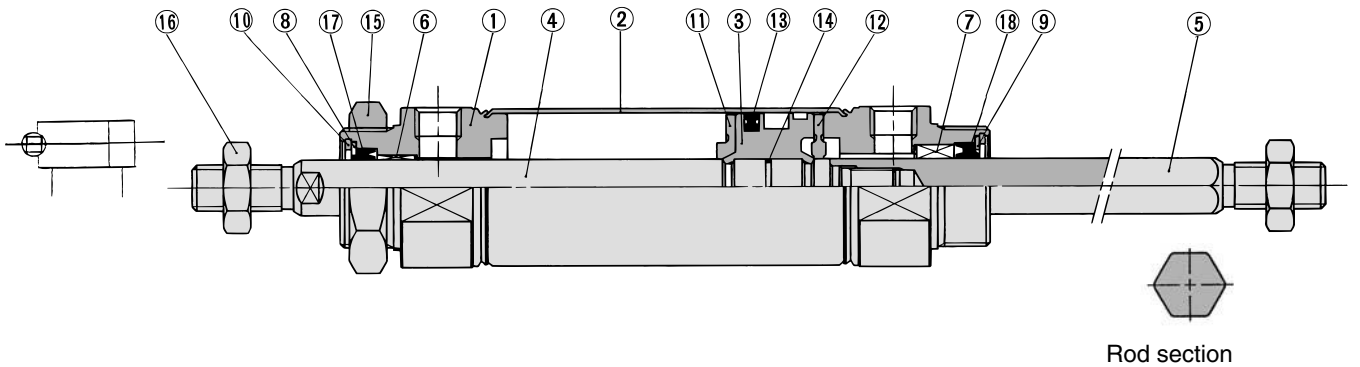
↓  
Copper/fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color

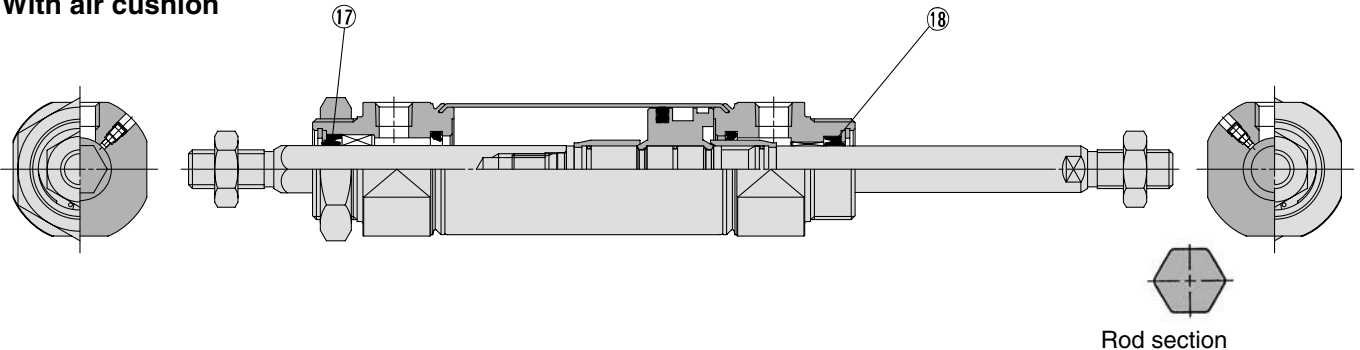
Refer to page 147 for the specifications since this cylinder has the same specification as the double acting double rod model.

## Construction

### Rubber bumper



### With air cushion



## Component Parts

| No. | Description        | Material                              | Note               |
|-----|--------------------|---------------------------------------|--------------------|
| 1   | Rod cover          | Aluminum alloy                        | Clear anodized     |
| 2   | Cylinder tube      | Stainless steel                       |                    |
| 3   | Piston             | Aluminum alloy                        | Chromated          |
| 4   | Piston rod A       | Carbon steel                          | Hard chrome plated |
| 5   | Piston rod B       | Stainless steel                       |                    |
| 6   | Bushing            | Copper oil-impregnated sintered alloy |                    |
| 7   | Non-rotating guide | Copper oil-impregnated sintered alloy |                    |
| 8   | Seal retainer A    | Stainless steel                       |                    |
| 9   | Seal retainer B    | Carbon steel                          | Nickel plated      |
| 10  | Retaining ring     | Carbon steel                          | Phosphate coated   |
| 11  | Bumper A           | Urethane                              |                    |
| 12  | Bumper B           | Urethane                              |                    |
| 13  | Piston seal        | NBR                                   |                    |
| 14  | Piston gasket      | NBR                                   |                    |
| 15  | mounting nut       | Carbon steel                          | Nickel plated      |
| 16  | Rod end nut        | Carbon steel                          | Nickel plated      |

## Replacement Part: Seal

### ● With Rubber Bumper, With Air Cushion, Built-in One-touch Fittings

| No. | Description | Material | Bore size (mm) |         |          |          |
|-----|-------------|----------|----------------|---------|----------|----------|
|     |             |          | 20             | 25      | 32       | 40       |
| 17  | Rod seal A  | NBR      | PDU-8Z         | PDU-10Z | PDU-12LZ | PDU-14LZ |
| 18  | Rod seal B  | NBR      | PDR-8W         | PDR-10W | PDR-12W  | PDR-14W  |

\* Since the seal kit does not include a grease pack, order it separately.  
Grease pack part no.: **GR-S-010** (10 g)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual  
-X□

Technical  
data





# Air Cylinder: Non-rotating Rod Type Single Acting, Spring Return/Extend

## Series **CM2K**

ø20, ø25, ø32, ø40

### How to Order



**Mounting style**

|           |                                  |
|-----------|----------------------------------|
| <b>B</b>  | Basic style                      |
| <b>L</b>  | Axial foot style                 |
| <b>F</b>  | Rod side flange style            |
| <b>G</b>  | Head side flange style           |
| <b>C</b>  | Single clevis style              |
| <b>D</b>  | Double clevis style              |
| <b>U</b>  | Rod side trunnion style          |
| <b>T</b>  | Head side trunnion style         |
| <b>E</b>  | Clevis integrated style          |
| <b>BZ</b> | Boss-cut basic style             |
| <b>FZ</b> | Boss-cut rod side flange style   |
| <b>UZ</b> | Boss-cut rod side trunnion style |

**Cylinder stroke (mm)**  
(Refer to "Standard Stroke" on page 182.)

**Action**

|          |                              |
|----------|------------------------------|
| <b>S</b> | Single acting, Spring return |
| <b>T</b> | Single acting, Spring extend |

**Made to Order**  
(Refer to page 182 for details.)

**With auto switch**

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

**Bore size**

|           |       |
|-----------|-------|
| <b>20</b> | 20 mm |
| <b>25</b> | 25 mm |
| <b>32</b> | 32 mm |
| <b>40</b> | 40 mm |

**Number of auto switches**

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

**Auto switch**

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

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

**Example Order Codes:**  
**CM2K L 32 - 150 S** (Basic style, 32mm bore, 150mm stroke, single acting spring return)  
**CDM2K L 32 - 150 S - M9BW** (Built-in magnet, 32mm bore, 150mm stroke, single acting spring return, M9BW auto switch)

### Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.  
(Example) CDM2KF32-100T

### Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

| Type               | Special function                            | Electrical entry                           | Indicator light | Wiring (Output)         | Load voltage |             | Auto switch model | Lead wire length (m) |             |       |            |               | Pre-wired connector | Applicable load |            |   |     |            |   |   |            |
|--------------------|---|--|-----------------|-------------------------|--------------|-------------|-------------------|----------------------|-------------|-------|------------|---------------|---------------------|-----------------|------------|---|-----|------------|---|---|------------|
|                    |   |  |                 |                         | DC           | AC          |                   | 0.5 (Nil)            | 1 (M)       | 3 (L) | 5 (Z)      | None (N)      |                     |                 |            |   |     |            |   |   |            |
| Solid state switch | —   | Grommet                                    | Yes             | 3-wire (NPN)            | 5 V, 12 V    | —           | <b>M9N</b>        | ●                    | ●           | ●     | ○          | —             | ○                   | IC circuit      | Relay, PLC |   |     |            |   |   |            |
|                    |   |  |                 | 3-wire (PNP)            |              |             | <b>M9P</b>        | ●                    | ●           | ●     | ○          | —             | ○                   |                 |            |   |     |            |   |   |            |
|                    |   | Connector                                  |                 | 2-wire                  | 12 V         | <b>M9B</b>  | ●                 | ●                    | ●           | ○     | —          | ○             | —                   |                 |            |   |     |            |   |   |            |
|                    |   |  |                 | Terminal conduit        | 3-wire (NPN) | 5 V, 12 V   | <b>H7C</b>        | ●                    | ●           | ●     | ●          | ●             | —                   | —               |            |   |     |            |   |   |            |
|                    | Grommet                                     | 2-wire                                     | 12 V            |                         | <b>G39A</b>  | —           | —                 | —                    | —           | ●     | —          | —             | IC circuit          |                 |            |   |     |            |   |   |            |
|                    |   | Diagnostic indication (2-color indication) | Grommet         | 3-wire (NPN)            | 5 V, 12 V    | <b>K39A</b> | —                 | —                    | —           | —     | ●          | —             | —                   | —               |            |   |     |            |   |   |            |
|                    | 3-wire (PNP)                                |  |                 | 5 V, 12 V               | <b>M9NW</b>  | ●           | ●                 | ●                    | ○           | —     | ○          | IC circuit    |                     |                 |            |   |     |            |   |   |            |
|                    | Water resistant (2-color indication)        | Grommet                                    | 2-wire          | 12 V                    | <b>M9PW</b>  | ●           | ●                 | ●                    | ○           | —     | ○          | —             |                     |                 |            |   |     |            |   |   |            |
|                    |   |  | 4-wire (NPN)    | 5 V, 12 V               | <b>M9BW</b>  | ●           | ●                 | ●                    | ○           | —     | ○          | —             |                     |                 |            |   |     |            |   |   |            |
|                    | With diagnostic output (2-color indication) | Grommet                                    | 2-wire          | 12 V                    | <b>H7BA</b>  | —           | —                 | ●                    | ○           | —     | ○          | —             |                     |                 |            |   |     |            |   |   |            |
| 4-wire (NPN)       |   |  | 5 V, 12 V       | <b>H7NF</b>             | ●            | —           | ●                 | ○                    | —           | ○     | IC circuit |               |                     |                 |            |   |     |            |   |   |            |
| Reed switch        | —   | Grommet                                    | Yes             | 3-wire (NPN equivalent) | —            | 5 V         | —                 | <b>A96</b>           | ●           | —     | ●          | —             | —                   | —               | IC circuit | — |     |            |   |   |            |
|                    |   |  |                 |                         |              |             |                   | Connector            | 2-wire      | 24 V  | 12 V       | 100 V         | <b>A93</b>          | ●               | —          |   | ●   | —          | — | — | —          |
|                    |   |  |                 |                         |              |             |                   |                      |             |       |            | 100 V or less | <b>A90</b>          | ●               | —          |   | ●   | —          | — | — | IC circuit |
|                    |   |  |                 |                         |              |             |                   |                      |             |       |            | 100 V, 200 V  | <b>B54</b>          | ●               | —          |   | ●   | ●          | — | — | —          |
|                    |   |  |                 |                         |              |             |                   |                      |             |       |            | 200 V or less | <b>B64</b>          | ●               | —          |   | ●   | —          | — | — | —          |
|                    |   | Terminal conduit                           |                 | 2-wire                  | 24 V         | 12 V        | 24 V or less      | <b>C73C</b>          | ●           | —     | ●          | ●             | ●                   | —               | —          |   |     |            |   |   |            |
|                    |   |  |                 |                         |              |             | —                 | <b>C80C</b>          | ●           | —     | ●          | ●             | ●                   | —               | IC circuit |   |     |            |   |   |            |
|                    |   | DIN terminal                               |                 | 2-wire                  | 24 V         | 12 V        | —                 | <b>A33A</b>          | —           | —     | —          | —             | ●                   | —               | —          |   | PLC |            |   |   |            |
|                    |   |  |                 |                         |              |             | 100 V, 200 V      | <b>A34A</b>          | —           | —     | —          | —             | —                   | ●               | —          |   | —   |            |   |   |            |
|                    |   | Diagnostic indication (2-color indication) |                 | Grommet                 | 2-wire       | 24 V        | 12 V              | —                    | <b>A44A</b> | —     | —          | —             | —                   | ●               | —          |   | —   | Relay, PLC |   |   |            |
| —                  | <b>B59W</b>                                 |  | ●               |                         |              |             |                   | —                    | ●           | —     | —          | —             | —                   |                 |            |   |     |            |   |   |            |

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW  
 1 m ..... M (Example) M9NWM  
 3 m ..... L (Example) M9NWL  
 5 m ..... Z (Example) M9NWZ  
 None ..... N (Example) H7CN

\* Solid state auto switches marked with "○" are produced upon receipt of order.  
 \* D-A9□□/M9□□□/□□□□□□ and D-M9□□□□(V) L cannot be mounted.  
 \* Do not indicate suffix "N" for no lead wire on D-A3□□□/A44A/G39A/K39A models.

\* Since there are other applicable auto switches than listed above, refer to page 218 for details.  
 \* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.  
 \* D-A9□□/M9□□□/□□□□□ auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

- CJ1
- CJP
- CJ2
- CM2**
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Individual -X□
- Technical data

# Series CM2K

**A cylinder which rod does not rotate because of the hexagonal rod shape.**

## Non-rotating accuracy

ø20, ø25—±0.7°

ø32, ø40—±0.5°

**Can operate without lubrication.**

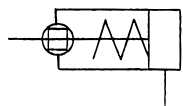
**The same installation dimensions as the standard cylinder.**

**Auto switches can also be mounted.**

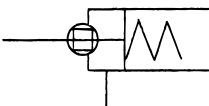
It can be installed with auto switches to simplify the detection of the stroke position of the cylinder.

## JIS Symbol

Single acting,  
Spring return



Spring extend



**Made to Order Specifications**  
(For details, refer to pages 1395 to 1498.)

| Symbol | Specifications   |
|--------|--|
| —XB12  | External stainless steel cylinder                                |
| —XC3   | Special port location  |
| —XC6   | Piston rod and rod end nut made of stainless steel               |
| —XC13  | Auto switch mounting rail style                                  |
| —XC20  | Head cover axial port  |
| —XC27  | Double clevis pin and double knuckle pin made of stainless steel |
| —XC52  | Mounting nut with set screw                                      |

## ⚠ Precautions

**Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.**

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

## Specifications

| Bore size (mm)                |               | 20  | 25    | 32     | 40    |
|-------------------------------|---------------|---|-------|--------|-------|
| Rod non-rotating accuracy     |               | ±0.7  |       | ±0.5   |       |
| Action                        |               | Spring acting, Spring return/Spring extend  |       |        |       |
| Fluid                         |               | Air   |       |        |       |
| Cushion                       |               | Rubber bumper   |       |        |       |
| Proof pressure                |               | 1.5 MPa   |       |        |       |
| Maximum operating pressure    |               | 1.0 MPa   |       |        |       |
| Minimum operating pressure    | Spring return | 0.18 MPa  |       |        |       |
|                               | Spring extend | 0.23 MPa  |       |        |       |
| Ambient and fluid temperature |               | Without auto switch: -10 to 70°C (No freezing)<br>With auto switch: -10 to 60°C (No freezing) |       |        |       |
| Lubrication                   |               | Not required (Non-lube)   |       |        |       |
| Stroke length tolerance       |               | +1.4<br>0 mm  |       |        |       |
| Piston speed                  |               | 50 to 500 mm/s  |       |        |       |
| Allowable kinetic energy      |               | 0.27 J  | 0.4 J | 0.65 J | 1.2 J |

## Standard Stroke

| Bore size (mm) | Standard stroke (mm) <sup>Note</sup> |
|----------------|--------------------------------------|
| 20             | 25, 50, 75, 100, 125, 150            |
| 25             | 25, 50, 75, 100, 125, 150            |
| 32             | 25, 50, 75, 100, 125, 150, 200       |
| 40             | 25, 50, 75, 100, 125, 150, 200, 250  |

Note 1) Other intermediate strokes can be manufactured upon receipt of order.

Manufacture of intermediate strokes at 1 mm intervals is possible.

(Spacers are not used.)

Note 2) Please contact SMC for longer strokes.

## Mounting Bracket Part No.

| Mounting bracket                | Min. order | Bore size (mm) |          |          |          | Description (for min. order)                                  |
|---------------------------------|------------|----------------|----------|----------|----------|---|
|                                 |            | 20             | 25       | 32       | 40       |   |
| Axial foot *                    | 2          | CM-L020B       | CM-L032B | CM-L040B | CM-L040B | 2 foot, 1 mounting nut  |
| Flange                          | 1          | CM-F020B       | CM-F032B | CM-F040B | CM-F040B | 1 flange  |
| Single clevis**                 | 1          | CM-C020B       | CM-C032B | CM-C040B | CM-C040B | 1 single clevis, 3 liners                                     |
| Double clevis***<br>(with pins) | 1          | CM-D020B       | CM-D032B | CM-D040B | CM-D040B | 1 double clevis, 3 liners,<br>1 clevis pin, 2 retaining rings |
| Trunnion (with nuts)            | 1          | CM-T020B       | CM-T032B | CM-T040B | CM-T040B | 1 trunnion, 1 trunnion nut                                    |

\* Order 2 foot brackets for each cylinder unit.

\*\* 3 Liners are attached with a clevis bracket for adjusting the mounting angle.

\*\*\* Clevis pins and retaining rings (cotter pins for ø40) are attached.

## Theoretical Output

Refer to "Theoretical Output 1" on page 1573.

## Spring Reaction Force

Refer to "Spring Reaction Force 3" on page 1570.

## Boss-cut style

Boss for the head side cover bracket is eliminated and the total length of cylinder is shortened.



## Comparison of the Full Length Dimension (Versus standard type) (mm)

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

## Mounting style

- Boss-cut basic style (BZ)
- Boss-cut flange style (FZ)
- Boss-cut trunnion style (UZ)

**Mounting Style and Accessory**

| Mounting                           | Accessory            | Standard equipment |                  |            | Option               |                                     |                               |
|------------------------------------|----------------------|--------------------|------------------|------------|----------------------|-------------------------------------|-------------------------------|
|                                    |                      | Mounting nut       | Rod end nut      | Clevis pin | Single knuckle joint | Double knuckle joint <sup>(3)</sup> | Clevis bracket <sup>(4)</sup> |
| Basic style                        | ● (1 pc.)            | ●                  | —                | ●          | ●                    | —                                   |                               |
| Axial foot style                   | ● (2)                | ●                  | —                | ●          | ●                    | —                                   |                               |
| Rod side flange style              | ● (1)                | ●                  | —                | ●          | ●                    | —                                   |                               |
| Head side flange style             | ● (1)                | ●                  | —                | ●          | ●                    | —                                   |                               |
| Clevis integrated style            | — <sup>(1)</sup>     | ●                  | —                | ●          | ●                    | ●                                   |                               |
| Single clevis style                | — <sup>(1)</sup>     | ●                  | —                | ●          | ●                    | —                                   |                               |
| Double clevis style <sup>(3)</sup> | — <sup>(1)</sup>     | ●                  | ● <sup>(5)</sup> | ●          | ●                    | —                                   |                               |
| Rod side trunnion style            | ● (1) <sup>(2)</sup> | ●                  | —                | ●          | ●                    | —                                   |                               |
| Head side trunnion style           | ● (1) <sup>(2)</sup> | ●                  | —                | ●          | ●                    | —                                   |                               |
| Boss-cut basic style               | ● (1)                | ●                  | —                | ●          | ●                    | —                                   |                               |
| Boss-cut flange style              | ● (1)                | ●                  | —                | ●          | ●                    | —                                   |                               |
| Boss-cut trunnion style            | ● (1)                | ●                  | —                | ●          | ●                    | —                                   |                               |

Note 1) Mounting nuts are not attached for clevis integrated style, single clevis, and double clevis styles.

Note 2) Trunnion nuts are attached for rod side trunnion and head side trunnion styles.

Note 3) Pin and retaining ring (cotter pin for bore size ø40) are shipped together with double clevis and double knuckle joint.

Note 4) Pin and retaining ring are shipped together with clevis pivot bracket.

Note 5) Clevis pins come with retaining rings (cotter pins for ø40).

**Mass**

**Spring Return/( ): Denotes Spring Extend.**

(kg)

| Bore size (mm)        |                                 | 20            | 25            | 32            | 40            |
|-----------------------|---------------------------------|---------------|---------------|---------------|---------------|
| Basic mass            | 25 stroke                       | 0.20 (0.19)   | 0.31 (0.30)   | 0.43 (0.41)   | 0.78 (0.75)   |
|                       | 50 stroke                       | 0.23 (0.21)   | 0.34 (0.33)   | 0.48 (0.45)   | 0.86 (0.83)   |
|                       | 75 stroke                       | 0.29 (0.25)   | 0.43 (0.41)   | 0.61 (0.56)   | 1.08 (0.99)   |
|                       | 100 stroke                      | 0.31 (0.27)   | 0.47 (0.44)   | 0.66 (0.60)   | 1.14 (1.06)   |
|                       | 125 stroke                      | 0.37 (0.32)   | 0.56 (0.52)   | 0.81 (0.72)   | 1.34 (1.23)   |
|                       | 150 stroke                      | 0.39 (0.34)   | 0.59 (0.55)   | 0.85 (0.76)   | 1.39 (1.31)   |
|                       | 200 stroke                      | — (—)         | — (—)         | 1.04 (0.92)   | 1.71 (1.54)   |
|                       | 250 stroke                      | — (—)         | — (—)         | — (—)         | 2.00 (1.78)   |
| Mounting bracket mass | Foot style                      | 0.15 (0.15)   | 0.16 (0.16)   | 0.16 (0.16)   | 0.27 (0.27)   |
|                       | Flange style                    | 0.06 (0.06)   | 0.09 (0.09)   | 0.09 (0.09)   | 0.12 (0.12)   |
|                       | Single clevis style             | 0.04 (0.04)   | 0.04 (0.04)   | 0.04 (0.04)   | 0.09 (0.09)   |
|                       | Double clevis style             | 0.05 (0.05)   | 0.06 (0.06)   | 0.06 (0.06)   | 0.13 (0.13)   |
|                       | Trunnion style                  | 0.04 (0.04)   | 0.07 (0.07)   | 0.07 (0.07)   | 0.10 (0.10)   |
|                       | Integral clevis style           | -0.02 (-0.02) | -0.02 (-0.02) | -0.01 (-0.01) | -0.04 (-0.04) |
|                       | Boss-cut basic style            | -0.01 (-0.01) | -0.02 (-0.02) | -0.02 (-0.02) | -0.03 (-0.03) |
|                       | Boss-cut flange style           | 0.05 (0.05)   | 0.07 (0.07)   | 0.07 (0.07)   | 0.09 (0.09)   |
|                       | Boss-cut trunnion style         | 0.03 (0.03)   | 0.05 (0.05)   | 0.05 (0.05)   | 0.07 (0.07)   |
|                       | Clevis bracket (With pin)       | 0.07 (0.07)   | 0.07 (0.07)   | 0.14 (0.14)   | 0.14 (0.14)   |
| Option bracket        | Single knuckle joint            | 0.06 (0.06)   | 0.06 (0.06)   | 0.06 (0.06)   | 0.23 (0.23)   |
|                       | Double knuckle joint (With pin) | 0.07 (0.07)   | 0.07 (0.07)   | 0.07 (0.07)   | 0.20 (0.20)   |

Calculation:

(Example) **CM2KL32-100S** (Bore size ø32, Foot style, 100 stroke)  
0.66 (Basic mass) + 0.16 (Mounting bracket mass) = 0.82 kg

- CJ1**
- CJP**
- CJ2**
- CM2**
- CG1**
- MB**
- MB1**
- CA2**
- CS1**
- CS2**

- D-□**
- X□**
- Individual  
**-X□**
- Technical  
data

# Series CM2K

## Copper/Fluorine-free

20-CM2K **Mounting style** **Bore size** **Stroke** **Action**

• Copper/fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluoro-resins over the color cathode ray tube.

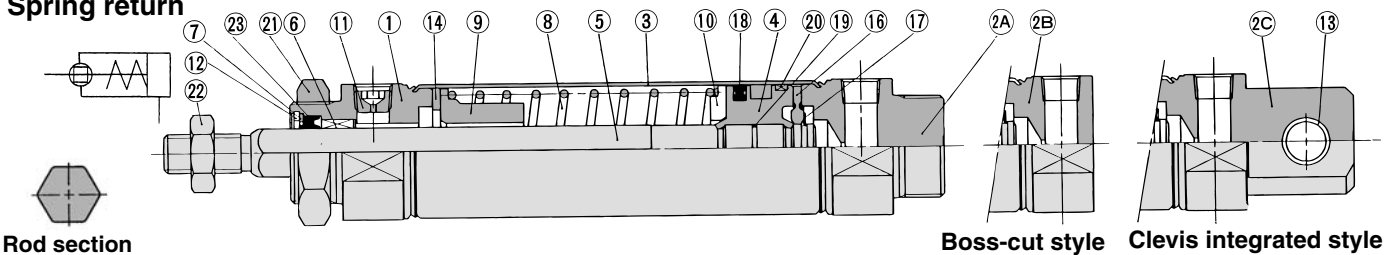
### Specifications

|                                |  |                              |
|--------------------------------|--|------------------------------|
| <b>Action</b>                  | Single acting, Spring return   | Single acting, Spring extend |
| <b>Bore size (mm)</b>          | ø20, ø25, ø32, ø40   |                              |
| <b>Max. operating pressure</b> | 1.0 MPa  |                              |
| <b>Min. operating pressure</b> | 0.18 MPa   | 0.23 MPa                     |
| <b>Cushion</b>                 | Rubber bumper  |                              |
| <b>Piston speed</b>            | 50 to 500 mm/s   |                              |
| <b>Mounting</b>                | Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style, Clevis integrated style, Boss-cut style |                              |

\* Auto switch can be mounted.

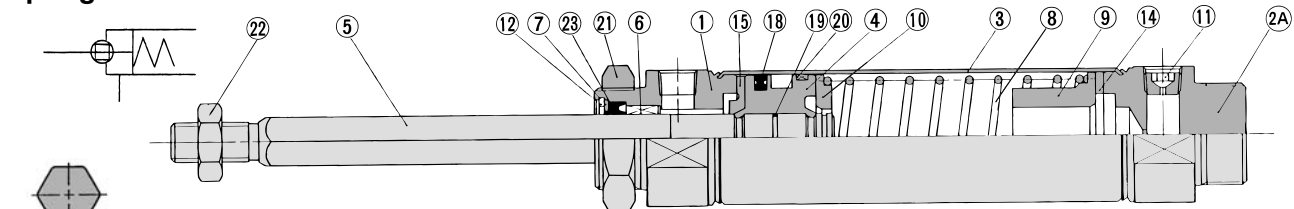
## Construction

### Spring return



Rod section

### Spring extend



Rod section

### Component Parts

| No. | Description             | Material                              | Note                 |
|-----|-------------------------|---------------------------------------|----------------------|
| 1   | Rod cover               | Aluminum alloy                        | Clear anodized       |
| 2A  | Head cover A            | Aluminum alloy                        | Clear anodized *     |
| 2B  | Head cover B            | Aluminum alloy                        | Clear anodized **    |
| 2C  | Head cover C            | Aluminum alloy                        | Clear anodized ***   |
| 3   | Cylinder tube           | Stainless steel                       |                      |
| 4   | Piston                  | Aluminum alloy                        | Chromated            |
| 5   | Piston rod              | Stainless steel                       |                      |
| 6   | Non-rotating guide      | Copper oil-impregnated sintered alloy |                      |
| 7   | Seal retainer           | Carbon steel                          | Nickel plated        |
| 8   | Return spring           | Steel wire                            | Zinc chromated       |
| 9   | Spring guide            | Aluminum alloy                        | Chromated            |
| 10  | Spring seat             | Aluminum alloy                        | Chromated            |
| 11  | Plug with fixed orifice | Alloy steel                           | Black zinc chromated |

\* Basic style, \*\* Boss-cut style, \*\*\* Clevis integrated style

| No. | Description    | Material                              | Note             |
|-----|----------------|---------------------------------------|------------------|
| 12  | Retaining ring | Carbon steel                          | Phosphate coated |
| 13  | Clevis bushing | Copper oil-impregnated sintered alloy |                  |
| 14  | Bumper         | Urethane                              |                  |
| 15  | Bumper A       | Urethane                              |                  |
| 16  | Bumper B       | Urethane                              |                  |
| 17  | Retaining ring | Stainless steel                       |                  |
| 18  | Piston seal    | NBR                                   |                  |
| 19  | Piston gasket  | NBR                                   |                  |
| 20  | Wear ring      | Resin                                 |                  |
| 21  | Mounting nut   | Carbon steel                          | Nickel plated    |
| 22  | Rod end nut    | Carbon steel                          | Nickel plated    |

### Replacement Parts: Seal

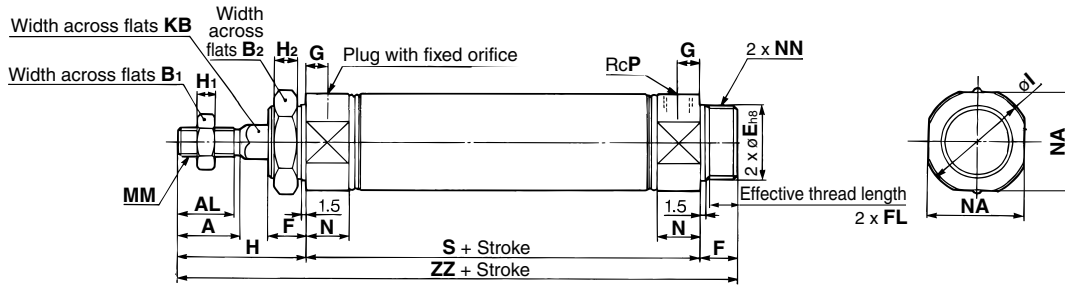
| No. | Description | Material | Part no. |         |         |         |
|-----|-------------|----------|----------|---------|---------|---------|
|     |             |          | 20       | 25      | 32      | 40      |
| 23  | Rod seal    | NBR      | PDR-8W   | PDR-10W | PDR-12W | PDR-14W |

\*Since the seal kit does not include a grease pack, order it separately.  
Grease pack part no.:GR-S-010(10g)

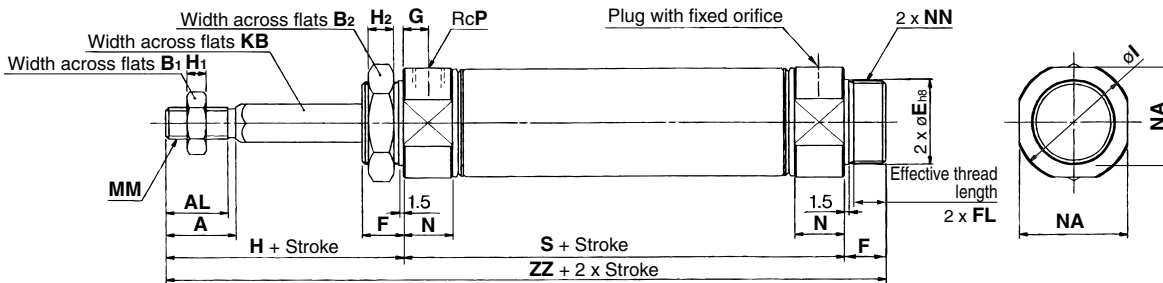
## Basic Style (B)

CM2KB Bore size — Stroke  $\frac{S}{T}$

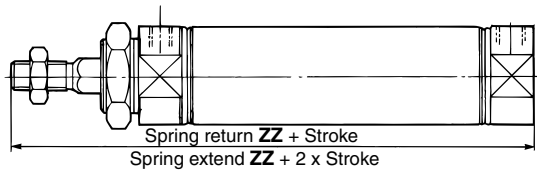
### Spring return



### Spring extend



### Boss-cut style



| Bore size | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | KB   | MM         | N    | NA   | NN        | P   |
|-----------|----|------|----------------|----------------|-----------------------------------|----|------|----|----|----------------|----------------|------|------|------------|------|------|-----------|-----|
| 20        | 18 | 15.5 | 13             | 26             | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 8              | 28   | 8.2  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 |
| 25        | 22 | 19.5 | 17             | 32             | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 8              | 33.5 | 10.2 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 |
| 32        | 22 | 19.5 | 17             | 32             | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 8              | 37.5 | 12.2 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 |
| 40        | 24 | 21   | 22             | 41             | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 10             | 46.5 | 14.2 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 |

### Dimensions by Stroke (mm)

| Bore size | Stroke 1 to 50 |     | Stroke 51 to 100 |     | Stroke 101 to 150 |     | Stroke 151 to 200 |     | Stroke 201 to 250 |     |
|-----------|----------------|-----|------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|
|           | S              | ZZ  | S                | ZZ  | S                 | ZZ  | S                 | ZZ  | S                 | ZZ  |
| 20        | 87             | 141 | 112              | 166 | 137               | 191 | —                 | —   | —                 | —   |
| 25        | 87             | 145 | 112              | 170 | 137               | 195 | —                 | —   | —                 | —   |
| 32        | 89             | 147 | 114              | 172 | 139               | 197 | 164               | 222 | —                 | —   |
| 40        | 113            | 179 | 138              | 204 | 163               | 229 | 188               | 254 | 213               | 279 |

### Boss-cut Style (mm)

| Bore size | Stroke 1 to 50 |     | Stroke 51 to 100 |     | Stroke 101 to 150 |    | Stroke 151 to 200 |    | Stroke 201 to 250 |  |
|-----------|----------------|-----|------------------|-----|-------------------|----|-------------------|----|-------------------|--|
|           | ZZ             | ZZ  | ZZ               | ZZ  | ZZ                | ZZ | ZZ                | ZZ | ZZ                |  |
| 20        | 128            | 153 | 178              | —   | —                 | —  | —                 | —  | —                 |  |
| 25        | 132            | 157 | 182              | —   | —                 | —  | —                 | —  | —                 |  |
| 32        | 134            | 159 | 184              | 209 | —                 | —  | —                 | —  | —                 |  |
| 40        | 163            | 188 | 213              | 238 | 263               | —  | —                 | —  | —                 |  |



External dimensions of each mounting bracket other than basic style are the same as standard type, single acting, spring return/spring extend (except piston rod configuration). Refer to pages 163 to 170.  
Specifications with auto switch are the same as standard type (CDM2- □S/T).

- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Individual -X□
- Technical data

# Air Cylinder: Direct Mount Type

## Double Acting, Single Rod

# Series CM2R

ø20, ø25, ø32, ø40



### How to Order

**Type**

|     |           |
|-----|-----------|
| Nil | Pneumatic |
| H   | Air-hydro |

**Cylinder stroke (mm)**  
(Refer to "Standard Stroke" on page 187.)

**Cushion**

|     |               |
|-----|---------------|
| Nil | Rubber bumper |
| A   | Air cushion   |

\* Air-hydro cylinder: Rubber bumper only

**Made to Order**  
(Refer to page 187 for details.)

**Mounting style**

|   |                       |
|---|-----------------------|
| A | Bottom mounting style |
| B | Front mounting style  |

**Bore size**

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

**Number of auto switches**

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

**Auto switch**

|     |                     |
|-----|---------------------|
| Nil | Without auto switch |
|-----|---------------------|

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

**CM2** **R** **A** **20** - **100** **A** - **M9BW**

**With auto switch (Built-in magnet)** **CDM2** **R** **A** **20** - **100** **A** - **M9BW**

### Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.  
(Example) CDM2RB32-100

### Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

| Type                                       | Special function                           | Electrical entry | Indicator light | Wiring (Output)         | Load voltage |    | Auto switch model | Lead wire length (m) |        |       |       |          | Pre-wired connector | Applicable load |              |
|--|--|------------------|-----------------|-------------------------|--------------|----|-------------------|----------------------|--------|-------|-------|----------|---------------------|-----------------|--------------|
|  |  |                  |                 |                         | DC           | AC |                   | 0.5 (Nil)            | 1 (M)  | 3 (L) | 5 (Z) | None (N) |                     |                 |              |
| Solid state switch                         | —  | Grommet          | Yes             | 3-wire (NPN)            | 24V          | —  | —                 | M9N                  | ●      | ●     | ●     | ○        | —                   | ○               | IC circuit   |
|  |  |                  |                 | 3-wire (PNP)            |              |    |                   | M9P                  | ●      | ●     | ●     | ○        | —                   |                 |              |
|  |  | 2-wire           | M9B             | ●                       |              |    |                   | ●                    | ●      | ○     | —     | ○        |                     |                 |              |
|  |  | 2-wire           | H7C             | ●                       |              |    |                   | —                    | ●      | ●     | ●     | —        |                     |                 |              |
|  | Diagnostic indication (2-color indication) | Grommet          | Yes             | 3-wire (NPN)            | 24V          | —  | —                 | G39A **              | —      | —     | —     | —        | ●                   | —               | IC circuit   |
|  |  |                  |                 | 2-wire                  |              |    |                   | K39A **              | —      | —     | —     | —        | ●                   | —               | —            |
|  |  |                  |                 | 3-wire (NPN)            |              |    |                   | M9NW                 | ●      | ●     | ●     | ○        | —                   | ○               | IC circuit   |
|  |  |                  |                 | 3-wire (PNP)            |              |    |                   | M9PW                 | ●      | ●     | ●     | ○        | —                   | ○               | —            |
|  |  |                  |                 | 2-wire                  |              |    |                   | M9BW                 | ●      | ●     | ●     | ○        | —                   | ○               | —            |
|  |  |                  |                 | 4-wire (NPN)            |              |    |                   | H7BA                 | —      | —     | ●     | ○        | —                   | ○               | —            |
| Reed switch                                | —  | Grommet          | Yes             | 3-wire (NPN equivalent) | 24V          | —  | —                 | A96                  | ●      | —     | ●     | —        | —                   | ○               | IC circuit   |
|  |  |                  |                 | No                      |              |    |                   | 100V                 | A93    | ●     | —     | ●        | —                   | —               | —            |
|  |  |                  |                 |                         |              |    |                   | 100V or less         | A90    | ●     | —     | ●        | —                   | —               | —            |
|  |  |                  |                 |                         |              |    |                   | 100V, 200V           | B54 ** | ●     | —     | ●        | ●                   | —               | —            |
|  |  |                  |                 |                         |              |    |                   | 200V or less         | B64 ** | ●     | —     | ●        | —                   | —               | —            |
|  |  | Connector        | No              | 24V or less             | C73C         | ●  | —                 | ●                    | ●      | ●     | —     |          |                     |                 |              |
|  |  |                  |                 | 24V or less             | C80C         | ●  | —                 | ●                    | ●      | ●     | —     |          |                     |                 |              |
|  |  |                  |                 | —                       | A33A **      | —  | —                 | —                    | —      | ●     | —     |          |                     |                 |              |
|  |  |                  |                 | —                       | A34A **      | —  | —                 | —                    | —      | ●     | —     |          |                     |                 |              |
|  |  |                  |                 | 100V, 200V              | A44A **      | —  | —                 | —                    | —      | ●     | —     |          |                     |                 |              |
| Terminal conduit                           | Yes  | —                | —               | —                       | —            | —  | —                 | —                    | —      | —     | —     | —        | —                   | —               |              |
|  |  |                  |                 |                         |              |    |                   |                      |        |       |       |          |                     |                 | DIN terminal |
| Diagnostic indication (2-color indication) | Grommet                                    | Yes              | —               | —                       | —            | —  | —                 | —                    | —      | —     | —     | —        | —                   |                 |              |
|  |  |                  |                 |                         |              |    |                   |                      |        |       |       |          |                     | —               | —            |

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW  
 1 m ..... M (Example) M9NWM  
 3 m ..... L (Example) M9NWL  
 5 m ..... Z (Example) M9NWZ  
 None ..... N (Example) H7CN

\* Solid state auto switches marked with "○" are produced upon receipt of order.  
 \* D-A9□□/M9□□/□□V and D-M9□□(V)L cannot be mounted.  
 \* Do not indicate suffix "N" for no lead wire on D-A3□□/A44A/G39A/K39A models.  
 \* D-A3□□/A44A/G39A/K39A/B54/B64 cannot be mounted on bore sizes ø20 and ø25 cylinder with air cushion.

\* Since there are other applicable auto switches than listed above, refer to page 218 for details.  
 \* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.  
 \* D-A9□□/M9□□/□□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

# Air Cylinder: Direct Mount Type Double Acting, Single Rod *Series CM2R*

**Series CM2R direct mount cylinder can be installed directly through the use of a square rod cover.**

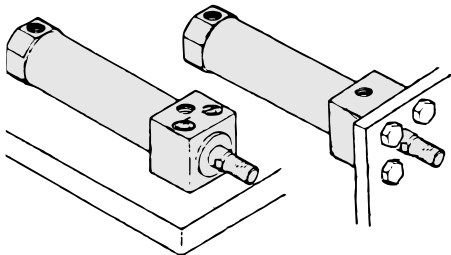
**Space saving has been realized.** Because it is a directly mounted style without using brackets, its overall length is shorter, and its installation pitch can be made smaller. Thus, the space that is required for installation has been dramatically reduced.

### Improved installation accuracy and strength

A centering boss has been provided to improve the installation accuracy. Also, because it is the directly mounted style, the strength has been increased.

### Two styles of installation

Two styles of installations are available and can be selected according to the purpose: the front mounting style or the bottom mounting style.

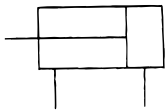


Bottom mounting style

Front mounting style

### JIS Symbol

Double acting



**Made to Order Specifications**  
(For details, refer to pages 1373 to 1498.)

| Symbol | Specifications  |
|--------|---|
| —XA□   | Change of rod end shape                               |
| —XB6   | Heat resistant cylinder (150°C)                       |
| —XB7   | Cold resistant cylinder                               |
| —XB9   | Low speed cylinder (10 to 50 mm/s)                    |
| —XB13  | Low speed cylinder (5 to 50 mm/s)                     |
| —XC3   | Special port location                                 |
| —XC5   | Heat resistant cylinder (110°C)                       |
| —XC6   | Piston rod and rod end nut made of stainless steel    |
| —XC8   | Adjustable stroke cylinder/Adjustable extension type  |
| —XC9   | Adjustable stroke cylinder/Adjustable retraction type |
| —XC11  | Dual stroke cylinder/Single rod type                  |
| —XC12  | Tandem cylinder                                       |
| —XC13  | Auto switch mounting rail style                       |
| —XC20  | Head cover axial port                                 |
| —XC22  | Fluororubber seals                                    |
| —XC25  | No fixed orifice of connecting port                   |
| —XC29  | Double knuckle joint with spring pin                  |

### Specifications

| Bore size (mm)                       |   | 20  | 25               | 32               | 40               |
|--------------------------------------|---|---|------------------|------------------|------------------|
| <b>Action</b>                        |   | Double acting, Single rod   |                  |                  |                  |
| <b>Fluid</b>                         |   | Air   |                  |                  |                  |
| <b>Proof pressure</b>                |   | 1.5 MPa   |                  |                  |                  |
| <b>Maximum operating pressure</b>    |   | 1.0 MPa   |                  |                  |                  |
| <b>Minimum operating pressure</b>    |   | 0.05 MPa  |                  |                  |                  |
| <b>Ambient and fluid temperature</b> |   | Without auto switch: -10 to 70°C (No freezing)<br>With auto switch: -10 to 60°C (No freezing) |                  |                  |                  |
| <b>Lubrication</b>                   |   | Not required (Non-lube)   |                  |                  |                  |
| <b>Stroke length tolerance</b>       |   | $\begin{matrix} +1.4 \\ 0 \end{matrix}$ mm  |                  |                  |                  |
| <b>Piston speed</b>                  |   | Rubber bumper: 50 to 750 mm/s, Air cushion: 50 to 1000 mm/s                                   |                  |                  |                  |
| <b>Cushion</b>                       |   | Rubber bumper, Air cushion  |                  |                  |                  |
| <b>Allowable kinetic energy</b>      | <b>Rubber bumper</b>                                  | 0.27 J  | 0.4 J            | 0.65 J           | 1.2 J            |
|                                      | <b>Air cushion</b><br>(Effective cushion length (mm)) | 0.54 J<br>(11.0)  | 0.78 J<br>(11.0) | 1.27 J<br>(11.0) | 2.35 J<br>(11.8) |

### Standard Stroke

| Bore size (mm) | Standard stroke (mm) <sup>(1)</sup>      | Maximum manufacturable stroke (mm) <sup>(2)</sup> |
|----------------|--|---|
| 20             | 25, 50, 75, 100, 125, 150                | 1000  |
| 25             | 25, 50, 75, 100, 125, 150, 200           | 1500  |
| 32             | 25, 50, 75, 100, 125, 150, 200           | 2000  |
| 40             | 25, 50, 75, 100, 125, 150, 200, 250, 300 | 2000  |

Note 1) Other intermediate strokes can be manufactured upon receipt of order.  
Manufacture of intermediate strokes at 1 mm intervals is possible.  
(Spacers are not used.)

Note 2) Refer to next page for Precautions.

**Tightening Torque:** Tighten the cylinder mounting bolts for the bottom mounting Style (Series CM2RA) with the following tightening torque.

| Bore size (mm) | Hexagon socket head cap screw size | Tightening torque(N·m) |
|----------------|------------------------------------|------------------------|
| 20             | M5 x 0.8                           | 2.4 to 3.6             |
| 25             | M6                                 | 4.2 to 6.2             |
| 32             | M8                                 | 10.0 to 15.0           |
| 40             | M10                                | 19.6 to 29.4           |

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual  
-X□

Technical  
data

# Series CM2R

## Accessory

| Accessory             | Standard equipment |                      | Option                            |  |
|-----------------------|--------------------|----------------------|-----------------------------------|--|
|                       | Rod end nut        | Single knuckle joint | Double knuckle joint (With pin) * |  |
| Bottom mounting style | ●                  | ●                    | ●                                 |  |
| Front mounting style  | ●                  | ●                    | ●                                 |  |

\* Knuckle pin and retaining ring (cotter pin for ø40) are shipped together.

## Mass

| Bore size (mm)                           |                       | 20   | 25   | 32   | 40   |
|--|-----------------------|------|------|------|------|
| Basic mass                               | Bottom mounting style | 0.14 | 0.23 | 0.32 | 0.62 |
|  | Front mounting style  | 0.14 | 0.22 | 0.32 | 0.61 |
| Additional mass per each 50 mm of stroke |                       | 0.04 | 0.06 | 0.08 | 0.13 |

(kg)

Calculation: (Example) **CM2RA32-100**

(ø32, 100 stroke, Bottom mounting)

- Basic mass.....0.32kg
- Additional mass.....0.08kg
- Cylinder stroke.....100mm  
0.32 + 0.08 x 100/50 = 0.48kg

## ⚠ Precautions

**Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.**

### Operating Precautions

#### ⚠ Warning

- Do not rotate the cover.**  
If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.
- Do not operate with the cushion needle in a fully closed condition.**  
Using it in the fully closed state will cause the cushion seal to be damaged. When adjusting the cushion needle, use the "Hexagon wrench key: nominal size 1.5".
- Do not open the cushion needle wide excessively.**  
If the cushion needle were set to be completely wide (more than 3 turns from fully closed), it would be equivalent to the cylinder with no cushion, thus making the impacts extremely high. Do not use it in such a way. Besides, using with fully open could give damage to the piston or cover.
- In the case of exceeding the standard stroke length, implement an intermediate support.**  
When using cylinder with longer stroke, implement an intermediate support for preventing the joint of rod cover and cylinder tube from being broken by vibration or external load.

#### ⚠ Caution

- Not able to disassemble.**  
Cover and cylinder tube are connected to each other by caulking method, thus making it impossible to disassemble. Therefore, internal parts of a cylinder other than rod seal are not replaceable.
- Use caution to the popping of a retaining ring.**  
When replacing rod seals and removing and mounting a retaining ring, use a proper tool (retaining ring plier: tool for installing a type C retaining ring). Even if a proper tool is used, it is likely to inflict damage to a human body or peripheral equipment, as a retaining ring may be flown out of the tip of a plier. Be much careful with the popping of a retaining ring. Besides, be certain that a retaining ring is placed firmly into the groove of rod cover before supplying air at the time of installment.
- Do not touch the cylinder during operation.**  
Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.
- Do not use an air cylinder as an air-hydro cylinder.**  
If it uses turbine oil in place of fluids for cylinder, it may result in oil leakage.

## Clean Series

10-CM2R **Mounting style** **Bore size** **Stroke**

• Clean Series (with relief port)

The type which is applicable for using inside the clean room graded Class 100 by making an actuator's rod section a double seal construction and discharging by relief port directly to the outside of clean room.

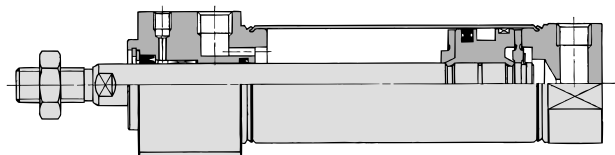


## Specifications

|                         |   |
|-------------------------|---|
| Action                  | Double acting, Single rod                   |
| Bore size (mm)          | ø20, ø25, ø32, ø40                          |
| Max. operating pressure | 1.0 MPa                                     |
| Min. operating pressure | 0.05 MPa                                    |
| Cushion                 | Rubber bumper (Standard equipment)          |
| Relief port size        | M5 x 0.8                                    |
| Piston speed            | 30 to 400 mm/s                              |
| Mounting                | Bottom mounting style, Front mounting style |

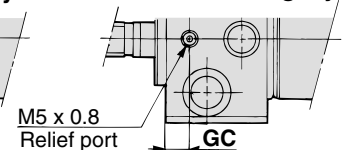
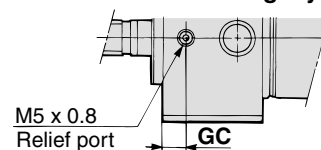
\* Auto switch can be mounted.

## Construction



Front mounting style

Bottom mounting style



| (mm)           |    |
|----------------|----|
| Bore size (mm) | GC |
| 20             | 6  |
| 25             | 6  |
| 32             | 7  |
| 40             | 9  |

For details, refer to the separate catalog, "Pneumatic Clean Series".



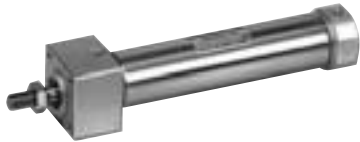
## Air-hydro

CM2HR Mounting style Bore size Stroke

• Air-hydro

A low hydraulic pressure cylinder used at a pressures of 1.0 MPa or below.

Through the concurrent use of a CC series air-hydro unit, it is possible to operate at a constant or low speeds or to effect an intermediate stop, just like a hydraulic unit, while using pneumatic equipment such as a valve.



### Specifications

|                               |   |
|-------------------------------|---|
| Type                          | Air-hydro                                   |
| Fluid                         | Turbine oil                                 |
| Action                        | Double acting, Single rod                   |
| Bore size (mm)                | ø20, ø25, ø32, ø40                          |
| Proof pressure                | 1.5 MPa                                     |
| Max. operating pressure       | 1.0 MPa                                     |
| Min. operating pressure       | 0.18 MPa                                    |
| Piston speed                  | 15 to 300 mm/s                              |
| Cushion                       | Rubber bumper                               |
| Ambient and fluid temperature | +5 to +60°C                                 |
| Thread tolerance              | + <sub>0</sub> <sup>1.4</sup> mm            |
| Stroke length tolerance       |   |
| Mounting                      | Bottom mounting style, Front mounting style |

\* Auto switches can be mounted. Dimensions are the same as the standard type of Series CM2R.

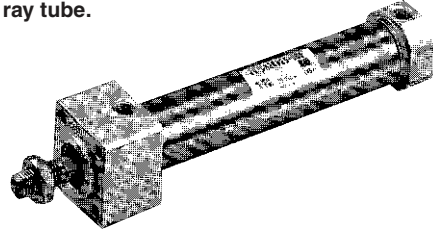
- For construction, refer to page 190.
- Since the dimensions of mounting style is the same as pages 191 and 192, refer to those pages.

## Copper/Fluorine-free

20-CM2R Mounting style Bore size Stroke

• Copper/fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.



### Specifications

|                         |   |
|-------------------------|---|
| Action                  | Double acting, Single rod                     |
| Bore size (mm)          | ø20, ø25, ø32, ø40                            |
| Max. operating pressure | 1.0 MPa                                       |
| Min. operating pressure | 0.05 MPa                                      |
| Cushion                 | Rubber bumper                                 |
| Piston speed            | 50 to 750 mm/s                                |
| Mounting                | Bottom mounting style<br>Front mounting style |

\* Auto switch can be mounted.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

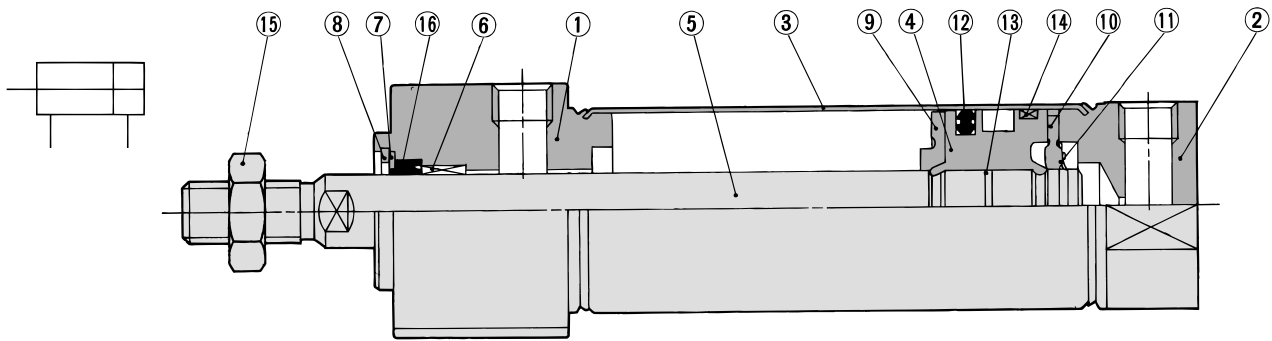
Individual  
-X□

Technical  
data

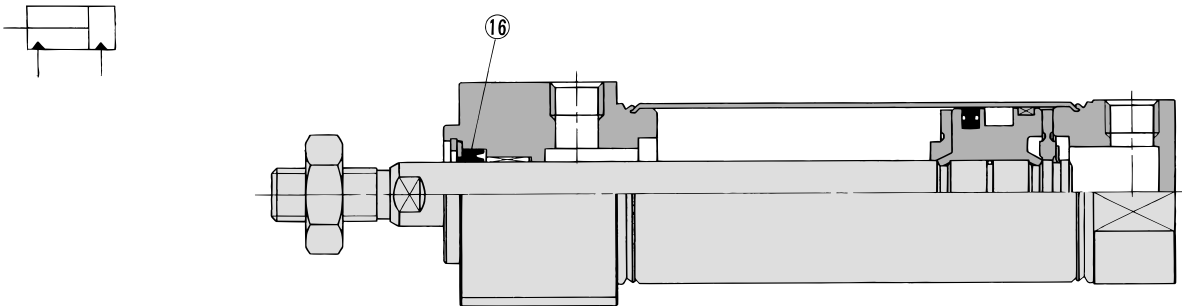
# Series CM2R

## Construction

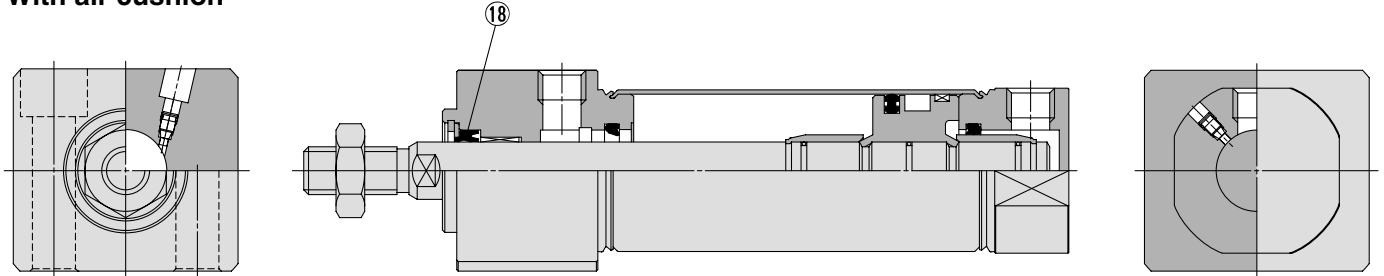
### Rubber bumper



### Air-hydro



### With air cushion



### Component Parts

| No. | Description    | Material                              | Note               |
|-----|----------------|---------------------------------------|--------------------|
| 1   | Rod cover      | Aluminum alloy                        | Clear anodized     |
| 2   | Head cover     | Aluminum alloy                        | Clear anodized     |
| 3   | Cylinder tube  | Stainless steel                       |                    |
| 4   | Piston         | Aluminum alloy                        | Chromated          |
| 5   | Piston rod     | Carbon steel                          | Hard chrome plated |
| 6   | Bushing        | Copper oil-impregnated sintered alloy |                    |
| 7   | Seal retainer  | Stainless steel                       |                    |
| 8   | Retaining ring | Carbon steel                          | Phosphate coated   |
| 9   | Bumper A       | Urethane                              |                    |
| 10  | Bumper B       | Urethane                              |                    |
| 11  | Retaining ring | Stainless steel                       |                    |
| 12  | Piston seal    | NBR                                   |                    |
| 13  | Piston gasket  | NBR                                   |                    |
| 14  | Wear ring      | Resin                                 |                    |
| 15  | Rod end nut    | Carbon steel                          | Nickel plated      |

### Replacement Part: Seal

#### ● With Rubber Bumper, With Air Cushion

| No. | Description | Material | Part no. |         |          |          |
|-----|-------------|----------|----------|---------|----------|----------|
|     |             |          | 20       | 25      | 32       | 40       |
| 16  | Rod seal    | NBR      | PDU-8Z   | PDU-10Z | PDU-12LZ | PDU-14LZ |

#### ● Air-hydro

| No. | Description | Material | Part no. |        |         |        |
|-----|-------------|----------|----------|--------|---------|--------|
|     |             |          | 20       | 25     | 32      | 40     |
| 16  | Rod seal    | NBR      | HDU-8    | HDU-10 | HDU-12L | HDU-14 |

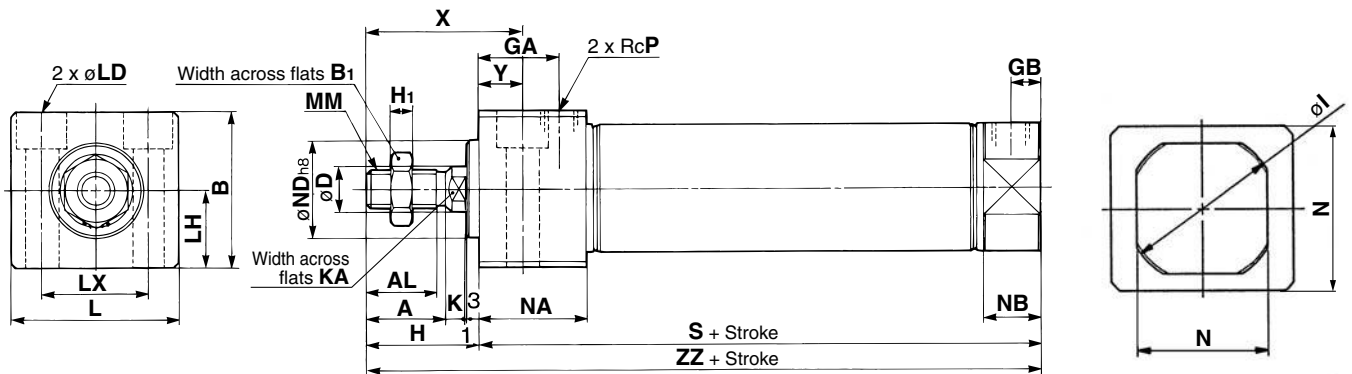
\* Since the seal kit does not include a grease pack, order it separately.

**Grease pack part no.: GR-S-010 (10 g)**

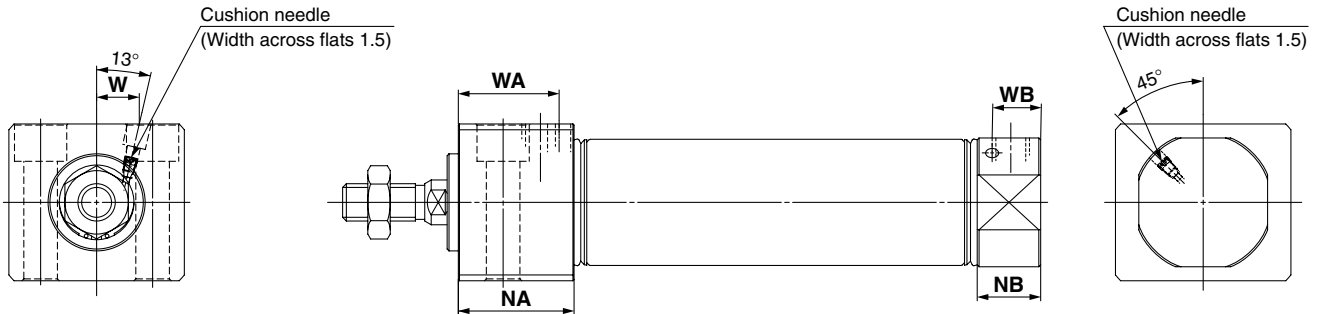
For proper auto switch mounting position (at stroke end), refer to pages 215 to 217, since the operating range is the same as standard type, single rod.

**Bottom Mounting Style**

CM2RA Bore size — Stroke



**With air cushion**



- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

| (mm)      |              |
|-----------|--------------|
| Bore size | Stroke range |
| 20        | 1 to 150     |
| 25        | 1 to 200     |
| 32        | 1 to 200     |
| 40        | 1 to 300     |

| (mm)      |    |      |      |                |    |    |    |    |                |      |     |    |      |                                   |    |    |            |      |      |      |                                   |     |     |    |    |     |
|-----------|----|------|------|----------------|----|----|----|----|----------------|------|-----|----|------|-----------------------------------|----|----|------------|------|------|------|-----------------------------------|-----|-----|----|----|-----|
| Bore size | A  | AL   | B    | B <sub>1</sub> | D  | GA | GB | H  | H <sub>1</sub> | I    | K   | KA | L    | LD                                | LH | LX | MM         | N    | NA   | NB   | ND                                | P   | S   | X  | Y  | ZZ  |
| 20        | 18 | 15.5 | 30.3 | 13             | 8  | 22 | 8  | 27 | 5              | 28   | 5   | 6  | 33.5 | ø5.5, ø9.5 counterbore depth 6.5  | 15 | 21 | M8 x 1.25  | 24   | 29   | 15   | 20 <sup>0</sup> <sub>-0.033</sub> | 1/8 | 76  | 39 | 12 | 103 |
| 25        | 22 | 19.5 | 36.3 | 17             | 10 | 22 | 8  | 31 | 6              | 33.5 | 5.5 | 8  | 39   | ø6.6, ø11 counterbore depth 7.5   | 18 | 25 | M10 x 1.25 | 30   | 29   | 15   | 26 <sup>0</sup> <sub>-0.033</sub> | 1/8 | 76  | 43 | 12 | 107 |
| 32        | 22 | 19.5 | 42.3 | 17             | 12 | 22 | 8  | 31 | 6              | 37.5 | 5.5 | 10 | 47   | ø9, ø14 counterbore depth 10      | 21 | 30 | M10 x 1.25 | 34.5 | 29   | 15   | 26 <sup>0</sup> <sub>-0.033</sub> | 1/8 | 78  | 43 | 12 | 109 |
| 40        | 24 | 21   | 52.3 | 22             | 14 | 27 | 11 | 34 | 8              | 46.5 | 7   | 12 | 58.5 | ø11, ø17.5 counterbore depth 12.5 | 26 | 38 | M14 x 1.5  | 42.5 | 37.5 | 21.5 | 32 <sup>0</sup> <sub>-0.039</sub> | 1/4 | 104 | 49 | 15 | 138 |

**With Air Cushion** (mm)

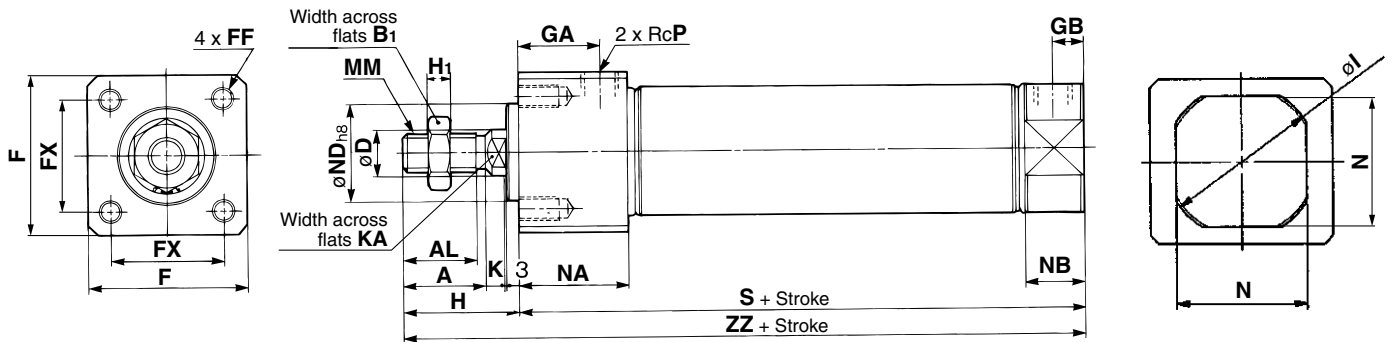
| Bore size | NA   | NB   | WA | WB | W    |
|-----------|------|------|----|----|------|
| 20        | 31.5 | 17.5 | 27 | 13 | 8.5  |
| 25        | 31.5 | 17.5 | 27 | 13 | 10.5 |
| 32        | 31.5 | 17.5 | 27 | 13 | 11.5 |
| 40        | 37.5 | 21.5 | 32 | 16 | 15   |

- D-□
- X□
- Individual
- X□
- Technical data

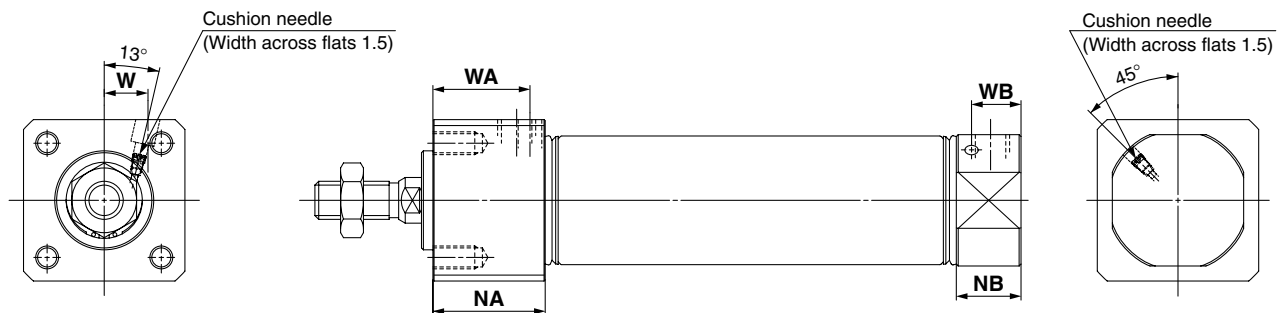
# Series CM2R

## Front Mounting Style

CM2RB Bore size — Stroke



## With air cushion



(mm)

| Bore size | Stroke range |
|-----------|--------------|
| 20        | 1 to 150     |
| 25        | 1 to 200     |
| 32        | 1 to 200     |
| 40        | 1 to 300     |

(mm)

| Bore size | A  | AL   | B <sub>1</sub> | D  | F    | FF                 | FX | GA | GB | H  | H <sub>1</sub> | I    | K   | KA | MM         | N    | NA   | NB   | ND                                | P   | S   | ZZ  |
|-----------|----|------|----------------|----|------|--------------------|----|----|----|----|----------------|------|-----|----|------------|------|------|------|-----------------------------------|-----|-----|-----|
| 20        | 18 | 15.5 | 13             | 8  | 30.4 | M5 x 0.8 depth 9   | 22 | 22 | 8  | 27 | 5              | 28   | 5   | 6  | M8 x 1.25  | 24   | 29   | 15   | 20 <sup>0</sup> <sub>-0.033</sub> | 1/8 | 76  | 103 |
| 25        | 22 | 19.5 | 17             | 10 | 36.4 | M6 x 1 depth 11    | 26 | 22 | 8  | 31 | 6              | 33.5 | 5.5 | 8  | M10 x 1.25 | 30   | 29   | 15   | 26 <sup>0</sup> <sub>-0.033</sub> | 1/8 | 76  | 107 |
| 32        | 22 | 19.5 | 17             | 12 | 42.4 | M6 x 1 depth 11    | 30 | 22 | 8  | 31 | 6              | 37.5 | 5.5 | 10 | M10 x 1.25 | 34.5 | 29   | 15   | 26 <sup>0</sup> <sub>-0.033</sub> | 1/8 | 78  | 109 |
| 40        | 24 | 21   | 22             | 14 | 52.4 | M8 x 1.25 depth 14 | 36 | 27 | 11 | 34 | 8              | 46.5 | 7   | 12 | M14 x 1.5  | 42.5 | 37.5 | 21.5 | 32 <sup>0</sup> <sub>-0.039</sub> | 1/4 | 104 | 138 |

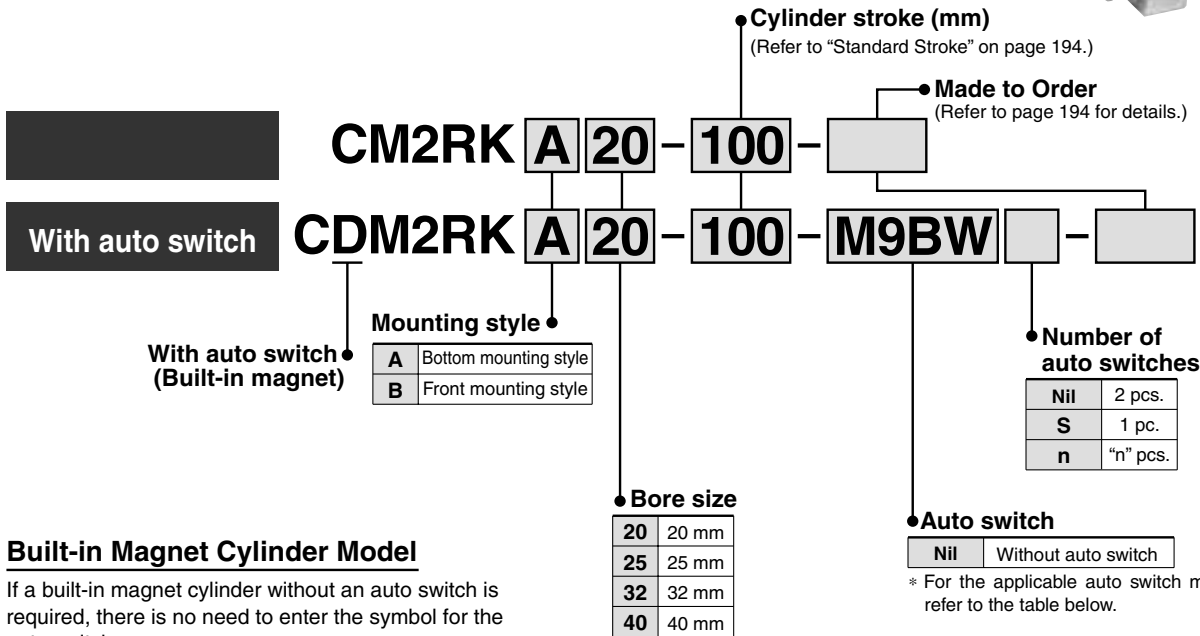
## With Air Cushion

(mm)

| Bore size | NA   | NB   | WA | WB | W    |
|-----------|------|------|----|----|------|
| 20        | 31.5 | 17.5 | 27 | 13 | 8.5  |
| 25        | 31.5 | 17.5 | 27 | 13 | 10.5 |
| 32        | 31.5 | 17.5 | 27 | 13 | 11.5 |
| 40        | 37.5 | 21.5 | 32 | 16 | 15   |

# Air Cylinder: Direct Mount, Non-rotating Rod Type Double Acting, Single Rod Series **CM2RK** ø20, ø25, ø32, ø40

## How to Order



### Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.

(Example) CDM2RKB32-100

### Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

| Type               | Special function                           | Electrical entry | Indicator light | Wiring (Output)                             | Load voltage |             | Auto switch model | Lead wire length (m) |            |       |       |          | Pre-wired connector | Applicable load |            |            |            |
|--------------------|--|------------------|-----------------|---|--------------|-------------|-------------------|----------------------|------------|-------|-------|----------|---------------------|-----------------|------------|------------|------------|
|                    |  |                  |                 |   | DC           | AC          |                   | 0.5 (Nil)            | 1 (M)      | 3 (L) | 5 (Z) | None (N) |                     |                 |            |            |            |
| Solid state switch | —  | Grommet          | Yes             | 3-wire (NPN)                                | 5V, 12V      | —           | <b>M9N</b>        | ●                    | ●          | ●     | ○     | —        | ○                   | IC circuit      | Relay, PLC |            |            |
|                    |  |                  |                 | 3-wire (PNP)                                |              |             | <b>M9P</b>        | ●                    | ●          | ●     | ○     | —        | ○                   |                 |            |            |            |
|                    |  | Connector        | Yes             | 2-wire                                      | 12V          | <b>M9B</b>  | ●                 | ●                    | ●          | ○     | —     | ○        | —                   |                 |            |            |            |
|                    |  | Terminal conduit |                 | 3-wire (NPN)                                | 5V, 12V      | <b>H7C</b>  | ●                 | ●                    | ●          | ●     | —     | —        |                     |                 |            |            |            |
|                    | Diagnostic indication (2-color indication) | Grommet          | Yes             | 2-wire                                      | 12V          | <b>G39A</b> | —                 | —                    | —          | —     | ●     | —        | —                   | IC circuit      |            |            |            |
|                    |  |                  |                 | 3-wire (NPN)                                | 5V, 12V      | <b>K39A</b> | —                 | —                    | —          | —     | ●     | —        | —                   | —               |            |            |            |
|                    |  |                  |                 | 3-wire (PNP)                                | 5V, 12V      | <b>M9NW</b> | ●                 | ●                    | ●          | ○     | —     | ○        | —                   | IC circuit      |            |            |            |
|                    |  |                  |                 | 2-wire                                      | 12V          | <b>M9PW</b> | ●                 | ●                    | ●          | ○     | —     | ○        | —                   | —               |            |            |            |
|                    |  |                  |                 | Water resistant (2-color indication)        | 2-wire       | 12V         | <b>M9BW</b>       | ●                    | ●          | ●     | ○     | —        | ○                   | —               |            | —          |            |
|                    |  |                  |                 | With diagnostic output (2-color indication) | 4-wire (NPN) | 5V, 12V     | <b>H7BA</b>       | —                    | —          | ●     | ○     | —        | ○                   | —               |            | —          |            |
| Reed switch        | —  | Grommet          | Yes             | 3-wire (NPN equivalent)                     | —            | 5V          | <b>A96</b>        | ●                    | —          | ●     | —     | —        | —                   | IC circuit      | —          |            |            |
|                    |  |                  |                 | Connector                                   | No           | 2-wire      | 24V               | 12V                  | <b>A93</b> | ●     | —     | ●        | —                   | —               | —          | —          | —          |
|                    |  |                  |                 |   |              |             |                   |                      | <b>A90</b> | ●     | —     | ●        | —                   | —               | —          | —          | IC circuit |
|                    |  | <b>B54</b>       | ●               |   |              |             |                   |                      | —          | ●     | —     | —        | —                   | —               | —          |            |            |
|                    |  | <b>B64</b>       | ●               |   |              |             |                   |                      | —          | ●     | —     | —        | —                   | —               | —          |            |            |
|                    |  | <b>C73C</b>      | ●               |   |              |             |                   |                      | —          | ●     | ●     | ●        | —                   | —               | —          |            |            |
|                    |  | Terminal conduit | No              | 2-wire                                      | 24V          | 12V         | <b>C80C</b>       | ●                    | —          | ●     | ●     | ●        | —                   | —               | IC circuit |            |            |
|                    |  |                  |                 |   |              |             | <b>A33A</b>       | —                    | —          | —     | —     | ●        | —                   | —               | —          | PLC        |            |
|                    |  |                  |                 |   |              |             | <b>A34A</b>       | —                    | —          | —     | —     | ●        | —                   | —               | —          | —          |            |
|                    |  | DIN terminal     | Yes             | 2-wire                                      | 24V          | 12V         | <b>A44A</b>       | —                    | —          | —     | —     | ●        | —                   | —               | —          |            |            |
|                    |  |                  |                 |   |              |             | <b>B59W</b>       | ●                    | —          | ●     | —     | —        | —                   | —               | —          | Relay, PLC |            |

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW  
1 m ..... M (Example) M9NWM  
3 m ..... L (Example) M9NWL  
5 m ..... Z (Example) M9NWZ  
None ..... N (Example) H7CN

\* Solid state auto switches marked with "○" are produced upon receipt of order.  
\* D-A9□V□/M9□V□/M9□W□ and D-M9□A(V)L cannot be mounted.  
\* Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.

\* Since there are other applicable auto switches than listed above, refer to page 218 for details.  
\* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.  
\* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Individual -X□
- Technical data

# Series CM2RK

**Series CM2R direct mount cylinder can be installed directly through the use of a square rod cover.**

## Non-rotating accuracy

A type of cylinder in which the rod does not rotate because of its hexagonal shape Cylinder

$\phi 20, \phi 25 - \pm 0.7^\circ$   
 $\phi 32, \phi 40 - \pm 0.5^\circ$

## Space-saving configuration

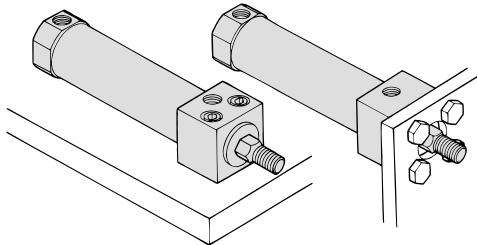
Because it is a directly mounted style without using brackets, its overall length is shorter, and its installation pitch can be made smaller. Thus, the space that is required for installation has been dramatically reduced.

## Improved installation accuracy and strength

A centering boss has been provided to improve the installation accuracy. Also, because it is the directly mounted style, the strength has been increased.

## Two styles of installation

Two styles of installations are available and can be selected according to the purpose: the front mounting style or the bottom mounting style.

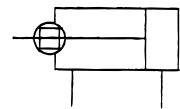


Bottom mounting style

Front mounting style

## JIS Symbol

Double acting



**Made to Order Specifications**  
 (For details, refer to pages 1373 to 1498.)

| Symbol | Specifications  |
|--------|---|
| —XA□   | Change of rod end shape                               |
| —XB6   | Heat resistant cylinder (150°C)                       |
| —XC3   | Special port location                                 |
| —XC6   | Piston rod and rod end nut made of stainless steel    |
| —XC8   | Adjustable stroke cylinder/Adjustable extension type  |
| —XC9   | Adjustable stroke cylinder/Adjustable retraction type |
| —XC11  | Dual stroke cylinder/Single rod type                  |
| —XC13  | Auto switch mounting rail style                       |
| —XC20  | Head cover axial port                                 |
| —XC22  | Fluororubber seals                                    |
| —XC25  | No fixed orifice of connecting port                   |

## Specifications

| Bore size (mm)                | 20  | 25    | 32              | 40    |
|-------------------------------|---|-------|-----------------|-------|
| Rod non-rotating accuracy     | $\pm 0.7^\circ$   |       | $\pm 0.5^\circ$ |       |
| Action                        | Double acting, Single rod   |       |                 |       |
| Fluid                         | Air   |       |                 |       |
| Proof pressure                | 1.5 MPa   |       |                 |       |
| Maximum operating pressure    | 1.0 MPa   |       |                 |       |
| Minimum operating pressure    | 0.05 MPa  |       |                 |       |
| Ambient and fluid temperature | Without auto switch: -10 to 70°C (No freezing)<br>With auto switch: -10 to 60°C (No freezing) |       |                 |       |
| Lubrication                   | Not required (Non-lube)   |       |                 |       |
| Stroke length tolerance       | $+1.4$<br>$0$ mm  |       |                 |       |
| Piston speed                  | 50 to 500 mm/s  |       |                 |       |
| Cushion                       | Rubber bumper   |       |                 |       |
| Allowable kinetic energy      | 0.27 J  | 0.4 J | 0.65 J          | 1.2 J |

## Standard Stroke

| Bore size (mm) | Standard stroke (mm) <sup>(1)</sup>      |
|----------------|--|
| 20             | 25, 50, 75, 100, 125, 150                |
| 25             | 25, 50, 75, 100, 125, 150, 200           |
| 32             | 25, 50, 75, 100, 125, 150, 200           |
| 40             | 25, 50, 75, 100, 125, 150, 200, 250, 300 |

Note 1) Other intermediate strokes can be manufactured upon receipt of order.

\* Manufacture of intermediate strokes at 1 mm intervals is possible.  
 (Spacers are not used.)

Note 2) The maximum limit is 1000 stroke, but the products that exceed the standard stroke might not be able to fulfill the specifications.

**Tightening Torque:** Tighten the cylinder mounting bolts for the bottom mounting style (Series CM2RA) with the following tightening torque.

| Bore size (mm) | Hexagon socket head cap bolt size | Tightening torque(N·m) |
|----------------|-----------------------------------|------------------------|
| 20             | M5 x 0.8                          | 2.4 to 3.6             |
| 25             | M6                                | 4.2 to 6.2             |
| 32             | M8                                | 10.0 to 15.0           |
| 40             | M10                               | 19.6 to 29.4           |

Refer to pages 214 to 218 for cylinders with an auto switch.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

# Air Cylinder: Direct Mount, Non-rotating Rod Type Series **CM2RK**

Double Acting, Single Rod

## Copper/Fluorine-free

20-CM2RK Mounting style Bore size — Stroke

• Copper/fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.



## Specifications

|                                |   |
|--------------------------------|---|
| <b>Action</b>                  | Double acting, Single rod                   |
| <b>Bore size (mm)</b>          | ø20, ø25, ø32, ø40                          |
| <b>Max. operating pressure</b> | 1.0 MPa                                     |
| <b>Min. operating pressure</b> | 0.05 MPa                                    |
| <b>Cushion</b>                 | Rubber bumper                               |
| <b>Piston speed</b>            | 50 to 500 mm/s                              |
| <b>Mounting</b>                | Bottom mounting style, Front mounting style |

\* Auto switch can be mounted.

## Accessory

| Accessory             | Standard equipment |                      | Option                           |  |
|-----------------------|--------------------|----------------------|----------------------------------|--|
|                       | Rod end nut        | Single knuckle joint | Double knuckle joint (With pin)* |  |
| Mounting              |                    |                      |                                  |  |
| Bottom mounting style | ●                  | ●                    | ●                                |  |
| Front mounting style  | ●                  | ●                    | ●                                |  |

\* Knuckle pin and retaining ring (cotter pin for bore size ø40) are shipped together.

## Mass

| Bore size (mm)                           |                       | 20   | 25   | 32   | 40   |
|--|-----------------------|------|------|------|------|
| Basic mass                               | Bottom mounting style | 0.14 | 0.23 | 0.32 | 0.63 |
|  | Front mounting style  | 0.14 | 0.22 | 0.32 | 0.62 |
| Additional mass per each 50 mm of stroke |                       | 0.04 | 0.07 | 0.09 | 0.14 |

Calculation: (Example) **CM2RKA32-100** (ø32, 100 stroke, Bottom mounting)

- Basic mass.....0.32 kg
  - Additional mass.....0.09 kg
  - Cylinder stroke.....100 mm
- $0.32 + 0.09 \times 100/50 = 0.50 \text{ kg}$

## ⚠ Precautions

**Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.**

### Caution on Handling/Disassembly

#### ⚠ Warning

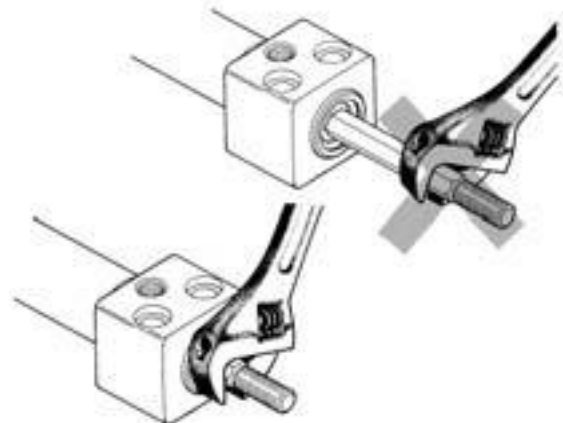
- 1. Do not rotate the cover.**  
If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.
- 2. Do not operate with the cushion needle in a fully closed condition.**  
Using it in the fully closed state will cause the cushion seal to be damaged. When adjusting the cushion needle, use the "Hexagon wrench key: nominal size 1.5".
- 3. Do not open the cushion needle wide excessively.**  
If the cushion needle were set to be completely wide (more than 3 turns from fully closed), it would be equivalent to the cylinder with no cushion, thus making the impacts extremely high. Do not use it in such a way. Besides, using with fully open could give damage to the piston or cover.
- 4. In the case of exceeding the standard stroke length, implement an intermediate support.**  
When using cylinder with longer stroke, implement an intermediate support for preventing the joint of rod cover and cylinder tube from being broken by vibration or external load.

#### ⚠ Caution

- 1. Avoid using the air cylinder in such a way that rotational torque would be applied to the piston rod.**  
If rotational torque is applied, the non-rotating guide will become deformed, thus affecting the non-rotating accuracy. Refer to the table below for the approximate values of the allowable range of rotational torque.

| Allowable rotational torque (N·m or less) | ø20 | ø25  | ø32  | ø40  |
|---|-----|------|------|------|
|   | 0.2 | 0.25 | 0.25 | 0.44 |

To screw a bracket or a nut onto the threaded portion at the tip of the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes. Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.



- 2. When replacing rod seals, please contact SMC.**  
Air leakage may be happened, depending on the position in which a rod seal is fitted. Thus, please contact SMC when replacing them.
- 3. Not able to disassemble.**  
Cover and cylinder tube are connected to each other by caulking method, thus making it impossible to disassemble. Therefore, internal parts of a cylinder other than rod seal are not replaceable.
- 4. Do not touch the cylinder during operation.**  
Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

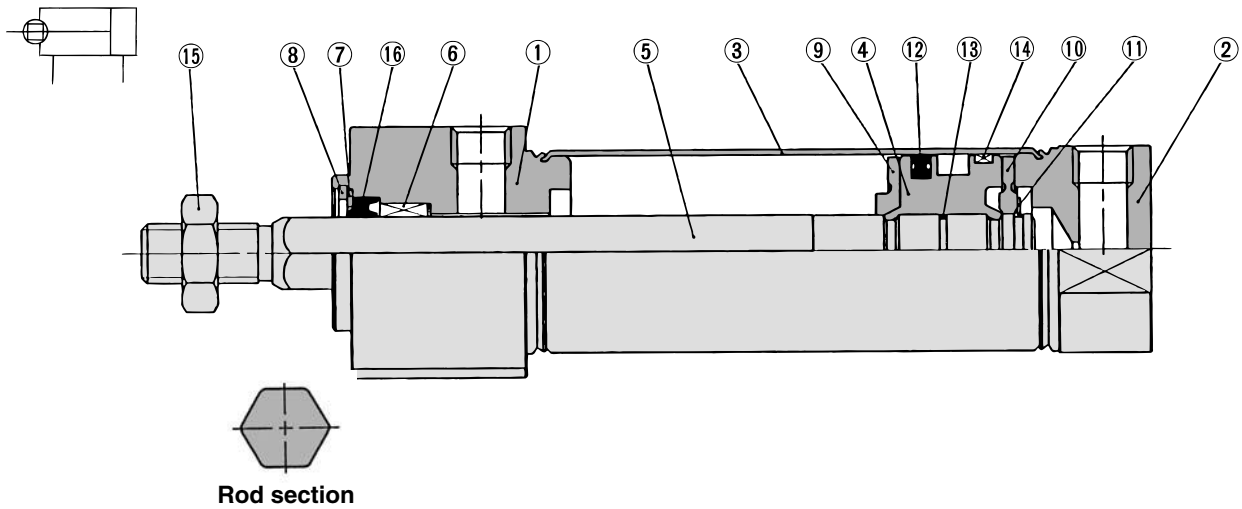
Individual

-X□

Technical data

# Series CM2RK

## Construction



### Component Parts

| No. | Description        | Material                              | Note             |
|-----|--------------------|---------------------------------------|------------------|
| 1   | Rod cover          | Aluminum alloy                        | Clear anodized   |
| 2   | Head cover         | Aluminum alloy                        | Clear anodized   |
| 3   | Cylinder tube      | Stainless steel                       |                  |
| 4   | Piston             | Aluminum alloy                        | Chromated        |
| 5   | Piston rod         | Stainless steel                       |                  |
| 6   | Non-rotating guide | Copper oil-impregnated sintered alloy |                  |
| 7   | Seal retainer      | Carbon steel                          | Nickel plated    |
| 8   | Retaining ring     | Carbon steel                          | Phosphate coated |
| 9   | Bumper A           | Urethane                              |                  |
| 10  | Bumper B           | Urethane                              |                  |
| 11  | Retaining ring     | Stainless steel                       |                  |
| 12  | Piston seal        | NBR                                   |                  |
| 13  | Piston gasket      | NBR                                   |                  |
| 14  | Wear ring          | Resin                                 |                  |
| 15  | Rod end nut        | Carbon steel                          | Nickel plated    |

### Replacement Part: Seal

| No. | Description | Material | Part no. |         |         |         |
|-----|-------------|----------|----------|---------|---------|---------|
|     |             |          | 20       | 25      | 32      | 40      |
| 16  | Rod seal    | NBR      | PDR-8W   | PDR-10W | PDR-12W | PDR-14W |

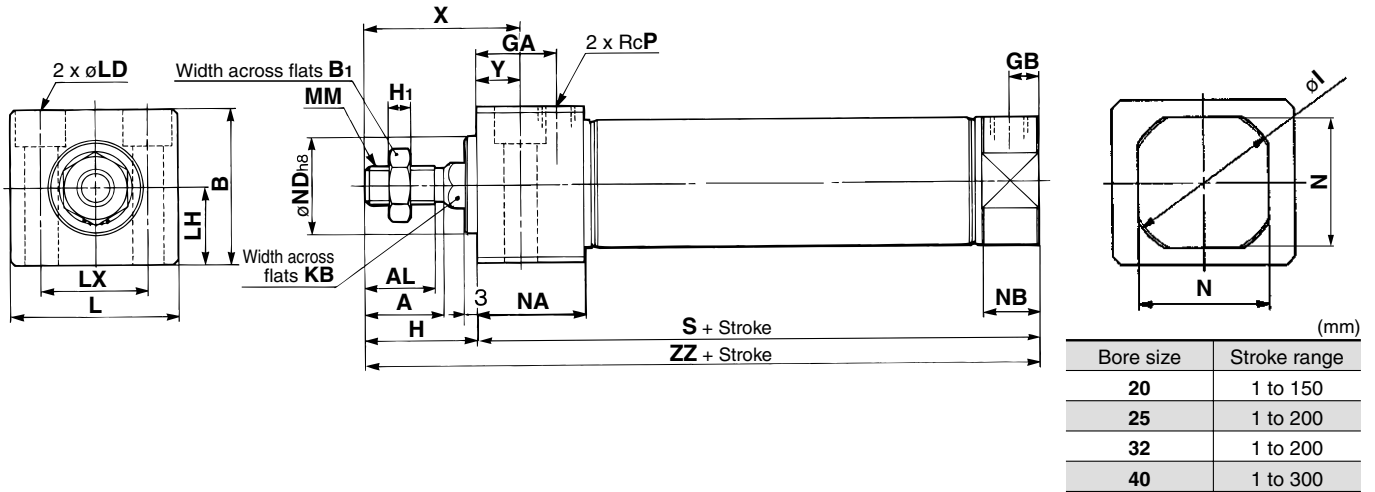
\* Since the seal kit does not include a grease pack, order it separately.  
**Grease pack part no.: GR-S-010 (10 g)**



# Air Cylinder: Direct Mount, Non-rotating Rod Type Series **CM2RK**

## Bottom Mounting Style

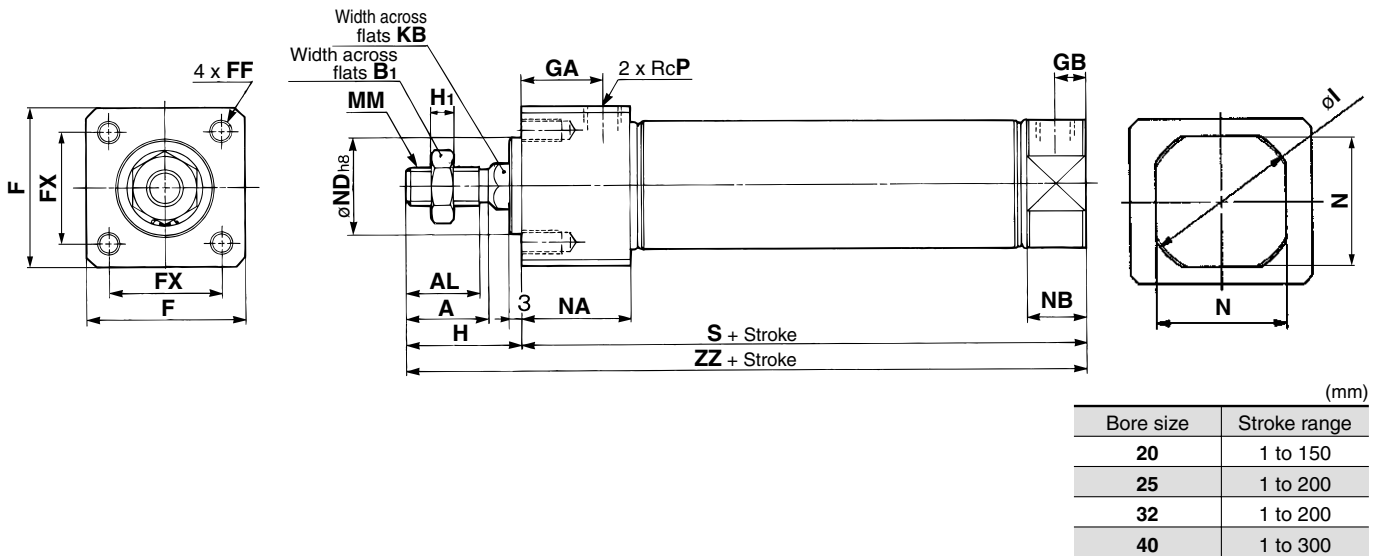
CM2RKA Bore size — Stroke



| Bore size | A  | AL   | B    | B <sub>1</sub> | GA | GB | H  | H <sub>1</sub> | I    | KB   | L    | LD                                | LH | LX | MM         | N    | NA   | NB   | ND                                | P   | S   | X  | Y  | ZZ  |
|-----------|----|------|------|----------------|----|----|----|----------------|------|------|------|-----------------------------------|----|----|------------|------|------|------|-----------------------------------|-----|-----|----|----|-----|
| 20        | 18 | 15.5 | 30.3 | 13             | 22 | 8  | 27 | 5              | 28   | 8.2  | 33.5 | ø5.5, ø9.5 counterbore depth 6.5  | 15 | 21 | M8 x 1.25  | 24   | 29   | 15   | 20 <sup>0</sup> <sub>-0.033</sub> | 1/8 | 76  | 39 | 12 | 103 |
| 25        | 22 | 19.5 | 36.3 | 17             | 22 | 8  | 31 | 6              | 33.5 | 10.2 | 39   | ø6.6, ø11 counterbore depth 7.5   | 18 | 25 | M10 x 1.25 | 30   | 29   | 15   | 26 <sup>0</sup> <sub>-0.033</sub> | 1/8 | 76  | 43 | 12 | 107 |
| 32        | 22 | 19.5 | 42.3 | 17             | 22 | 8  | 31 | 6              | 37.5 | 12.2 | 47   | ø9, ø14 counterbore depth 10      | 21 | 30 | M10 x 1.25 | 34.5 | 29   | 15   | 26 <sup>0</sup> <sub>-0.033</sub> | 1/8 | 78  | 43 | 12 | 109 |
| 40        | 24 | 21   | 52.3 | 22             | 27 | 11 | 34 | 8              | 46.5 | 14.2 | 58.5 | ø11, ø17.5 counterbore depth 12.5 | 26 | 38 | M14 x 1.5  | 42.5 | 37.5 | 21.5 | 32 <sup>0</sup> <sub>-0.039</sub> | 1/4 | 104 | 49 | 15 | 138 |

## Front Mounting Style

CM2RKB Bore size — Stroke



| Bore size | A  | AL   | B <sub>1</sub> | F    | FF                 | FX | GA | GB | H  | H <sub>1</sub> | I    | KB   | MM         | N    | NA   | NB   | ND                                | P   | S   | ZZ  |
|-----------|----|------|----------------|------|--------------------|----|----|----|----|----------------|------|------|------------|------|------|------|-----------------------------------|-----|-----|-----|
| 20        | 18 | 15.5 | 13             | 30.4 | M5 x 0.8 depth 9   | 22 | 22 | 8  | 27 | 5              | 28   | 8.2  | M8 x 1.25  | 24   | 29   | 15   | 20 <sup>0</sup> <sub>-0.033</sub> | 1/8 | 76  | 103 |
| 25        | 22 | 19.5 | 17             | 36.4 | M6 x 1 depth 11    | 26 | 22 | 8  | 31 | 6              | 33.5 | 10.2 | M10 x 1.25 | 30   | 29   | 15   | 26 <sup>0</sup> <sub>-0.033</sub> | 1/8 | 76  | 107 |
| 32        | 22 | 19.5 | 17             | 42.4 | M6 x 1 depth 11    | 30 | 22 | 8  | 31 | 6              | 37.5 | 12.2 | M10 x 1.25 | 34.5 | 29   | 15   | 26 <sup>0</sup> <sub>-0.033</sub> | 1/8 | 78  | 109 |
| 40        | 24 | 21   | 22             | 52.4 | M8 x 1.25 depth 14 | 36 | 27 | 11 | 34 | 8              | 46.5 | 14.2 | M14 x 1.5  | 42.5 | 37.5 | 21.5 | 32 <sup>0</sup> <sub>-0.039</sub> | 1/4 | 104 | 138 |

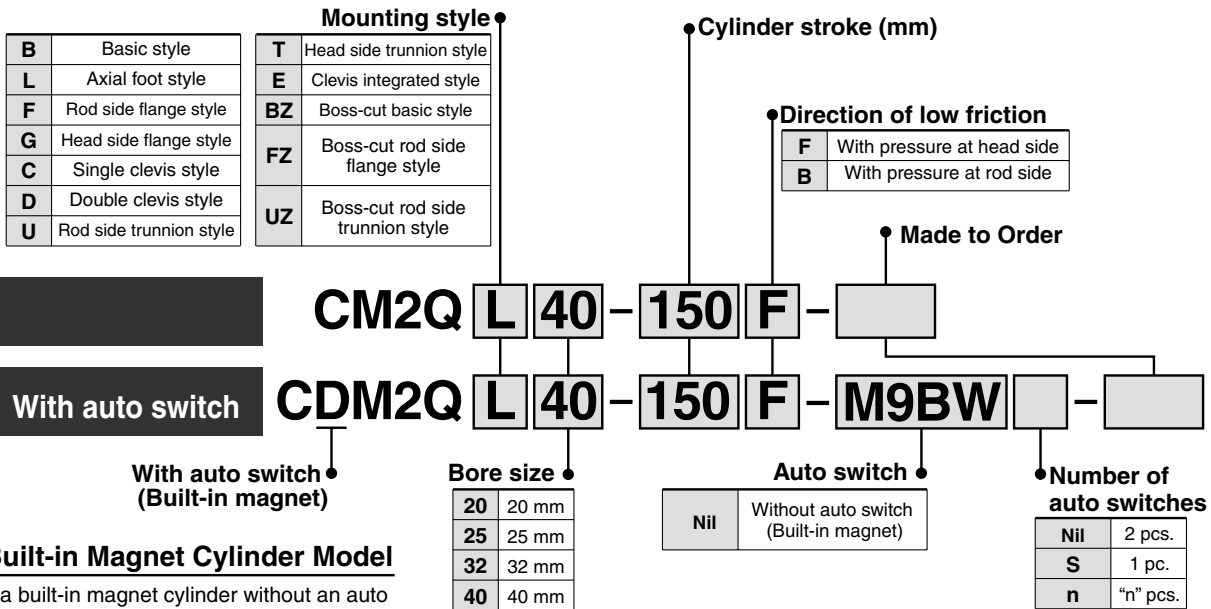
- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Individual
- X□
- Technical data

# Air Cylinder: Low Friction Type Double Acting, Single Rod Series *CM2Q* ø20, ø25, ø32, ø40

Use the new "Smooth Cylinder Series CM2Y" to realize both-direction low friction and low-speed operation. (Refer to **Best Pneumatics No. 3.**)

## How to Order



### Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.  
(Example) CDM2QF32-100B

# Air Cylinder: Centralized Piping Type Double Acting, Single Rod

## Series **CM2□P**

ø20, ø25, ø32, ø40

### How to Order

**Mounting style**

|          |                         |
|----------|-------------------------|
| <b>B</b> | Basic style             |
| <b>F</b> | Rod side flange style   |
| <b>U</b> | Rod side trunnion style |

**Cylinder stroke (mm)**  
(Refer to "Standard Stroke" on page 200.)

**Rod boot**

|          |                          |
|----------|--------------------------|
| Nil      | None                     |
| <b>J</b> | Nylon tarpaulin          |
| <b>K</b> | Heat resistant tarpaulin |

**Made to Order**  
(Refer to page 200 for details.)

**With auto switch** **CDM2** **F** **32** **P** - **150** - **M9BW** -

**With auto switch (Built-in magnet)** **CM2** **F** **32** **P** - **150** -

**Centralized piping type**

**Port thread type**

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

**Bore size**

|           |       |
|-----------|-------|
| <b>20</b> | 20 mm |
| <b>25</b> | 25 mm |
| <b>32</b> | 32 mm |
| <b>40</b> | 40 mm |

**Number of auto switches**

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

**Auto switch**

|     |                     |
|-----|---------------------|
| Nil | Without auto switch |
|-----|---------------------|

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

#### Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.  
(Example) CDM2B40P-100

#### Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

| Type               | Special function                           | Electrical entry | Indicator light | Wiring (Output)         | Load voltage |             | Auto switch model | Lead wire length (m) |       |            |       |            | Pre-wired connector | Applicable load |
|--------------------|--|------------------|-----------------|-------------------------|--------------|-------------|-------------------|----------------------|-------|------------|-------|------------|---------------------|-----------------|
|                    |  |                  |                 |                         | DC           | AC          |                   | 0.5 (Nil)            | 1 (M) | 3 (L)      | 5 (Z) | None (N)   |                     |                 |
| Solid state switch | —  | Grommet          | Yes             | 3-wire (NPN)            | 5V, 12V      | —           | <b>M9N</b>        | ●                    | ●     | ●          | ○     | —          | ○                   | IC circuit      |
|                    |  |                  |                 | 3-wire (PNP)            |              |             | <b>M9P</b>        | ●                    | ●     | ●          | ○     | —          | ○                   |                 |
|                    |  | Connector        | No              | 2-wire                  | 12V          | <b>M9B</b>  | ●                 | ●                    | ●     | ○          | —     | ○          | —                   |                 |
|                    |  |                  |                 | <b>H7C</b>              | ●            | —           | ●                 | ●                    | ●     | —          | —     |            |                     |                 |
|                    | Diagnostic indication (2-color indication) | Grommet          | Yes             | 3-wire (NPN)            | 5V, 12V      | —           | <b>M9NW</b>       | ●                    | ●     | ●          | ○     | —          | ○                   | IC circuit      |
|                    |  |                  |                 | 3-wire (PNP)            |              |             | <b>M9PW</b>       | ●                    | ●     | ●          | ○     | —          | ○                   |                 |
|                    |  | Connector        | No              | 2-wire                  | 12V          | <b>M9BW</b> | ●                 | ●                    | ●     | ○          | —     | ○          | —                   |                 |
|                    |  |                  |                 | <b>H7BA</b>             | —            | —           | ●                 | ○                    | —     | ○          |       |            |                     |                 |
| Reed switch        | —  | Grommet          | Yes             | 3-wire (NPN equivalent) | 5V           | —           | <b>A96</b>        | ●                    | —     | ●          | —     | —          | —                   | IC circuit      |
|                    |  |                  |                 | Connector               |              |             | No                | 2-wire               | 12V   | <b>A93</b> | ●     | —          | ●                   |                 |
|                    |  | No               | 100V or less    |                         | <b>A90</b>   | ●           |                   |                      |       | —          | ●     | —          | —                   |                 |
|                    |  |                  | 100V, 200V      | <b>B54</b>              | ●            | —           | ●                 | ●                    | —     | —          | —     |            |                     |                 |
|                    | No   | 200V or less     | <b>B64</b>      | ●                       | —            | ●           | —                 | —                    | —     |            |       |            |                     |                 |
|                    |  | Yes              | No              | 24V or less             | <b>C73C</b>  | ●           | —                 | ●                    | ●     | ●          | —     | IC circuit |                     |                 |
|                    | <b>C80C</b>                                |                  |                 |                         | ●            | —           | ●                 | ●                    | ●     | —          |       |            |                     |                 |
|                    | Diagnostic indication (2-color indication) | Connector        | Yes             | No                      | —            | —           | —                 | <b>B59W</b>          | ●     | —          | ●     | —          | —                   | —               |
| —                  |  |                  |                 |                         |              |             |                   | —                    | —     | —          | —     | —          | —                   |                 |

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW  
1 m ..... M (Example) M9NWM  
3 m ..... L (Example) M9NWL  
5 m ..... Z (Example) M9NWZ  
None ..... N (Example) H7CN

\* Solid state auto switches marked with "○" are produced upon receipt of order.  
\* D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L cannot be mounted.

\* Since there are other applicable auto switches than listed above, refer to page 218 for details.  
\* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.  
\* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual  
-X□

Technical  
data

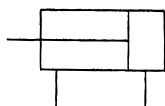
# Series CM2□P

A cylinder in which two piping ports are provided in the head cover, enabling pipes to be connected only in the axial direction.



## JIS Symbol

Double acting,  
Single rod



**Made to Order Specifications**  
(For details, refer to pages 1373 to 1498.)

| Symbol | Specifications                                     |
|--------|--|
| —XA□   | Change of rod end shape                            |
| —XC4   | With heavy duty scraper                            |
| —XC6   | Piston rod and rod end nut made of stainless steel |
| —XC29  | Double knuckle joint with spring pin               |
| —XC52  | Mounting nut with set screw                        |



## Precautions

Be sure to read before handling.  
Refer to front matters 54 and 55 for  
Safety Instructions and pages 3 to  
11 for Actuator and Auto Switch  
Precautions.

## Specifications

| Bore size (mm)                | 20  | 25                | 32                | 40                |
|-------------------------------|---|-------------------|-------------------|-------------------|
| Action                        | Double acting, Single rod   |                   |                   |                   |
| Fluid                         | Air   |                   |                   |                   |
| Proof pressure                | 1.5 MPa   |                   |                   |                   |
| Maximum operating pressure    | 1.0 MPa   |                   |                   |                   |
| Minimum operating pressure    | 0.05 MPa  |                   |                   |                   |
| Ambient and fluid temperature | Without auto switch: -10 to 70°C (No freezing)<br>With auto switch: -10 to 60°C (No freezing) |                   |                   |                   |
| Lubrication                   | Not required (Non-lube)   |                   |                   |                   |
| Stroke length tolerance       | $^{+1.4}_0$ mm  |                   |                   |                   |
| Cushion                       | Rubber bumper   |                   |                   |                   |
| Piston speed                  | 50 to 700<br>mm/s   | 50 to 650<br>mm/s | 50 to 590<br>mm/s | 50 to 420<br>mm/s |
| Allowable kinetic energy      | 0.27 J  | 0.4 J             | 0.65 J            | 1.2 J             |

## Standard Stroke

| Bore size (mm) | Standard stroke <sup>(1)</sup> (mm)        | Maximum manufacturable stroke <sup>(2)</sup> (mm) |
|----------------|--|---|
| 20             | 25, 50, 75, 100, 125, 150<br>200, 250, 300 | 1000  |
| 25             |  |   |
| 32             |  |   |
| 40             |  |   |

Note 1) Other intermediate strokes can be manufactured upon receipt of order.  
Manufacture of intermediate strokes at 1 mm intervals is possible.  
(Spacers are not used.)

Note 2) When exceeding 300 strokes, the allowable maximum stroke length is determined by the stroke selection table (front matter 28).

## Mounting Style and Accessory

| Mounting                      | Accessory          |              | Option      |                      |                                  |
|-------------------------------|--------------------|--------------|-------------|----------------------|----------------------------------|
|                               | Standard equipment | Mounting nut | Rod end nut | Single knuckle joint | Double knuckle joint (With pin)* |
| Basic style                   | ● (1 pc.)          | ●            | ●           | ●                    | ●                                |
| Rod side<br>Flange side style | ● (1)              | ●            | ●           | ●                    | ●                                |
| Rod side<br>trunnion style    | ● (1)              | ●            | ●           | ●                    | ●                                |

\* Pin and retaining ring (cotter pin for bore size ø40) are shipped together with double knuckle joint.

## Mounting Bracket Part No.

| Mounting bracket     | Min. order | Bore size (mm) |          |          |    | Description (for min. order) |
|----------------------|------------|----------------|----------|----------|----|------------------------------|
|                      |            | 20             | 25       | 32       | 40 |                              |
| Flange               | 1          | CM-F020B       | CM-F032B | CM-F040B |    | 1 flange                     |
| Trunnion (With nuts) | 1          | CM-T020B       | CM-T032B | CM-T040B |    | 1 trunnion, 1 trunnion nut   |

\* Order 2 foot brackets for each cylinder unit.

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

# Air Cylinder: Centralized Piping Type Double Acting, Single Rod **Series CM2□P**

## Rod Boot Material

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

\* Maximum ambient temperature for the rod boot itself.

## Mass

(kg)

|  |                           | Bore size (mm) |      |      |      |
|--|---------------------------|----------------|------|------|------|
|  |                           | 20             | 25   | 32   | 40   |
| Basic mass                               | Basic style               | 0.14           | 0.21 | 0.27 | 0.58 |
|  | Rod side flange style     | 0.20           | 0.30 | 0.36 | 0.70 |
|  | Rod side trunnion style   | 0.18           | 0.28 | 0.33 | 0.68 |
| Additional mass per each 50 mm of stroke |                           | 0.05           | 0.08 | 0.10 | 0.17 |
| Option bracket                           | Single knuckle joint      | 0.06           | 0.06 | 0.06 | 0.23 |
|  | Double knuckle (with pin) | 0.07           | 0.07 | 0.07 | 0.20 |

Calculation: (Example) **CM2F32P-100**

- Basic mass.....0.36
- Additional mass.....0.10
- Cylinder stroke.....100 stroke  
 $0.36 + 0.10 \times 100/50 = 0.56 \text{ kg}$

## Copper/Fluorine-free

20-CM2  Mounting style  Bore size  P —  Stroke

↓ Copper/fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.



## Specifications

|                                |   |                |
|--------------------------------|---|----------------|
| <b>Action</b>                  | Double acting, Single rod                                   |                |
| <b>Bore size (mm)</b>          | ø20, ø25, ø32, ø40  |                |
| <b>Max. operating pressure</b> | 1.0 MPa   |                |
| <b>Min. operating pressure</b> | 0.05 MPa  |                |
| <b>Piston speed</b>            | ø20   | 50 to 700 mm/s |
|                                | ø25   | 50 to 650 mm/s |
|                                | ø32   | 50 to 590 mm/s |
|                                | ø40   | 50 to 420 mm/s |
| <b>Mounting</b>                | Basic style, Rod side flange style, Rod side trunnion style |                |

\* Auto switch can be mounted.

CJ1

CJP

CJ2

**CM2**

CG1

MB

MB1

CA2

CS1

CS2

D-□

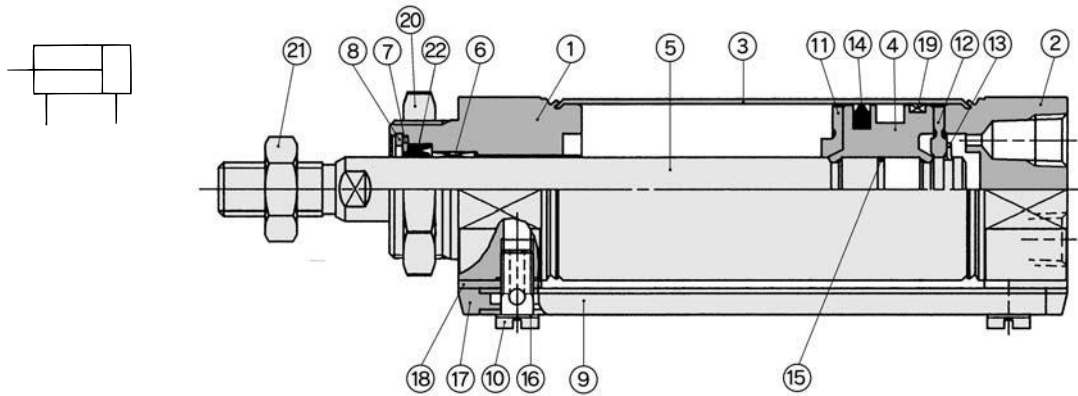
-X□

Individual  
-X□

Technical  
data

# Series CM2□P

## Construction



### Component Parts

| No. | Description    | Material                              | Note                      |
|-----|----------------|---------------------------------------|---------------------------|
| 1   | Rod cover      | Aluminum alloy                        | Clear anodized            |
| 2   | Head cover     | Aluminum alloy                        | Clear anodized            |
| 3   | Cylinder tube  | Stainless steel                       |                           |
| 4   | Piston         | Aluminum alloy                        | Chromated                 |
| 5   | Piston rod     | Carbon steel                          | Hard chrome plated        |
| 6   | Bushing        | Copper oil-impregnated sintered alloy |                           |
| 7   | Seal retainer  | Stainless steel                       |                           |
| 8   | Retaining ring | Carbon steel                          | Phosphate coated          |
| 9   | Pipe           | Aluminum alloy                        | Clear anodized            |
| 10  | Stud           | Brass                                 | Electroless nickel plated |
| 11  | Bumper A       | Urethane                              |                           |
| 12  | Bumper B       | Urethane                              |                           |

| No. | Description    | Material        | Note             |
|-----|----------------|-----------------|------------------|
| 13  | Retaining ring | Stainless steel |                  |
| 14  | Piston seal    | NBR             |                  |
| 15  | Piston gasket  | NBR             |                  |
| 16  | Gasket         | Resin           |                  |
| 17  | Pipe gasket    | Urethane rubber |                  |
| 18  | Spacer gasket  | Resin           | Except $\phi 25$ |
| 19  | Wear ring      | Resin           |                  |
| 20  | mounting nut   | Carbon steel    | Nickel plated    |
| 21  | Rod end nut    | Carbon steel    | Nickel plated    |

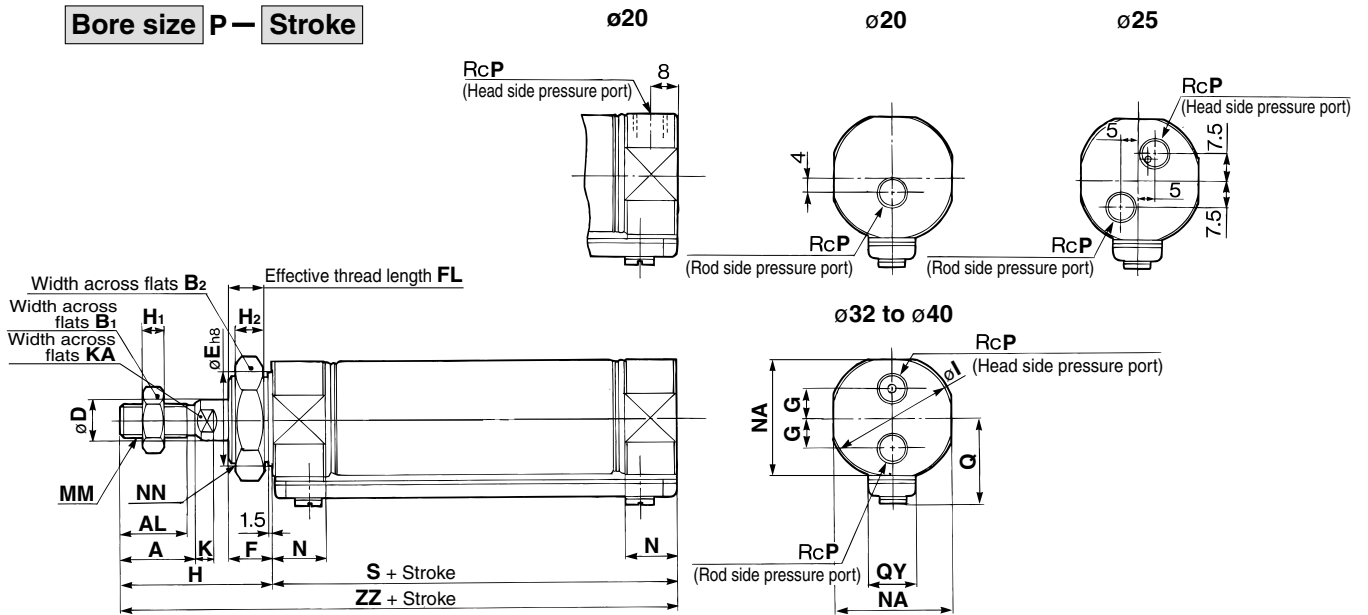
### Replacement Part: Seal

| No. | Description | Material | Part no. |         |          |         |
|-----|-------------|----------|----------|---------|----------|---------|
|     |             |          | 20       | 25      | 32       | 40      |
| 22  | Rod seal    | NBR      | PDU-8Z   | PDU-10Z | PDU-12LZ | PDU-14Z |

\* Since the seal kit does not include a grease pack, order it separately.  
Grease pack part no.: GR-S-010 (10 g)

## Basic Style (B)

Bore size P — Stroke



| Bore size | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | E                                 | F  | FL   | G    | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   | Q    | QY | S  | ZZ  |
|-----------|----|------|----------------|----------------|----|-----------------------------------|----|------|------|----|----------------|----------------|------|-----|----|------------|------|------|-----------|-----|------|----|----|-----|
| 20        | 18 | 15.5 | 13             | 26             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | —    | 41 | 5              | 8              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 19.8 | 14 | 62 | 103 |
| 25        | 22 | 19.5 | 17             | 32             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | —    | 45 | 6              | 8              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 22   | 14 | 62 | 107 |
| 32        | 22 | 19.5 | 17             | 32             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 9    | 45 | 6              | 8              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 25.8 | 16 | 64 | 109 |
| 40        | 24 | 21   | 22             | 41             | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 10.5 | 50 | 8              | 10             | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 29.8 | 16 | 88 | 138 |

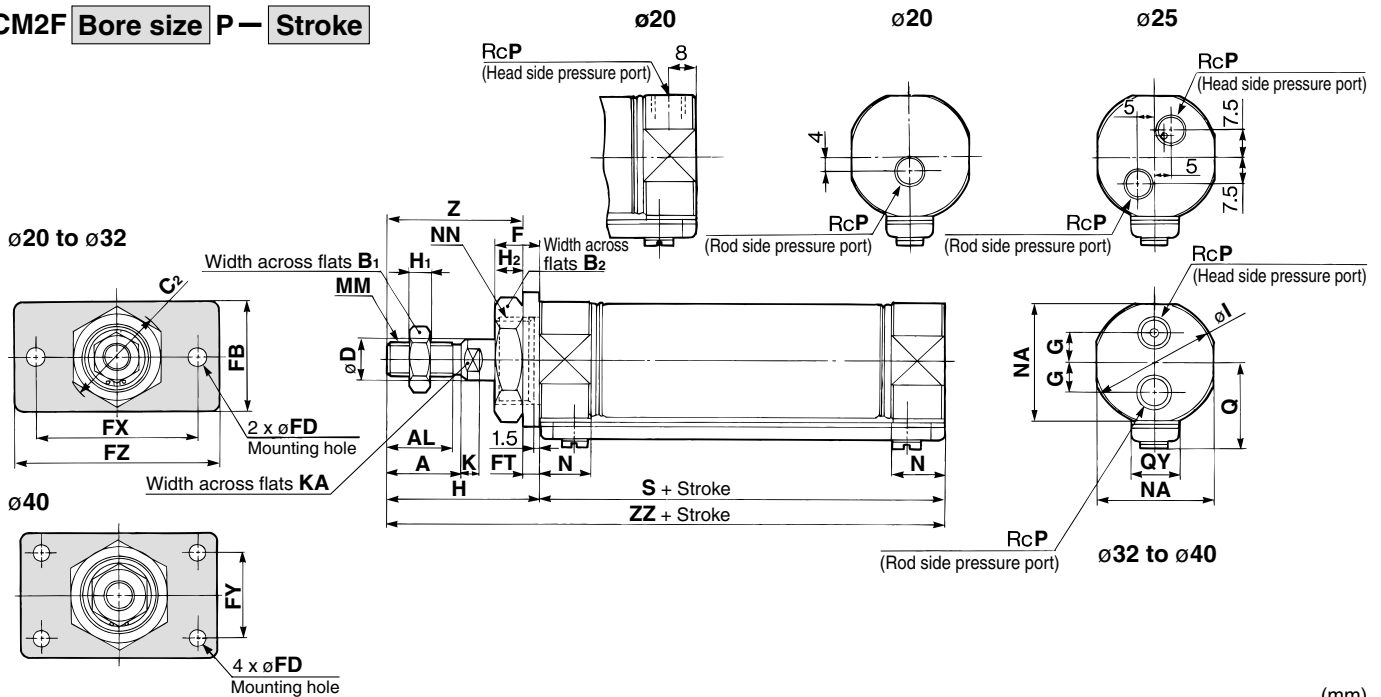


\* The dimensions of air cylinders with a rod boot are the same as the standard, double acting/single rod boss-cut style. Refer to page 135.

# Air Cylinder: Centralized Piping Type *Series CM2□P*

## Rod Side Flange Style (F)

CM2F Bore size P — Stroke

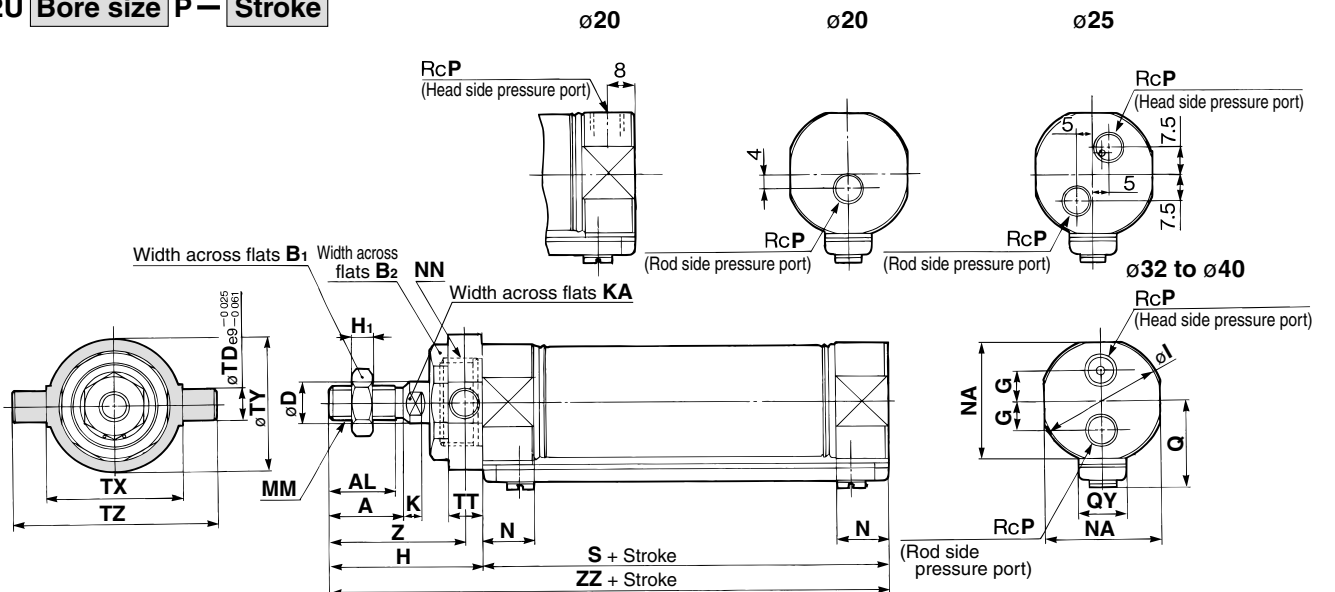


| Bore size | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | C <sub>2</sub> | D  | F  | FB | FD | FT | FX | FY | FZ | G    | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   | Q    | QY | S  | Z  | ZZ  |
|-----------|----|------|----------------|----------------|----------------|----|----|----|----|----|----|----|----|------|----|----------------|----------------|------|-----|----|------------|------|------|-----------|-----|------|----|----|----|-----|
| 20        | 18 | 15.5 | 13             | 26             | 30             | 8  | 13 | 34 | 7  | 4  | 60 | —  | 75 | —    | 41 | 5              | 8              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 19.8 | 14 | 62 | 37 | 103 |
| 25        | 22 | 19.5 | 17             | 32             | 37             | 10 | 13 | 40 | 7  | 4  | 60 | —  | 75 | —    | 45 | 6              | 8              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 22   | 14 | 62 | 41 | 107 |
| 32        | 22 | 19.5 | 17             | 32             | 37             | 12 | 13 | 40 | 7  | 4  | 60 | —  | 75 | 9    | 45 | 6              | 8              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 25.8 | 16 | 64 | 41 | 109 |
| 40        | 24 | 21   | 22             | 41             | 47.3           | 14 | 16 | 52 | 7  | 5  | 66 | 36 | 82 | 10.5 | 50 | 8              | 10             | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 29.8 | 16 | 88 | 45 | 138 |

\* The dimensions of air cylinders with a rod boot are the same as the standard, double acting/single rod boss-cut style. Refer to page 137.

## Rod Side Trunnion Style (U)

CM2U Bore size P — Stroke



| Bore size | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | G    | H  | H <sub>1</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   | Q    | QY | S  | TD | TT | TX | TY | TZ | Z    | ZZ  |
|-----------|----|------|----------------|----------------|----|------|----|----------------|------|-----|----|------------|------|------|-----------|-----|------|----|----|----|----|----|----|----|------|-----|
| 20        | 18 | 15.5 | 13             | 26             | 8  | —    | 41 | 5              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 19.8 | 14 | 62 | 8  | 10 | 32 | 32 | 52 | 36   | 103 |
| 25        | 22 | 19.5 | 17             | 32             | 10 | —    | 45 | 6              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 22   | 14 | 62 | 9  | 10 | 40 | 40 | 60 | 40   | 107 |
| 32        | 22 | 19.5 | 17             | 32             | 12 | 9    | 45 | 6              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 25.8 | 16 | 64 | 9  | 10 | 40 | 40 | 60 | 40   | 109 |
| 40        | 24 | 21   | 22             | 41             | 14 | 10.5 | 50 | 8              | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 29.8 | 16 | 88 | 10 | 11 | 53 | 53 | 77 | 44.5 | 138 |

\* The dimensions of air cylinders with a rod boot are the same as the standard, double acting/single rod boss-cut style. Refer to page 141.

- CJ1
- CJP
- CJ2
- CM2**
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Individual -X□
- Technical data

# Air Cylinder: With End Lock

## Series *CBM2*

ø20, ø25, ø32, ø40

### How to Order

**CBM2 L 40 - 150 - H N -**

**With auto switch CDBM2 L 40 - 150 - H N - M9BW -**

**Mounting style**

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

**Bore size**

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

**Cylinder stroke (mm)**  
(Refer to "Standard Stroke" on page 205.)

**Manual release type**

|   |               |
|---|---------------|
| N | Non-lock type |
| L | Lock type     |

**Lock position**

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

**Number of auto switches**

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

**Auto switch**

|     |                     |
|-----|---------------------|
| Nil | Without auto switch |
|-----|---------------------|

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

**Auto switch**

|     |                     |
|-----|---------------------|
| Nil | Without auto switch |
|-----|---------------------|

**Lock position**

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

**Rod boot**

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

**Cushion**

|     |               |
|-----|---------------|
| Nil | Rubber bumper |
| A   | Air cushion   |

**Made to Order**  
(Refer to page 205 for details.)

### Built-in Magnet Cylinder Model

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

### Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

| Type                                       | Special function                           | Electrical entry | Indicator light         | Wiring (Output)                             | Load voltage |     | Auto switch model | Lead wire length (m) |         |       |       |            | Pre-wired connector | Applicable load |            |            |   |            |   |            |
|--|--|------------------|-------------------------|---|--------------|-----|-------------------|----------------------|---------|-------|-------|------------|---------------------|-----------------|------------|------------|---|------------|---|------------|
|  |  |                  |                         |   | DC           | AC  |                   | 0.5 (Nil)            | 1 (M)   | 3 (L) | 5 (Z) | None (N)   |                     |                 |            |            |   |            |   |            |
| Solid state switch                         |  | Grommet          | Yes                     | 3-wire (NPN)                                | 5V, 12V      |     | M9N               | ●                    | ●       | ●     | ○     | —          | ○                   | IC circuit      | Relay, PLC |            |   |            |   |            |
|  |  |                  |                         | 3-wire (PNP)                                |              |     | M9P               | ●                    | ●       | ●     | ○     | —          | ○                   |                 |            |            |   |            |   |            |
|  |  | Connector        |                         | 2-wire                                      | 12V          | M9B | ●                 | ●                    | ●       | ○     | —     | ○          | —                   |                 |            |            |   |            |   |            |
|  |  | Terminal conduit |                         | 3-wire (NPN)                                | 5V, 12V      | H7C | ●                 | ●                    | ●       | ●     | —     | —          | —                   |                 |            |            |   |            |   |            |
|  | Diagnostic indication (2-color indication) | Grommet          | Yes                     | 2-wire                                      | 24V          | 12V | —                 | G39A **              | —       | —     | —     | —          | ●                   | —               |            | IC circuit |   |            |   |            |
|  |  |                  |                         | 3-wire (NPN)                                |              |     |                   | K39A **              | —       | —     | —     | —          | ●                   | —               |            | —          |   |            |   |            |
|  |  |                  |                         | 3-wire (PNP)                                | M9NW         | ●   | ●                 | ●                    | ○       | —     | ○     | IC circuit |                     |                 |            |            |   |            |   |            |
|  |  |                  |                         | 2-wire                                      | M9PW         | ●   | ●                 | ●                    | ○       | —     | ○     | —          |                     |                 |            |            |   |            |   |            |
|  |  |                  |                         | Water resistant (2-color indication)        | M9BW         | ●   | ●                 | ●                    | ○       | —     | ○     | —          |                     |                 |            |            |   |            |   |            |
|  |  |                  |                         | With diagnostic output (2-color indication) | H7BA         | —   | —                 | ●                    | ○       | —     | ○     | —          | —                   |                 |            |            |   |            |   |            |
| Reed switch                                |  | Grommet          | Yes                     | 3-wire (NPN equivalent)                     | 24V          | 12V | —                 | A96                  | ●       | —     | ●     | —          | —                   | —               | IC circuit | Relay, PLC |   |            |   |            |
|  |  |                  |                         |   |              |     |                   | A93                  | ●       | —     | ●     | —          | —                   | —               | —          |            | — |            |   |            |
|  |  |                  |                         |   |              |     |                   | A90                  | ●       | —     | ●     | —          | —                   | —               | —          |            | — | IC circuit |   |            |
|  |  |                  |                         |   |              |     |                   | B54 **               | ●       | —     | ●     | —          | —                   | —               | —          |            | — | —          |   |            |
|  |  |                  |                         |   |              |     |                   | B64 **               | ●       | —     | ●     | —          | —                   | —               | —          |            | — | —          |   |            |
|  |  | Connector        |                         | 2-wire                                      | 24V          | 12V | —                 | 100V                 | C73C    | ●     | —     | ●          | ●                   | ●               | —          |            | — | —          |   |            |
|  |  | Terminal conduit |                         |   |              |     |                   |                      | C80C    | ●     | —     | ●          | ●                   | ●               | —          |            | — | IC circuit |   |            |
|  |  | DIN terminal     |                         |   |              |     |                   |                      | A33A ** | —     | —     | —          | —                   | ●               | —          |            | — | —          | — | PLC        |
|  |  |                  |                         |   |              |     |                   |                      | A34A ** | —     | —     | —          | —                   | ●               | —          |            | — | —          | — | Relay, PLC |
|  |  |                  |                         |   |              |     |                   |                      | A44A ** | —     | —     | —          | —                   | ●               | —          |            | — | —          |   |            |
| Diagnostic indication (2-color indication) | Grommet                                    | Yes              | 3-wire (NPN equivalent) | —   | —            | —   | B59W              | ●                    | —       | ●     | —     | —          | —                   | —               |            |            |   |            |   |            |

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW  
 1 m ..... M (Example) M9NWM  
 3 m ..... L (Example) M9NWL  
 5 m ..... Z (Example) M9NWZ  
 None ..... N (Example) H7CN

\* Solid state auto switches marked with "○" are produced upon receipt of order.  
 \* D-A9□□/M9□□/M9□□W and D-M9□□(V)L cannot be mounted.  
 \* Do not indicate suffix "N" for no lead wire on D-A3□□/A44A/G39A/K39A models.  
 \*\* D-A3□□/A44A/G39A/K39A/B54/B64 cannot be mounted on bore sizes ø20 and ø25 cylinder with air cushion.

\* Since there are other applicable auto switches than listed above, refer to page 218 for details.  
 \* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.  
 \* D-A9□□/M9□□/M9□□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)



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

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

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

**Auto switch is mountable.**



**Made to Order Specifications**  
(For details, refer to pages 1373 to 1498.)

| Symbol | Specifications   |
|--------|--|
| —XA□   | Change of rod end shape  |
| —XB6   | Heat resistant cylinder (150°C)                                  |
| —XB9   | Low speed cylinder (10 to 50 mm/s)                               |
| —XC3   | Special port location  |
| —XC4 * | With heavy duty scraper  |
| —XC5   | Heat resistant cylinder (110°C)                                  |
| —XC6   | Piston rod and rod end nut made of stainless steel               |
| —XC8 * | Adjustable stroke cylinder/Adjustable extension type             |
| —XC13  | Auto switch mounting rail style                                  |
| —XC22  | Fluororubber seals   |
| —XC25  | No fixed orifice of connecting port                              |
| —XC27  | Double clevis pin and double knuckle pin made of stainless steel |
| —XC29  | Double knuckle joint with spring pin                             |
| —XC35  | With coil scraper  |
| —XC52  | Mounting nut with set screw                                      |

\* Available only for locking at head end

## Specifications

| Bore size (mm)                | 20  | 25              | 32 | 40 |
|-------------------------------|---|-----------------|----|----|
| Type                          | Pneumatic   |                 |    |    |
| Action                        | Double acting, Single rod   |                 |    |    |
| Fluid                         | Air   |                 |    |    |
| Proof pressure                | 1.5 MPa   |                 |    |    |
| Maximum operating pressure    | 1.0 MPa   |                 |    |    |
| Minimum operating pressure    | 0.15 MPa *  |                 |    |    |
| Ambient and fluid temperature | Without auto switch: -10 to 70°C (No freezing)<br>With auto switch: -10 to 60°C (No freezing)   |                 |    |    |
| Cushion                       | Rubber bumper, Air cushion  |                 |    |    |
| Lubrication                   | Not required (Non-lube)   |                 |    |    |
| Stroke length tolerance       | +1.4 mm   |                 |    |    |
| Piston speed                  | Rubber bumper   | 50 to 750 mm/s  |    |    |
|                               | Air cushion   | 50 to 1000 mm/s |    |    |
| Mounting                      | Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style |                 |    |    |

\* 0.05 MPa for other part than the lock unit

## Lock Specifications

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

## Allowable Kinetic Energy

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

## Standard Stroke

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



\* Long stroke applies to the axial foot style and the rod side flange style only.

When using other types of mounting brackets or exceeding the long stroke limit, the maximum allowable stroke will be determined by the stroke selection table listed on front matter 28.

\* Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual  
-X□

Technical  
data

# Series CBM2

**Accessory**/For details, refer to pages 144 and 145, since it is the same as Series CM2 standard type.

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

\* Mounting nuts are not equipped to single clevis and double clevis.

## Rod Boot Material

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

\* Maximum ambient temperature for the rod boot itself.

## Mass

(kg)

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

## Lock Unit Additional Mass

(kg)

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

Calculation: (Example) **CBM2L32-100-HN**

- Basic mass ..... 0.44 (Foot style, ø32)
- Additional mass ..... 0.08/50 stroke
- Cylinder stroke ..... 100 stroke
- Locking mass ..... 0.02 (Locking at head end, Manual release non-locking type)

$$0.44 + 0.08 \times 100/50 + 0.02 = 0.62 \text{ kg}$$

## Mounting Bracket Part No.

| Mounting bracket            | Min. order | Bore size (mm) |          |          |    | Description (for min. order)                               |
|-----------------------------|------------|----------------|----------|----------|----|--|
|                             |            | 20             | 25       | 32       | 40 |  |
| Axial foot *                | 2          | CM-L020B       | CM-L032B | CM-L040B |    | 2 foot, 1 mounting nut                                     |
| Flange                      | 1          | CM-F020B       | CM-F032B | CM-F040B |    | 1 flange   |
| Single clevis**             | 1          | CM-C020B       | CM-C032B | CM-C040B |    | 1 single clevis, 3 liners                                  |
| Double clevis (With pin)*** | 1          | CM-D020B       | CM-D032B | CM-D040B |    | 1 double clevis, 3 liners, 1 clevis pin, 2 retaining rings |
| Trunnion (With nut)         | 1          | CM-T020B       | CM-T032B | CM-T040B |    | 1 trunnion, 1 trunnion nut                                 |

\* Order 2 foot brackets for each cylinder unit.

\*\* 3 Liners are attached with a clevis bracket for adjusting the mounting angle.

\*\*\* Clevis pins and retaining rings (cotter pins for ø40) are attached.

## Double Rod Type End Lock Cylinder

**CBM2W** Mounting style Bore size — Stroke — H Manual release type

↓ Double rod type end lock cylinder

### Specifications

|                                      |   |
|--------------------------------------|---|
| <b>Action</b>                        | Double acting, Double rod                             |
| <b>Bore size (mm)</b>                | ø20, ø25, ø32, ø40                                    |
| <b>Max. operating pressure</b>       | 1.0 MPa   |
| <b>Min. operating pressure</b>       | 0.15 MPa  |
| <b>Cushion</b>                       | Rubber bumper   |
| <b>Piston speed</b>                  | 50 to 750 mm/s  |
| <b>Mounting</b>                      | Basic style, Foot style, Flange style, Trunnion style |
| <b>Lock position</b>                 | Head end lock   |
| <b>Maximum manufacturable stroke</b> | 500 mm  |

Note 1) Auto switch can be mounted.

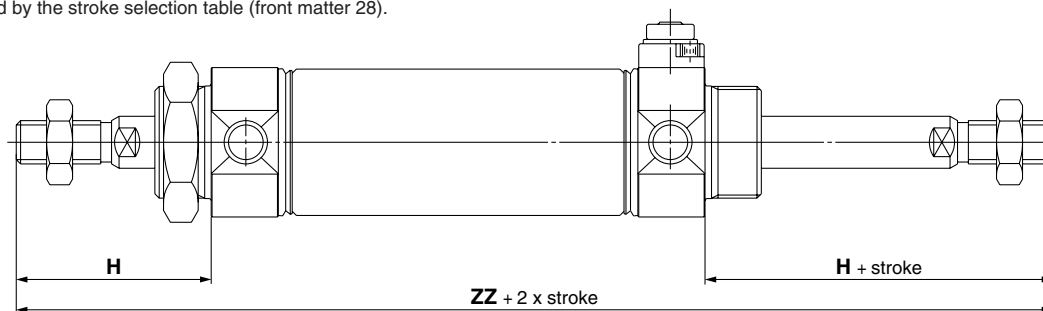
Note 2) Refer to the Precautions on page 210 when mounting flanges and trunnion brackets on the end lock side.

Note 3) When exceeding 300 strokes, the allowable maximum stroke length is determined by the stroke selection table (front matter 28).

### Dimensions

| Bore size (mm) | H  | ZZ  |
|----------------|----|-----|
| <b>20</b>      | 41 | 144 |
| <b>25</b>      | 45 | 152 |
| <b>32</b>      | 45 | 154 |
| <b>40</b>      | 50 | 188 |

\* Dimensions for other bore sizes are the same as the double acting single rod model.



## Non-rotating Rod Type End Lock Cylinder

**CBM2K** Mounting style Bore size — Stroke — H Manual release type

↓ Non-rotating rod type end lock cylinder

### Specifications

|                                      |   |
|--------------------------------------|---|
| <b>Action</b>                        | Double acting, Double rod   |
| <b>Bore size (mm)</b>                | ø20, ø25, ø32, ø40  |
| <b>Max. operating pressure</b>       | 1.0 MPa   |
| <b>Min. operating pressure</b>       | 0.15 MPa  |
| <b>Cushion</b>                       | Rubber bumper   |
| <b>Piston speed</b>                  | 50 to 500 mm/s  |
| <b>Mounting</b>                      | Basic, foot, rod side flange, head side flange, single clevis, double clevis, rod side trunnion, head side trunnion |
| <b>Lock position</b>                 | Head end lock   |
| <b>Maximum manufacturable stroke</b> | 1000 mm   |

Note 1) Auto switch can be mounted.

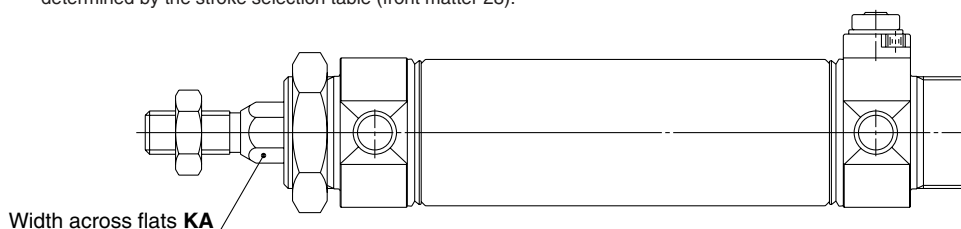
Note 2) Refer to the Precautions on page 210 for the head side flange and head side trunnion styles.

Note 3) When exceeding 300 strokes, the allowable maximum stroke length is determined by the stroke selection table (front matter 28).

### Dimensions

| Bore size (mm) | KA   |
|----------------|------|
| <b>20</b>      | 8.2  |
| <b>25</b>      | 10.2 |
| <b>32</b>      | 12.2 |
| <b>40</b>      | 14.2 |

\* Dimensions for other bore sizes are the same as the double acting single rod model.



- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Individual -X□
- Technical data

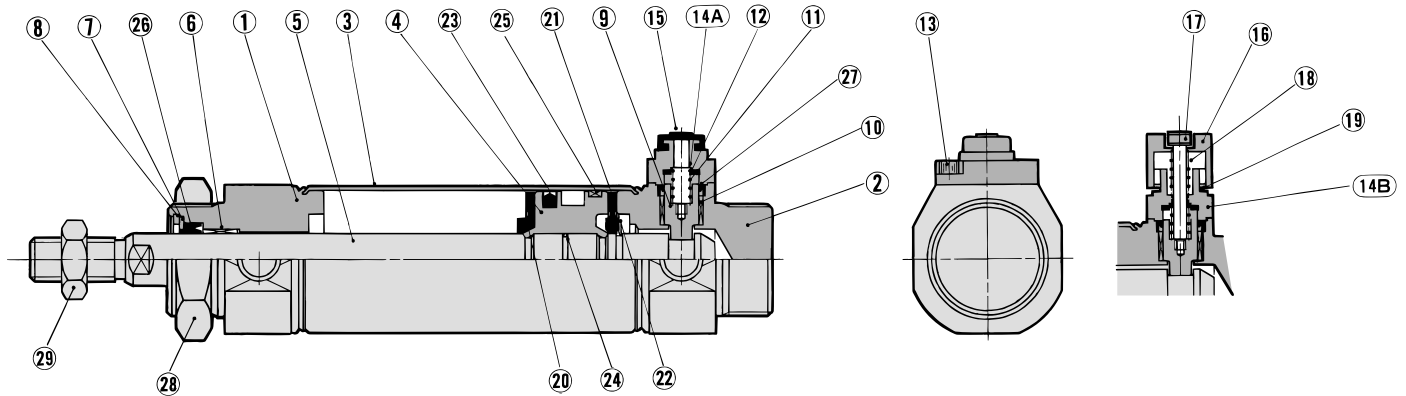
# Series CBM2

## Construction

### Head end lock

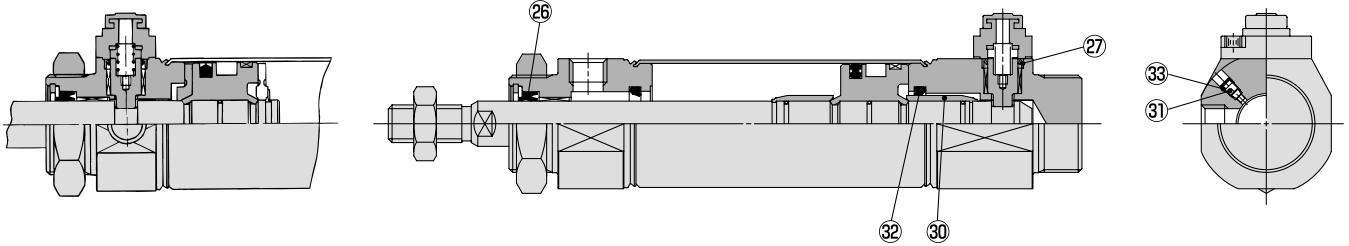
Manual release (Non-lock type): Suffix N

Manual release (Lock type): Suffix L



### Rod end lock

### With air cushion



### Component Parts

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

### Component Parts

| No. | Description         | Material | Note |
|-----|---------------------|----------|------|
| 26  | Rod seal            | NBR      |      |
| 27  | Lock piston seal    | NBR      |      |
| 33  | Cushion needle seal | NBR      |      |

### Replacement Parts: Seal Kit

#### With lock in single end

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

#### With lock at double ends

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

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

\* Seal kit includes a grease pack (10 g). Order with the following part number when only the grease pack is needed.

**Grease pack part number: GR-S-010 (10 g)**

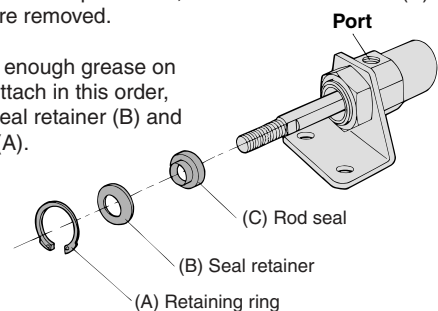
### How to Change Seal Kit

#### <Removal>

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

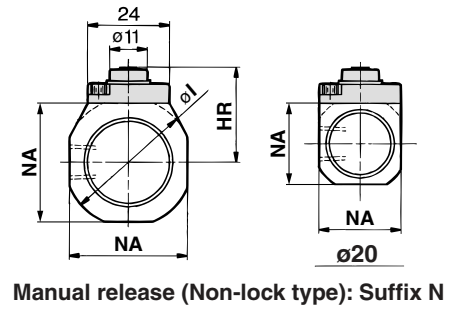
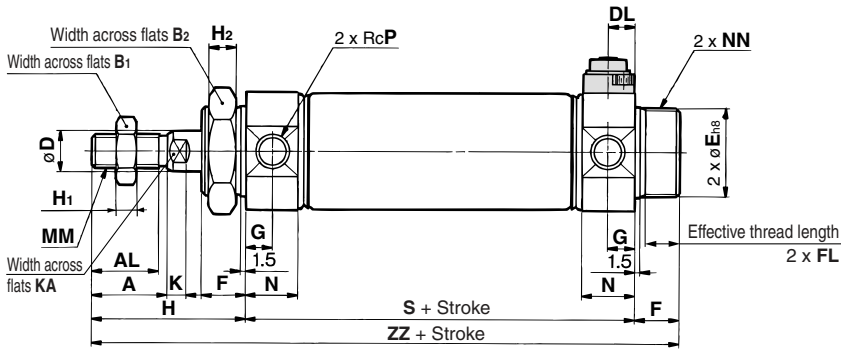
#### <Mounting>

• After applying enough grease on the rod seal, attach in this order, rod seal (C), seal retainer (B) and retaining ring (A).



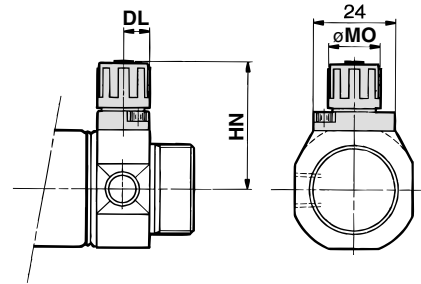
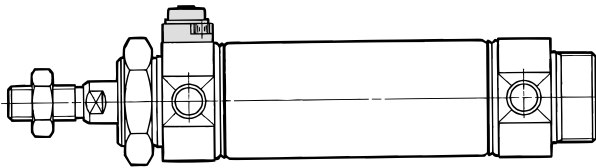
## Basic Style (Dimensions are common irrespective of the lock position; rod end, head end, or double end.)

### Head end lock: CBM2B Bore size - Stroke -HN



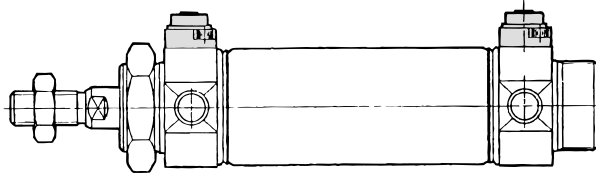
Manual release (Non-lock type): Suffix N

### Rod end lock: CBM2B Bore size - Stroke -RN

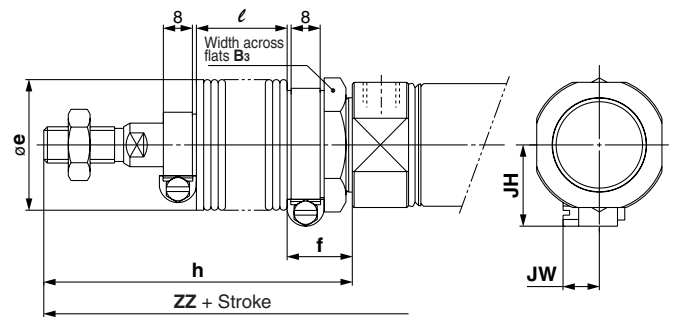


Manual release (Lock type): Suffix L

### Double end lock: CBM2B Bore size - Stroke -WN



### With rod boot



| Symbol         |              | (mm) |      |                |                |    |      |                      |    |      |    |    |                |                |      |           |      |     |    |            |    |      |      |           |     |    |     |
|----------------|--------------|------|------|----------------|----------------|----|------|----------------------|----|------|----|----|----------------|----------------|------|-----------|------|-----|----|------------|----|------|------|-----------|-----|----|-----|
| Bore size (mm) | Stroke range | A    | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | DL   | E                    | F  | FL   | G  | H  | H <sub>1</sub> | H <sub>2</sub> | HR   | HN (Max.) | I    | K   | KA | MM         | MO | N    | NA   | NN        | P   | S  | ZZ  |
| 20             | Up to 300    | 18   | 15.5 | 13             | 26             | 8  | 7.5  | 20 <sup>-0.033</sup> | 13 | 10.5 | 8  | 41 | 5              | 8              | 22.3 | 34        | 28   | 5   | 6  | M8 x 1.25  | 15 | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 116 |
| 25             | Up to 300    | 22   | 19.5 | 17             | 32             | 10 | 7.5  | 26 <sup>-0.033</sup> | 13 | 10.5 | 8  | 45 | 6              | 8              | 25.3 | 37        | 33.5 | 5.5 | 8  | M10 x 1.25 | 15 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 120 |
| 32             | Up to 300    | 22   | 19.5 | 17             | 32             | 12 | 7.5  | 26 <sup>-0.033</sup> | 13 | 10.5 | 8  | 45 | 6              | 8              | 27.6 | 39.3      | 37.5 | 5.5 | 10 | M10 x 1.25 | 15 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 122 |
| 40             | Up to 300    | 24   | 21   | 22             | 41             | 14 | 10.7 | 32 <sup>-0.039</sup> | 16 | 13.5 | 11 | 50 | 8              | 10             | 33.6 | 47.8      | 46.5 | 7   | 12 | M14 x 1.5  | 19 | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 154 |

### With Rod Boot

| Symbol         |                | (mm) |    |         |           |            |            |            |            |            |         |           |            |            |            |            |            |
|----------------|----------------|------|----|---------|-----------|------------|------------|------------|------------|------------|---------|-----------|------------|------------|------------|------------|------------|
| Bore size (mm) | B <sub>3</sub> | e    | f  | h       |           |            |            |            |            |            | l       |           |            |            |            |            |            |
|                |                |      |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 |
| 20             | 30             | 36   | 18 | 68      | 81        | 93         | 106        | 131        | 156        | 181        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        |
| 25             | 32             | 36   | 18 | 72      | 85        | 97         | 110        | 135        | 160        | 185        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        |
| 32             | 32             | 36   | 18 | 72      | 85        | 97         | 110        | 135        | 160        | 185        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        |
| 40             | 41             | 46   | 20 | 77      | 90        | 102        | 115        | 140        | 165        | 190        | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        |

### With Rod Boot

| Symbol         |        | ZZ      |           |            |            |            |            |            | (mm) |      |
|----------------|--------|---------|-----------|------------|------------|------------|------------|------------|------|------|
| Bore size (mm) | Symbol | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | JH   | JW   |
|                |        | 20      |           | 143        | 156        | 168        | 181        | 206        |      |      |
| 25             |        | 147     | 160       | 172        | 185        | 210        | 235        | 260        | 23.5 | 10.5 |
| 32             |        | 149     | 162       | 174        | 187        | 212        | 237        | 262        | 23.5 | 10.5 |
| 40             |        | 181     | 194       | 206        | 219        | 244        | 269        | 294        | 27   | 10.5 |

\* For details about the rod end nut and accessory, refer to pages 144 and 145.

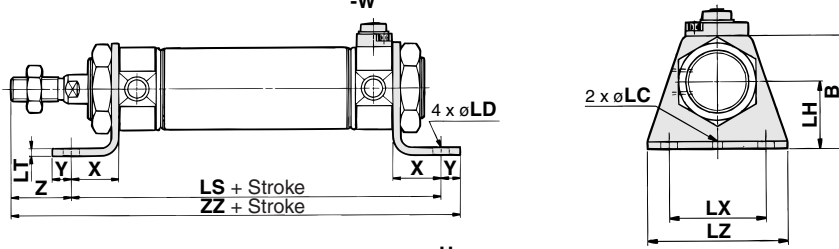
- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Individual
- X□
- Technical data

# Series CBM2

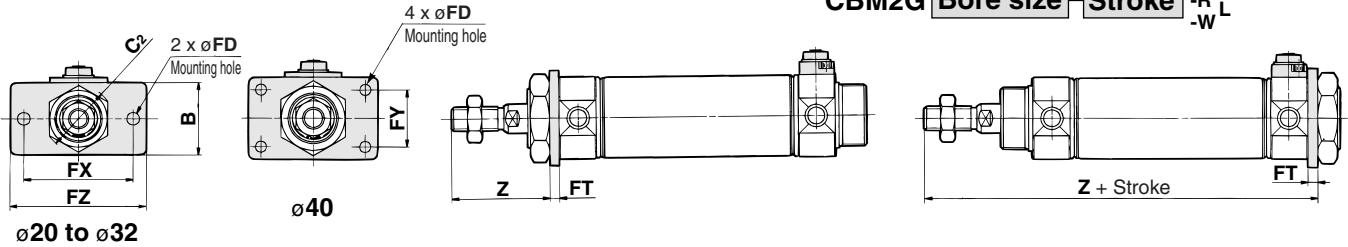
With Mounting Bracket (For dimensions not indicated below, refer to page 209.)

Axial foot style: CBM2L Bore size — Stroke  $\begin{matrix} -H \\ -R \\ -W \end{matrix} \begin{matrix} N \\ L \\ L \end{matrix}$

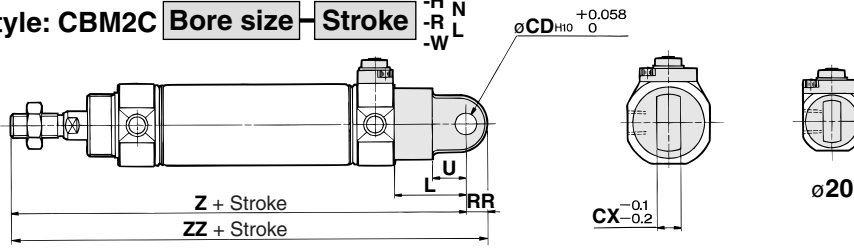


Rod side flange style: CBM2F Bore size — Stroke  $\begin{matrix} -H \\ -R \\ -W \end{matrix} \begin{matrix} N \\ L \\ L \end{matrix}$

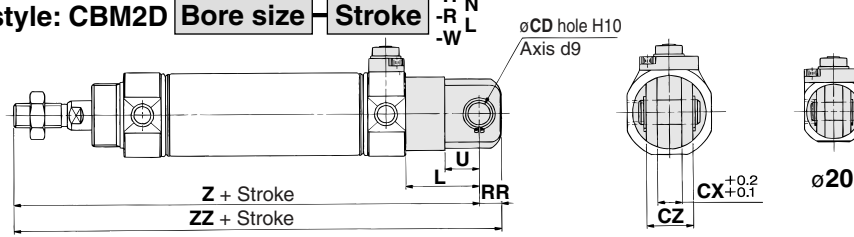
Head side flange style: CBM2G Bore size — Stroke  $\begin{matrix} -H \\ -R \\ -W \end{matrix} \begin{matrix} N \\ L \\ L \end{matrix}$



Single clevis style: CBM2C Bore size — Stroke  $\begin{matrix} -H \\ -R \\ -W \end{matrix} \begin{matrix} N \\ L \\ L \end{matrix}$



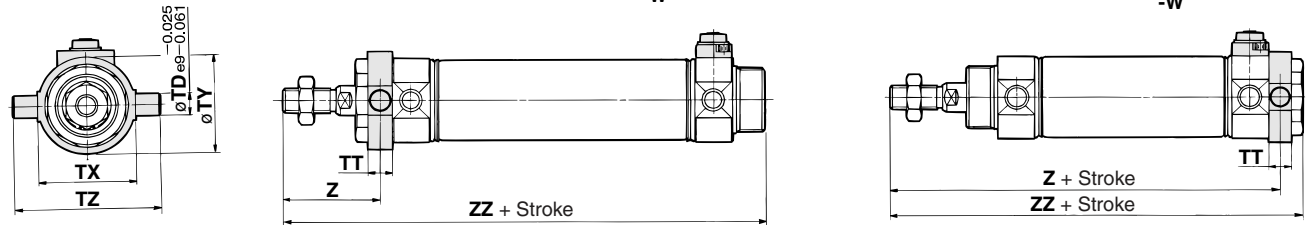
Double clevis style: CBM2D Bore size — Stroke  $\begin{matrix} -H \\ -R \\ -W \end{matrix} \begin{matrix} N \\ L \\ L \end{matrix}$



\* Clevis pin and retaining ring (cotter pin for bore size  $\phi 40$ ) are shipped together.

Rod side trunnion style: CBM2U Bore size — Stroke  $\begin{matrix} -H \\ -R \\ -W \end{matrix} \begin{matrix} N \\ L \\ L \end{matrix}$

Head side trunnion style: CBM2T Bore size — Stroke  $\begin{matrix} -H \\ -R \\ -W \end{matrix} \begin{matrix} N \\ L \\ L \end{matrix}$



| Bore size (mm) | Axial foot style |    |    |     |    |     |     |    |    |    |    |    |     | Flange style |    |                |    |    |    |    | Clevis style |    |              |           |    |    |    |    |    |    | Trunnion style |              |           |    |    |    |    |          |           |          |           |          |
|----------------|------------------|----|----|-----|----|-----|-----|----|----|----|----|----|-----|--------------|----|----------------|----|----|----|----|--------------|----|--------------|-----------|----|----|----|----|----|----|----------------|--------------|-----------|----|----|----|----|----------|-----------|----------|-----------|----------|
|                | Stroke range     | B  | LC | LD  | LH | LS  | LT  | LX | LZ | X  | Y  | Z  | ZZ  | Stroke range | B  | C <sub>2</sub> | FD | FT | FX | FY | FZ           | Z  | Stroke range | CD        | CX | CZ | L  | RR | U  | Z  | ZZ             | Stroke range | TD        | TT | TX | TY | TZ | Z        |           | ZZ       |           |          |
|                |                  |    |    |     |    |     |     |    |    |    |    |    |     |              |    |                |    |    |    |    |              |    |              |           |    |    |    |    |    |    |                |              |           |    |    |    |    | Rod side | Head side | Rod side | Head side | Rod side |
| 20             | to 400           | 40 | 4  | 6.8 | 25 | 102 | 3.2 | 40 | 55 | 20 | 8  | 21 | 131 | Up to 400    | 34 | 30             | 7  | 4  | 60 | —  | 75           | 37 | 107          | Up to 300 | 9  | 10 | 19 | 30 | 9  | 14 | 133            | 142          | Up to 300 | 8  | 10 | 32 | 32 | 52       | 36        | 108      | 116       | 118      |
| 25             | to 450           | 47 | 4  | 6.8 | 28 | 102 | 3.2 | 40 | 55 | 20 | 8  | 25 | 135 | Up to 450    | 40 | 37             | 7  | 4  | 60 | —  | 75           | 41 | 111          | Up to 300 | 9  | 10 | 19 | 30 | 9  | 14 | 137            | 146          | Up to 300 | 9  | 10 | 40 | 40 | 60       | 40        | 112      | 120       | 122      |
| 32             | to 450           | 47 | 4  | 6.8 | 28 | 104 | 3.2 | 40 | 55 | 20 | 8  | 25 | 137 | Up to 450    | 40 | 37             | 7  | 4  | 60 | —  | 75           | 41 | 113          | Up to 300 | 9  | 10 | 19 | 30 | 9  | 14 | 138            | 148          | Up to 300 | 9  | 10 | 40 | 40 | 60       | 40        | 114      | 122       | 124      |
| 40             | to 500           | 54 | 4  | 7   | 30 | 134 | 3.2 | 55 | 75 | 23 | 10 | 27 | 171 | Up to 500    | 52 | 47.3           | 7  | 5  | 66 | 36 | 82           | 45 | 143          | Up to 300 | 10 | 15 | 30 | 39 | 11 | 18 | 177            | 188          | Up to 300 | 10 | 11 | 53 | 53 | 77       | 44.5      | 143.5    | 154       | 154      |

\* Dimensions other than mentioned above are the same as on page 209.

## Precautions on Trunnion Style, Flange Style

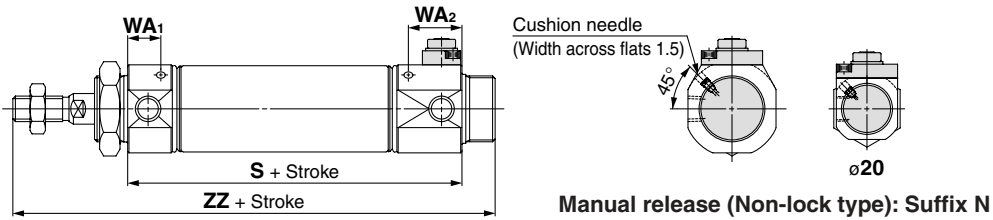
- Trunnion style
  - With lock in rod side of the rod side trunnion style
  - With lock in head side of the head side trunnion style
  - With lock in both sides. For above cases, use caution since the trunnion pin and fittings may be interfered with each other because the trunnion pin and port are very closed to each other.
- Flange style ( $\phi 20$  to  $\phi 32$ )
  - With lock in rod side of the rod side flange style
  - With lock in head side of the head side flange style
  - With lock in both sides. For above cases, use caution since the bolt for mounting a cylinder and fittings may be interfered with each other. Refer to "Special Port Position" in "Made to Order Specifications" on page 1416.



**With Air Cushion** (For dimensions not indicated below, refer to pages 209 and 210.)

**Basic style**

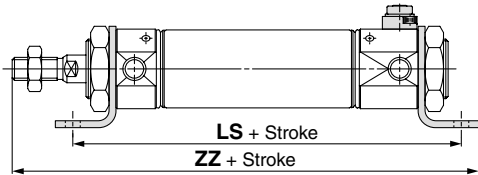
Head end lock: **CBM2B** Bore size Stroke **A-HN**



**With Air Cushion**

| Bore size (mm) | S             |              |                 | WA1           |              |                 | WA2           |              |                 | ZZ            |              |                 |
|----------------|---------------|--------------|-----------------|---------------|--------------|-----------------|---------------|--------------|-----------------|---------------|--------------|-----------------|
|                | Head end lock | Rod end lock | Double end lock | Head end lock | Rod end lock | Double end lock | Head end lock | Rod end lock | Double end lock | Head end lock | Rod end lock | Double end lock |
| 20             | 72            | 73           | 83              | 13            | 24           | 24              | 23            | 13           | 23              | 126           | 127          | 137             |
| 25             | 72            | 73           | 83              | 13            | 24           | 24              | 23            | 13           | 23              | 130           | 131          | 141             |
| 32             | 72            | 75           | 83              | 13            | 24           | 24              | 21            | 13           | 21              | 130           | 133          | 141             |
| 40             | 93            | 96           | 101             | 16            | 24           | 24              | 21            | 16           | 21              | 159           | 162          | 167             |

Axial foot style: **CBM2L** Bore size Stroke **A<sup>-H N</sup><sub>-R L</sub>-W**

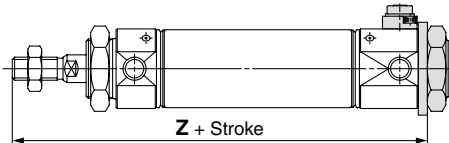


Rod side flange style: **CBM2F** Bore size Stroke **A<sup>-H N</sup><sub>-R L</sub>-W**

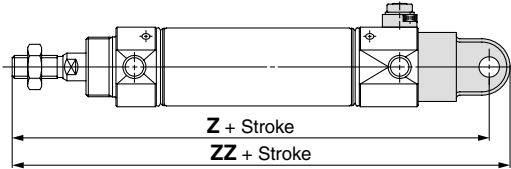


Head side flange style:

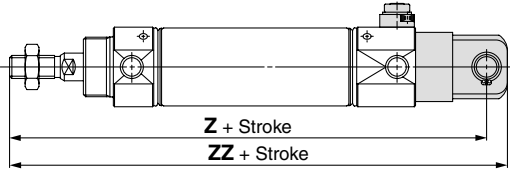
**CBM2G** Bore size Stroke **A<sup>-H N</sup><sub>-R L</sub>-W**



Single clevis style: **CBM2C** Bore size Stroke **A<sup>-H N</sup><sub>-R L</sub>-W**

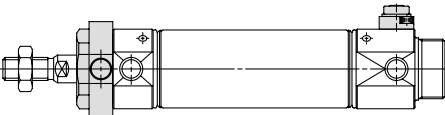


Double clevis style: **CBM2D** Bore size Stroke **A<sup>-H N</sup><sub>-R L</sub>-W**



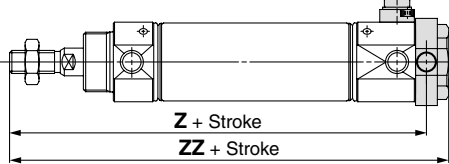
Rod side trunnion style:

**CBM2U** Bore size Stroke **A<sup>-H N</sup><sub>-R L</sub>-W**



Head side trunnion style:

**CBM2T** Bore size Stroke **A<sup>-H N</sup><sub>-R L</sub>-W**



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

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

**CJ1**

**CJP**

**CJ2**

**CM2**

**CG1**

**MB**

**MB1**

**CA2**

**CS1**

**CS2**

**D-□**

**-X□**

Individual  
**-X□**

Technical  
data



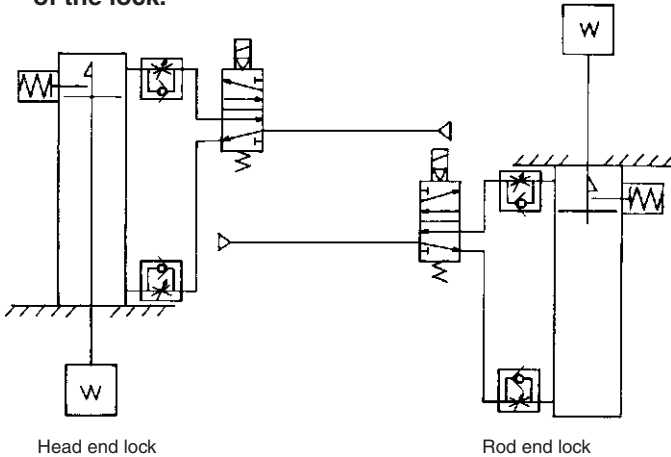
# Series CBM2 Specific Product Precautions 1

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

## Use the Recommended Pneumatic Circuit

### ⚠ Caution

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



## Operating Precautions

### ⚠ Caution

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

## Operating Pressure

### ⚠ Caution

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

## Exhaust Speed

### ⚠ Caution

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

## Relation to Cushion

### ⚠ Caution

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

## Releasing the Lock

### ⚠ Warning

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





# Series CBM2 Specific Product Precautions 2

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

## Manual Release

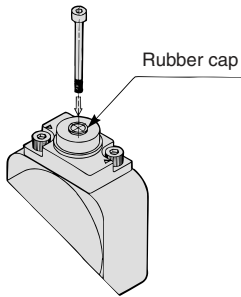
### ⚠ Caution

#### 1. Manual release (Non-lock type)

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

| Bore size (mm) | Thread size              | Pulling force | Stroke (mm) |
|----------------|--------------------------|---------------|-------------|
| 20, 25, 32     | M2.5 x 0.45 x 25 or more | 4.9 N         | 2           |
| 40             | M3 x 0.5 x 30 or more    | 10 N          | 3           |

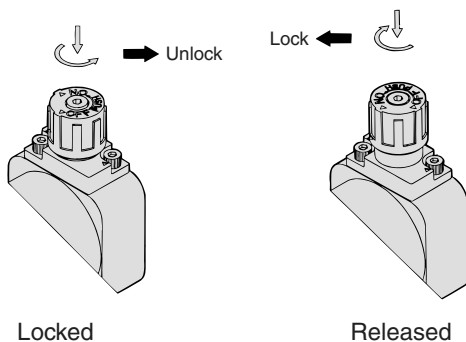
Remove the bolt for normal operation.  
It can cause lock malfunction or faulty release.



#### 2. Manual release (Lock type)

While pushing the M/O knob, turn it 90° counterclockwise. The lock is released (and remains in a released state) by aligning the ▲ mark on the cap with the ▼ OFF mark on the M/O knob. When locking is desired, turn M/O button clockwise 90° while pushing fully, correspond ▲ on cap and ▼ ON mark on M/O button. The correct position is confirmed by a click sound "click".

If not confirmed, locking is not done.

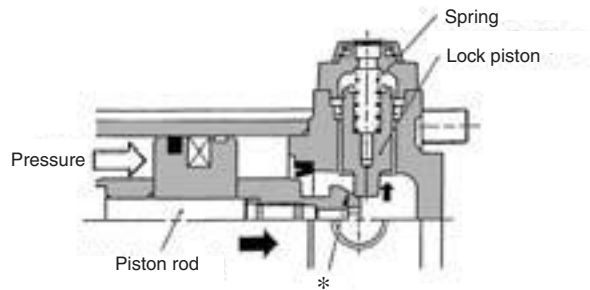


## Working Principle

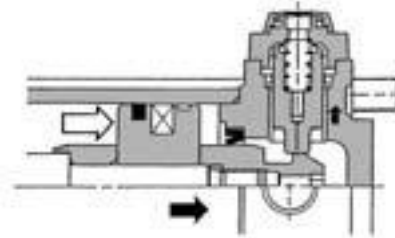
The figures below are for Series CBA2.

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

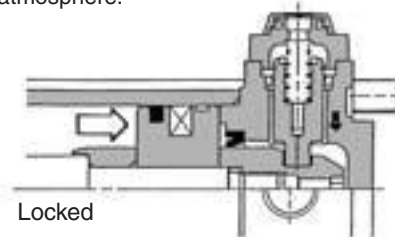
- When the piston rod is getting closer to the stroke end, the taper part (\*) of the piston rod edge will push the lock piston up.



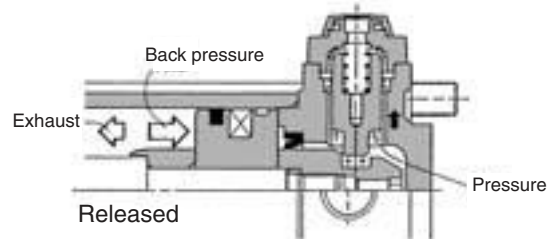
- Lock piston is pushed up further.



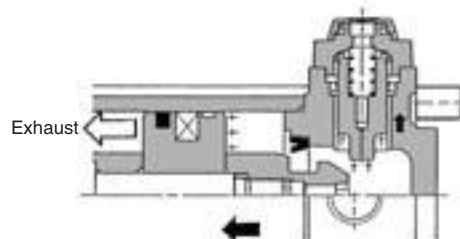
- Lock piston is pushed up into the groove of piston rod to lock it. (Lock piston is pushed up by spring force.) At this time, it is exhausted from port in head side and introduced to atmosphere.



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



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



CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual  
-X□

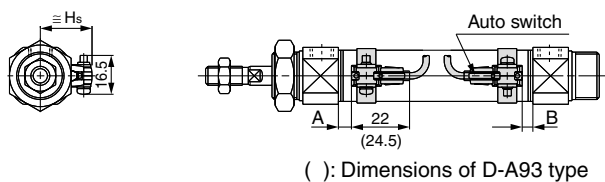
Technical  
data

# Series CM2

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

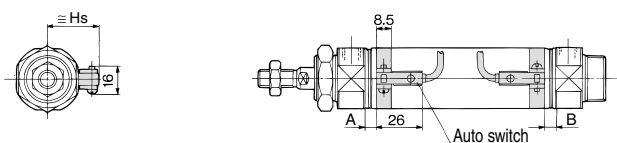
### Reed auto switch

#### D-A9□

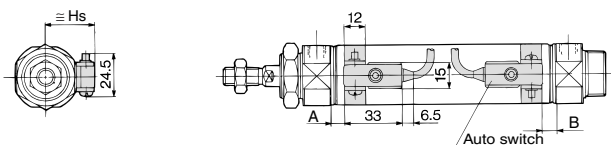


( ) : Dimensions of D-A93 type

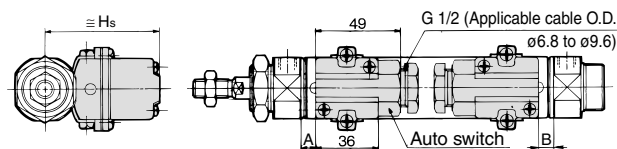
#### D-C7/C8



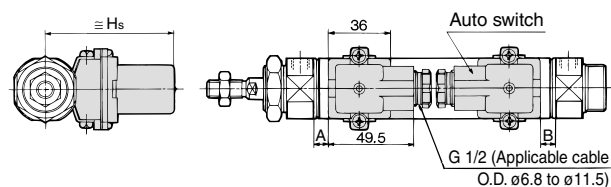
#### D-B5/B6/B59W



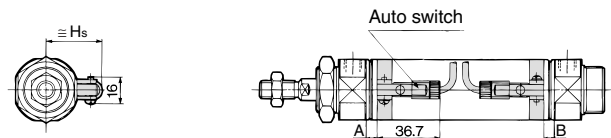
#### D-A33A/A34A



#### D-A44A



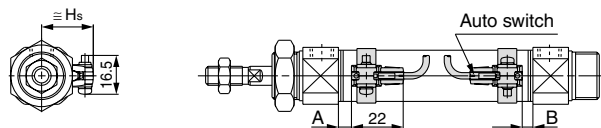
#### D-C73C/C80C



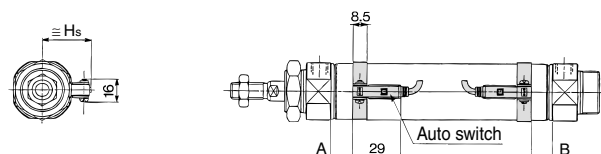
### Solid state auto switch

#### D-M9□

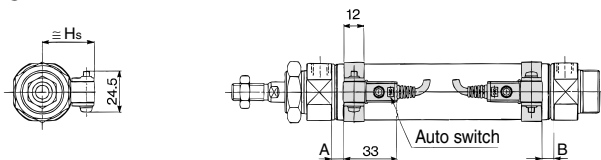
#### D-M9□W



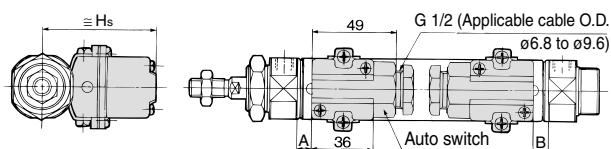
#### D-H7□/H7□W/H7NF/H7BAL



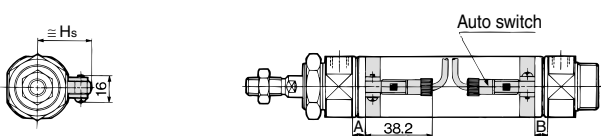
#### D-G5NTL



#### D-G39A/K39A



#### D-H7C



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

**Proper Auto Switch Mounting Position (Excluding Single Acting Type)**

(mm)

| Auto switch model | D-A9□      |            | D-M9□<br>D-M9□W |             | D-B5□<br>D-B64 |          | D-C7□<br>D-C80<br>D-C73C<br>D-C80C |          | D-B59W   |          | D-A3□A<br>D-G39A<br>D-K39A<br>D-A44A |            | D-H7□<br>D-H7C<br>D-H7□W<br>D-H7BAL<br>D-H7NF |          | D-G5NTL      |              |
|-------------------|------------|------------|-----------------|-------------|----------------|----------|------------------------------------|----------|----------|----------|--------------------------------------|------------|---|----------|--------------|--------------|
|                   | A          | B          | A               | B           | A              | B        | A                                  | B        | A        | B        | A                                    | B          | A   | B        | A            | B            |
| <b>20</b>         | 6.5<br>(4) | 5.5<br>(3) | 10.5<br>(8)     | 9.5<br>(7)  | 1<br>(—)       | 0<br>(—) | 7<br>(5)                           | 6<br>(4) | 4<br>(2) | 3<br>(1) | 0.5<br>(—)                           | 0<br>(—)   | 6<br>(4)                                      | 5<br>(3) | 2.5<br>(0.5) | 1.5<br>(0)   |
| <b>25</b>         | 6.5<br>(4) | 5.5<br>(3) | 10.5<br>(8)     | 9.5<br>(7)  | 1<br>(—)       | 0<br>(—) | 7<br>(5)                           | 6<br>(4) | 4<br>(2) | 3<br>(1) | 0.5<br>(—)                           | 0<br>(—)   | 6<br>(4)                                      | 5<br>(3) | 2.5<br>(0.5) | 1.5<br>(0)   |
| <b>32</b>         | 7.5<br>(5) | 6.5<br>(4) | 11.5<br>(9)     | 10.5<br>(8) | 2<br>(0)       | 1<br>(0) | 8<br>(6)                           | 7<br>(5) | 5<br>(3) | 4<br>(2) | 1.5<br>(0)                           | 0.5<br>(0) | 7<br>(5)                                      | 6<br>(4) | 3.5<br>(1.5) | 2.5<br>(0.5) |
| <b>40</b>         | 13.5       | 11.5       | 17.5            | 15.5        | 7              | 6        | 13                                 | 12       | 10       | 9        | 6.5                                  | 5.5        | 12  | 11       | 8.5          | 7.5          |

※ ( ) : Setting position for the auto switch with an air cushion.

D-B5/B6/A3□A/A44A/G39A/K39A cannot be mounted on the bore size ø20 and ø25 cylinder with an air cushion.

Note) Adjust the auto switch after confirming the operating condition in the actual setting.

**Auto Switch Mounting Height**

(mm)

| Auto switch model | D-A9□<br>D-M9□<br>D-M9□W | D-B5□<br>D-B64<br>D-B59W<br>D-G5NTL<br>D-H7C | D-C7□<br>D-C80<br>D-H7□<br>D-H7□W<br>D-H7BAL<br>D-H7NF | D-C73C<br>D-C80C | D-A3□A<br>D-G39A<br>D-K39A | D-A44A |
|-------------------|--------------------------|--|--|------------------|----------------------------|--------|
|                   | Hs                       | Hs   | Hs   | Hs               | Hs                         | Hs     |
| <b>20</b>         | 22                       | 25.5   | 22.5   | 25               | 60                         | 69.5   |
| <b>25</b>         | 24.5                     | 28   | 25   | 27.5             | 62.5                       | 72     |
| <b>32</b>         | 28                       | 31.5   | 28.5   | 31               | 66                         | 75.5   |
| <b>40</b>         | 32                       | 35.5   | 32.5   | 35               | 70                         | 79.5   |

CJ1

CJP

CJ2

**CM2**

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual  
-X□

Technical  
data

# Series CM2

## Proper Auto Switch Mounting Position (Detection at stroke end) and Mounting Height: Single Acting/Spring Return Type (S), Spring Extend Type (T)

### Proper Auto Switch Mounting Position: Standard Type/Spring Return Type (S), Non-rotating Rod Type/Spring Return Type (S) (mm)

| Auto switch model                             | Bore size | A Dimensions           |                         |                          |                          |                          | B    |
|---|-----------|------------------------|-------------------------|--------------------------|--------------------------|--------------------------|------|
|   |           | Up to 15 <sup>st</sup> | 51 to 100 <sup>st</sup> | 101 to 150 <sup>st</sup> | 151 to 200 <sup>st</sup> | 201 to 250 <sup>st</sup> |      |
| D-A9□   | 20        | 31.5                   | 56.5                    | 81.5                     | —                        | —                        | 5.5  |
|   | 25        | 31.5                   | 56.5                    | 81.5                     | —                        | —                        | 5.5  |
|   | 32        | 32.5                   | 57.5                    | 82.5                     | 107.5                    | —                        | 6.5  |
|   | 40        | 38.5                   | 63.5                    | 88.5                     | 113.5                    | 138.5                    | 11.5 |
| D-M9□<br>D-M9□W                               | 20        | 35.5                   | 60.5                    | 85.5                     | —                        | —                        | 9.5  |
|   | 25        | 35.5                   | 60.5                    | 85.5                     | —                        | —                        | 9.5  |
|   | 32        | 36.5                   | 61.5                    | 86.5                     | 111.5                    | —                        | 10.5 |
| D-B5□<br>D-B64                                | 40        | 42.5                   | 67.5                    | 92.5                     | 117.5                    | 142.5                    | 15.5 |
|   | 20        | 26                     | 51                      | 76                       | —                        | —                        | 0    |
|   | 25        | 26                     | 51                      | 76                       | —                        | —                        | 0    |
| D-C7□<br>D-C80<br>D-C73C<br>D-C80C            | 32        | 27                     | 52                      | 77                       | 102                      | —                        | 1    |
|   | 40        | 32                     | 57                      | 82                       | 107                      | 132                      | 6    |
|   | 20        | 32                     | 57                      | 82                       | —                        | —                        | 6    |
| D-B59W  | 25        | 32                     | 57                      | 82                       | —                        | —                        | 6    |
|   | 32        | 33                     | 58                      | 83                       | 108                      | —                        | 7    |
|   | 40        | 38                     | 63                      | 88                       | 113                      | 138                      | 12   |
|   | 20        | 29                     | 54                      | 79                       | —                        | —                        | 3    |
| D-A3□A<br>D-G39A<br>D-K39A<br>D-A44A          | 25        | 29                     | 54                      | 79                       | —                        | —                        | 3    |
|   | 32        | 30                     | 55                      | 80                       | 105                      | —                        | 4    |
|   | 40        | 35                     | 60                      | 85                       | 110                      | 135                      | 9    |
|   | 20        | 25.5                   | 50.5                    | 75.5                     | —                        | —                        | 0    |
| D-H7□<br>D-H7C<br>D-H7□W<br>D-H7BAL<br>D-H7NF | 25        | 25.5                   | 50.5                    | 75.5                     | —                        | —                        | 0    |
|   | 32        | 26.5                   | 51.5                    | 76.5                     | 101.5                    | —                        | 0.5  |
|   | 40        | 31.5                   | 56.5                    | 81.5                     | 106.5                    | 131.5                    | 5.5  |
|   | 20        | 31                     | 56                      | 81                       | —                        | —                        | 5    |
| D-G5NTL                                       | 25        | 31                     | 56                      | 81                       | —                        | —                        | 5    |
|   | 32        | 32                     | 57                      | 82                       | 107                      | —                        | 6    |
|   | 40        | 37                     | 62                      | 87                       | 112                      | 137                      | 11   |
|   | 20        | 27.5                   | 52.5                    | 77.5                     | —                        | —                        | 1.5  |
| D-G5NTL                                       | 25        | 27.5                   | 52.5                    | 77.5                     | —                        | —                        | 1.5  |
|   | 32        | 28.5                   | 53.5                    | 78.5                     | 103.5                    | —                        | 2.5  |
|   | 40        | 33.5                   | 58.5                    | 83.5                     | 108.5                    | 133.5                    | 7.5  |

Note) Adjust the auto switch after confirming the operating condition in the actual setting.

### Proper Auto Switch Mounting Position: Standard Type/Spring Extend Type (T), Non-rotating Rod Type/Spring Extend Type (T) (mm)

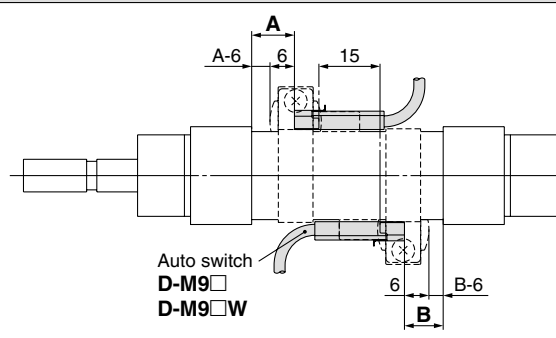
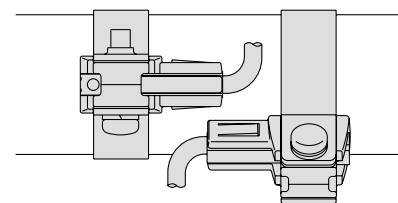
| Auto switch model                             | Bore size | A    | B Dimensions           |                         |                          |                          |                          |
|---|-----------|------|------------------------|-------------------------|--------------------------|--------------------------|--------------------------|
|   |           |      | Up to 15 <sup>st</sup> | 51 to 100 <sup>st</sup> | 101 to 150 <sup>st</sup> | 151 to 200 <sup>st</sup> | 201 to 250 <sup>st</sup> |
| D-A9□   | 20        | 6.5  | 30.5                   | 55.5                    | 80.5                     | —                        | —                        |
|   | 25        | 6.5  | 30.5                   | 55.5                    | 80.5                     | —                        | —                        |
|   | 32        | 7.5  | 31.5                   | 56.5                    | 81.5                     | 106.5                    | —                        |
|   | 40        | 13.5 | 36.5                   | 61.5                    | 86.5                     | 111.5                    | 136.5                    |
| D-M9□<br>D-M9□W                               | 20        | 10.5 | 34.5                   | 59.5                    | 84.5                     | —                        | —                        |
|   | 25        | 10.5 | 34.5                   | 59.5                    | 84.5                     | —                        | —                        |
|   | 32        | 11.5 | 35.5                   | 60.5                    | 85.5                     | 110.5                    | —                        |
| D-B5□<br>D-B64                                | 40        | 17.5 | 40.5                   | 65.5                    | 90.5                     | 115.5                    | 140.5                    |
|   | 20        | 1    | 25                     | 50                      | 75                       | —                        | —                        |
|   | 25        | 1    | 25                     | 50                      | 75                       | —                        | —                        |
|   | 32        | 2    | 26                     | 51                      | 76                       | 101                      | —                        |
| D-C7□<br>D-C80<br>D-C73C<br>D-C80C            | 40        | 7    | 31                     | 56                      | 81                       | 106                      | 131                      |
|   | 20        | 7    | 31                     | 56                      | 81                       | —                        | —                        |
|   | 25        | 7    | 31                     | 56                      | 81                       | —                        | —                        |
|   | 32        | 8    | 32                     | 57                      | 82                       | 107                      | —                        |
| D-B59W  | 40        | 13   | 37                     | 62                      | 87                       | 112                      | 137                      |
|   | 20        | 4    | 28                     | 53                      | 78                       | —                        | —                        |
|   | 25        | 4    | 28                     | 53                      | 78                       | —                        | —                        |
|   | 32        | 5    | 29                     | 54                      | 79                       | 104                      | —                        |
| D-A3□A<br>D-G39A<br>D-K39A<br>D-A44A          | 40        | 10   | 34                     | 59                      | 84                       | 109                      | 134                      |
|   | 20        | 0.5  | 24.5                   | 49.5                    | 74.5                     | —                        | —                        |
|   | 25        | 0.5  | 24.5                   | 49.5                    | 74.5                     | —                        | —                        |
|   | 32        | 1.5  | 25.5                   | 50.5                    | 75.5                     | 100.5                    | —                        |
| D-H7□<br>D-H7C<br>D-H7□W<br>D-H7BAL<br>D-H7NF | 40        | 6.5  | 30.5                   | 55.5                    | 80.5                     | 105.5                    | 130.5                    |
|   | 20        | 6    | 30                     | 55                      | 80                       | —                        | —                        |
|   | 25        | 6    | 30                     | 55                      | 80                       | —                        | —                        |
|   | 32        | 7    | 31                     | 56                      | 81                       | 106                      | —                        |
| D-G5NTL                                       | 40        | 12   | 36                     | 61                      | 86                       | 111                      | 136                      |
|   | 20        | 2.5  | 26.5                   | 51.5                    | 76.5                     | —                        | —                        |
|   | 25        | 2.5  | 26.5                   | 51.5                    | 76.5                     | —                        | —                        |
|   | 32        | 3.5  | 27.5                   | 52.5                    | 77.5                     | 102.5                    | —                        |
| D-G5NTL                                       | 40        | 8.5  | 32.5                   | 57.5                    | 81.5                     | 107.5                    | 132.5                    |

Note) Adjust the auto switch after confirming the operating condition in the actual setting.

## Minimum Auto Switch Mounting Stroke

| Auto switch model                                   | n: No. of auto switch (mm) |                    |                   |   |                |
|---|----------------------------|--------------------|-------------------|---|----------------|
|   | No. of auto switch mounted |                    |                   |   |                |
|   | 1                          | 2                  |                   | n   |                |
|   |                            | Different surfaces | Same surface      | Different surfaces                          | Same surface   |
| D-A9□<br>D-M9□<br>D-M9□W                            | 10                         | 15 <sup>(1)</sup>  | 45 <sup>(1)</sup> | $15 + 45 \frac{(n-2)}{2}$<br>(n=2, 4, 6...) | 45 + 45(n-2)   |
| D-C7□<br>D-C80                                      | 10                         | 15                 | 50                | $15 + 45 \frac{(n-2)}{2}$<br>(n=2, 4, 6...) | 50 + 45(n-2)   |
| D-H7□<br>D-H7□W<br>D-H7BAL<br>D-H7NF                | 10                         | 15                 | 60                | $15 + 45 \frac{(n-2)}{2}$<br>(n=2, 4, 6...) | 60 + 45(n-2)   |
| D-C73C<br>D-C80C<br>D-H7C                           | 10                         | 15                 | 65                | $15 + 50 \frac{(n-2)}{2}$<br>(n=2, 4, 6...) | 65 + 50(n-2)   |
| D-B5□/B64<br>D-G5NTL                                | 10                         | 15                 | 75                | $15 + 50 \frac{(n-2)}{2}$<br>(n=2, 4, 6...) | 75 + 55(n-2)   |
| D-B59W  | 15                         | 20                 | 75                | $20 + 50 \frac{(n-2)}{2}$<br>(n=2, 4, 6...) | 75 + 55(n-2)   |
| D-A3□A <sup>(2)</sup><br>D-G39A<br>D-K39A<br>D-A44A | 10                         | 35                 | 100               | 35 + 30(n-2)                                | 100 + 100(n-2) |

Note 1) Auto switch mounting (The adjustment as shown in the figures below is required with the following stroke ranges.)

| Auto switch model   | With 2 auto switches   |                             |
|---|--|-----------------------------|
|   | Different surfaces <sup>(1)</sup>  | Same surface <sup>(1)</sup> |
|  <p>The proper auto switch mounting position is 6 mm inward from the switch holder edge.</p> |  <p>The auto switch is mounted by slightly displacing it in a direction (cylinder tube circumferential exterior) so that the auto switch and lead wire do not interfere with each other.</p> |                             |
| D-A93   | —  | 45 to less than 50 stroke   |
| D-M9□<br>D-M9□W   | 15 to less than 20 stroke  | 45 to less than 55 stroke   |

Note 2) D-A3□A/A44A/G39A/K39A cannot be mounted on the centralized piping type Series CDM2□P.

## Operating Range

| Auto switch model                          | (mm)      |     |     |     |
|--|-----------|-----|-----|-----|
|  | Bore size |     |     |     |
|  | 20        | 25  | 32  | 40  |
| D-A9□                                      | 6         | 6   | 6   | 6   |
| D-M9□<br>D-M9□W                            | 3         | 3   | 4   | 3.5 |
| D-C7□/C80<br>D-C73C/C80C                   | 7         | 8   | 8   | 8   |
| D-B5□/B64<br>D-A3□A/A44A <sup>(Note)</sup> | 8         | 8   | 9   | 9   |
| D-B59W                                     | 12        | 12  | 13  | 13  |
| D-H7□/H7□W/H7BAL<br>D-G5NTL/H7NF           | 4         | 4   | 4.5 | 5   |
| D-H7C                                      | 7         | 8.5 | 9   | 10  |
| D-G39A/K39A <sup>(Note)</sup>              | 8         | 9   | 9   | 9   |

\* 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.

Note) D-A3□A/A44A/G39A/K39A cannot be mounted on the centralized piping type Series CDM2□P.

# Series CM2

## Auto Switch Mounting Bracket: Part No.

| Auto switch model  | Bore size (mm)                |                               |                               |                               |
|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|  | ø20                           | ø25                           | ø32                           | ø40                           |
| D-A9□<br>D-M9□<br>D-M9□W   | Note 1)<br>①BM2-020<br>②BJ3-1 | Note 1)<br>①BM2-025<br>②BJ3-1 | Note 1)<br>①BM2-032<br>②BJ3-1 | Note 1)<br>①BM2-040<br>②BJ3-1 |
| D-C7□/C80<br>D-C73C/C80C<br>D-H7□<br>D-H7□W<br>D-H7BAL<br>D-H7NF | BM2-020                       | BM2-025                       | BM2-032                       | BM2-040                       |
| D-B5□/B64<br>D-B59W<br>D-G5NTL<br>D-G5NBL                        | BA2-020                       | BA2-025                       | BA2-032                       | BA2-040                       |
| D-A3□/A44A <sup>Note 2)</sup><br>D-G39A/K39A                     | BM3-020                       | BM3-025                       | BM3-032                       | BM3-040                       |

Note 1) Two kinds of auto switch brackets are used as a set.

Note 2) D-A3□/A44A/G39A/K39A cannot be mounted on the centralized piping type Series CDM2□P.

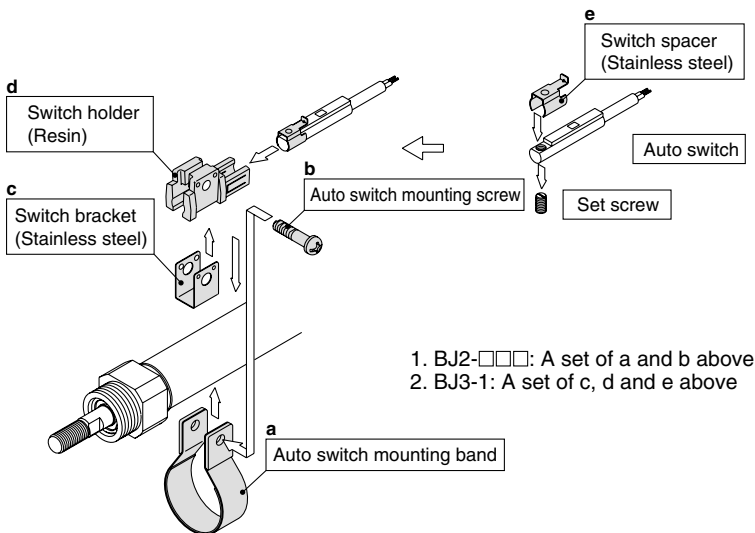
### [Mounting screw set made of stainless steel]

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

BBA4: For D-C7/C8/H7 types

Note 3) Refer to page 1358 for the details of BBA4 screws.

The above stainless steel screws are used when a cylinder is shipped with D-H7BAL type auto switches. When only an auto switch is shipped independently, BBA4 screws are attached.



Besides the models listed in How to Order, the following auto switches are applicable. Refer to pages 1263 to 1371 for the detailed specifications.

| Auto switch type | Part no.           | Electrical entry (Entry direction) | Features                                  |
|------------------|--------------------|------------------------------------|---|
| Reed             | D-B53, C73, C76    | Grommet (In-line)                  | —   |
|                  | D-C80              |                                    | Without indicator light                   |
| Solid state      | D-H7A1, H7A2, H7B  |                                    | —   |
|                  | D-H7NW, H7PW, H7BW |                                    | Diagnosis indication (2-color indication) |
|                  | D-G5NTL            |                                    | With timer                                |

\* For solid state switches, auto switches with a pre-wired connector are also available. Refer to pages 1328 and 1329 for details.

\* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H types) are also available. Refer to page 1290 for details.

\* A wide range detection type, solid state auto switch (D-GNBL type) is also available. Refer to page 1320 for details.

# Fine Lock Cylinders/Lock-up Cylinder

## Series CL





ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100, ø125, ø140, ø160

| Locking method | Spring locking   | Pneumatic locking  | Spring and pneumatic locking   |
|----------------|--|--|--|
| Features       | <ul style="list-style-type: none"> <li>Unlocking: Discharging the air causes the lock to operate.</li> </ul> | <ul style="list-style-type: none"> <li>Pressure locking: The holding power can be varied according to the air pressure that is applied to the port.</li> </ul> | <ul style="list-style-type: none"> <li>Pressure locking: The holding power can be varied according to the air pressure that is applied to the port.</li> <li>Unlocking: Discharging the air causes the lock to operate.</li> </ul> |

(Lock-up cylinders are spring locking only.)

**Locking in both directions is possible.**  
 Locking in either side of cylinder stroke is possible, too.  
 (The lock-up cylinder can be locked only in one direction.)

### Series Variations

| Series  | Action        | Rod        | Standard variations         |               | Locking direction | Locking method |                   |                              | Bore size (mm)                             | Standard stroke (mm)  | Page |
|---|---------------|------------|-----------------------------|---------------|-------------------|----------------|-------------------|------------------------------|--|---|------|
|   |               |            | Auto switch built-in magnet | With rod boot |                   | Spring locking | Pneumatic locking | Spring and Pneumatic locking |  |   |      |
| <b>Fine lock cylinders</b><br><b>Series CLJ2</b><br> | Double acting | Single rod | ●                           | ●             | Both directions   | ●              | ●                 | ●                            | 16   | 15 to 200   | 601  |
| <b>Series CLM2</b><br>                               | Double acting | Single rod | ●                           | ●             | Both directions   | ●              | ●                 | ●                            | 20<br>25<br>32<br>40                       | 25 to 300   | 611  |
| <b>Series CLG1</b><br>                               | Double acting | Single rod | ●                           | ●             | Both directions   | ●              | ●                 | ●                            | 20<br>25<br>32<br>40                       | 25 to 300   | 625  |
| <b>Lock-up cylinder</b><br><b>Series CL1</b><br>     | Double acting | Single rod | ●                           | ●             | One direction     | ●              |                   |                              | 40<br>50, 63<br>80, 100<br>125, 140<br>160 | 25 to 500<br>25 to 600<br>25 to 700<br>Up to 1000<br>Up to 1200 | 636  |

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual  
-X□



## Series CL

# Specific Product Precautions 1

Be sure to read before handling.

The precautions on these pages are for the fine lock cylinders and the lock-up cylinders.  
For general actuator precautions, refer to Actuator Precautions on pages 3 to 7.

### Design of Equipment and Machinery

#### Warning

- Construct so that the human body will not come into direct contact with driven objects or the moving parts of locking cylinders. If there is a risk of contact, provide safety measures such as a cover or a system that uses sensors that will activate an emergency stop before contact is made.
- Use a balance circuit in which lurching of the piston is taken into consideration. If the lock is applied at a desired position of a stroke and compressed air is applied to only one side of the cylinder, the piston will lurch at a high speed the moment the lock is disengaged. In such a situation, there is a risk of injury to humans, or equipment damage. To prevent the piston from lurching, use a balance circuit such as the recommended pneumatic circuit (P. 598). If an air-hydro fine lock cylinder is used, make sure to operate the lock portion through air pressure. Never use oil on the lock-up cylinder because the lock-up cylinder is a non-lube style. Failure to observe this could cause the lock to malfunction.

### Selection

#### Warning

Refer to the following criteria for the maximum load in the locked state, and set.

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

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

- When kinetic energy acts upon the cylinder, such as when effecting an intermediate stop, there are constraints in terms of the allowable kinetic energy that can be applied to the cylinder in a locked state. Therefore, refer to the allowable kinetic energy of the respective series. Furthermore, during locking, the mechanism must sustain the thrust of the cylinder itself, in addition to absorbing the kinetic energy. Therefore, even within a given allowable kinetic energy level, there is an upper limit to the amount of the load that can be sustained.
  - Fine lock series (Series CLJ2/CLM2/CLG1)  
Maximum load at horizontal mounting: 70% or less of the holding force (Maximum static load) for spring lock  
Maximum load at vertical mounting: 35% or less of the holding force (Maximum static load) for spring lock
  - Lock-up series (Series CL1)  
Maximum load at horizontal mounting: 50% or less of the holding force (Maximum static load)  
Maximum load at vertical mounting: 25% or less of the holding force (Maximum static load)

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

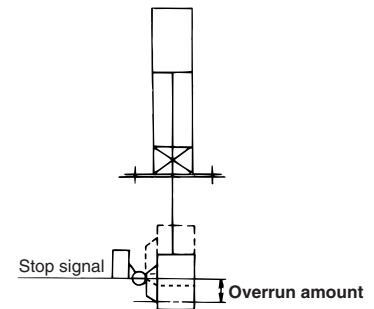
- The locking of the fine lock cylinder is directional. Although the fine lock cylinder can be locked in both directions, be aware that its holding force is smaller in one of the directions. CLJ2/CLM2/CLG1.... Holding force at piston rod extended side decreases approx. 15%.

- The locking of the lock-up cylinder is unidirectional. Because the locking direction of the lock-up cylinder is unidirectional, select the locking direction in accordance with the particular operating conditions. It is also possible to manufacture a bidirectional lock-up cylinder. For details, refer to "Made to Order" on page 1989. Due to the nature of its construction, a lock-up cylinder has a play of approximately 0.5 mm to 1 mm in the axial direction. Therefore, if an external stopper is used to stop the piston rod and the lock is engaged, the piston rod will shift in the amount of its axial play.

- To effect an intermediate stop, take the cylinder's stopping precision and overrun amount into consideration. Because the lock is applied by mechanical means, the piston will not stop immediately in response to a stopping signal, but only after a time lag. This lag determines the amount of the overrun of the piston stroke. Thus, the range of the maximum and minimum amounts of the overrun is the stopping precision.

- Place the limit switch before the desired stopping position, only in the amount of the overrun.
- The limit switch must have a detection length (dog length) of the overrun amount +  $\alpha$ .
- For SMC's auto switches, the operating range are between 8 and 14 mm. (It varies depending on a switch model.) When the overrun amount exceeds this range, self-holding of the contact should be performed at the switch load side.

\* For stopping accuracy, refer to Series CLJ (P. 603), Series CLM2 (P. 614), Series CLG1 (P. 627), and Series CL1 (P. 637) respectively.



- In order to further improve stopping accuracy, the time from the stop signal to the operation of the lock should be shortened as much as possible. To accomplish this, use a device such as a highly responsive electric control circuit or solenoid valve driven by direct current, and place the solenoid valve as close as possible to the cylinder.
- Be aware that the stopping accuracy is influenced by changes in the piston speed. The variance in the stopping position increases if the piston speed changes, such as due to load fluctuations during the reciprocal movement of the piston. Therefore, take measures to ensure a constant piston speed immediately preceding the stopping position. Furthermore, the variances in the stopping position increases when the piston is effecting a cushioning stroke or during acceleration after starting its movement.
- When unlocking is performed, if the thrust is applied to the piston, unlocking will not be easily done. To avoid that, ensure that unlocking should be performed before the thrust is applied to the piston.





# Series CL Specific Product Precautions 2

Be sure to read before handling.

The precautions on these pages are for the fine lock cylinders and the lock-up cylinders.  
For general actuator precautions, refer to Actuator Precautions on pages 3 to 7.

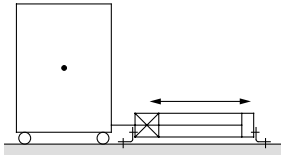
## Mounting

### ⚠ Warning

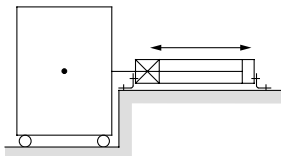
- Be certain to connect the rod end to the load with the lock released.
  - If this is performed with the lock engaged, a load that exceeds the allowable rotational force or holding force would be applied to the piston rod, which could damage the locking mechanism. The fine lock and Series CL1 with  $\phi 40$  to  $\phi 100$  cylinders have a built-in manual unlocking mechanism. Therefore, they can be maintained in the unlocked state without supplying air. For Series CL1 with  $\phi 125$  to  $\phi 160$  cylinders, simply connect piping to the lock-up port, and supply air pressure of 0.2 MPa or more to disengage the lock in order to attach a load.

### ⚠ Caution

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



X Load center of gravity and cylinder shaft center are not matched.



○ Load center of gravity and cylinder shaft center are matched.

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

## Adjustment

### ⚠ Caution

- Place it in the locked position. (Excluding the series CL1  $\phi 125$  to  $\phi 160$ .)
  - The locks are manually disengaged at the time the cylinders are shipped from the factory. Therefore, make sure to change them to the locked state before using the cylinders. For procedures to effect the change, refer to page 599 for the fine lock series. Be aware that the lock will not operate properly if the change is not performed correctly.
  - Adjust the cylinder's air balance. In the state in which a load is attached to the cylinder, disengage the lock and adjust the air pressure at the rod side and the head side of the cylinder to obtain a load balance. By maintaining a proper air balance, the piston rod can be prevented from lurching when the lock is disengaged.
- Adjust the mounting position of detections such as those of the auto switches. To effect an intermediate stop, adjust the mounting position of the auto switch detection by taking the amount of overrun into consideration in relation to the desired stopping position.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual  
-X□



# Series CL Specific Product Precautions 3

Be sure to read before handling.

The precautions on these pages are for the fine lock cylinders and the lock-up cylinders.  
For general actuator precautions, refer to Actuator Precautions on pages 3 to 7.

## Pneumatic Circuit

### Warning

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

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

2. Use a solenoid valve for unlocking which has a large effective area, as a rule 50% or more of the effective area of the cylinder drive solenoid valve.

The larger the effective area is, the shorter the locking time will be (the overrun amount will be shorter), and stopping accuracy will be improved.

3. Place the solenoid valve for unlocking close to the cylinder, and no farther than the cylinder drive solenoid valve.

The shorter the distance from the cylinder (the shorter the piping), the shorter the overrun amount will be, and stopping accuracy will be improved.

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

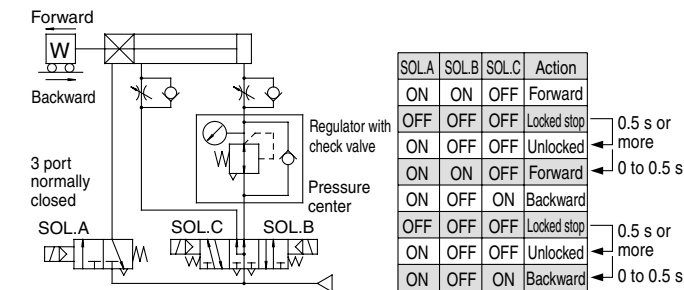
When the locked stop time is too short, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

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

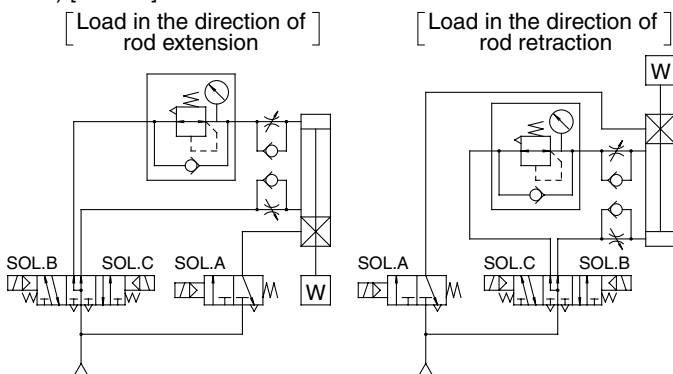
If the signal is delayed, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

### 6. Basic circuit

#### 1) [Horizontal]

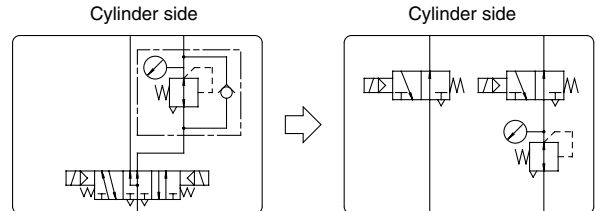


#### 2) [Vertical]



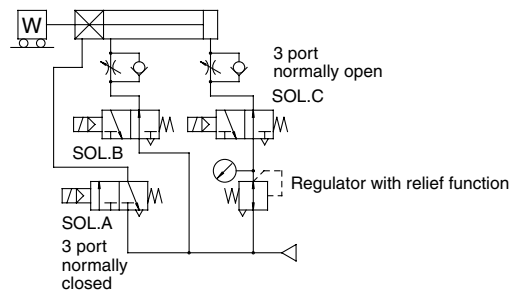
### Caution

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



[Example]

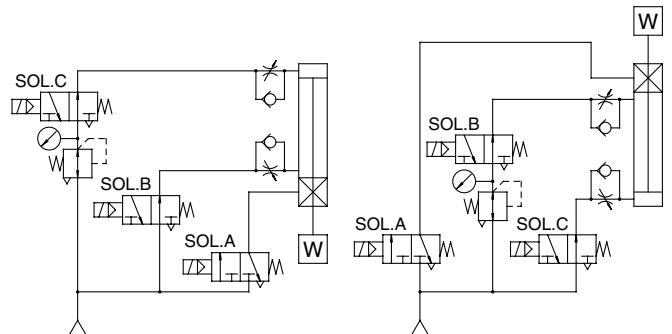
#### 1) [Horizontal]



#### 2) [Vertical]

[Load in the direction of rod extension]

[Load in the direction of rod retraction]





# Series CL Specific Product Precautions 4

Be sure to read before handling.

The precautions on these pages are for the fine lock cylinders and the lock-up cylinders.  
For general actuator precautions, refer to Actuator Precautions on pages 3 to 7.

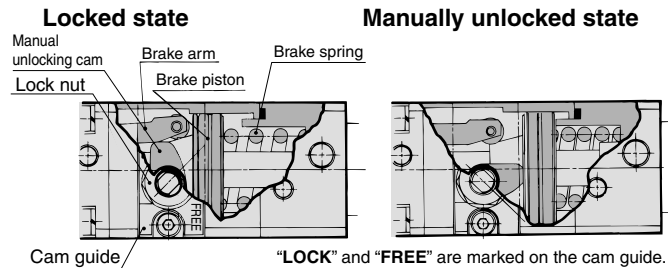
## How to Manually Disengage the Lock and Change from the Unlocked to the Locked State

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

### How to Change from Unlocked to Locked State

#### 1. Series CLJ2, CLM2, CLG1

- 1) Loose locking nut.
  - 2) Turn the wrench flats section of the manual unlocking cam to the LOCK position that is marked on the cam guide.
  - 3) While keeping the wrench flats section in place, tighten the lock nut.
- Note) The manual unlocking cam will rotate approximately 180°. Do not rotate the wrench flats section excessively.



### Manually Unlocking

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

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

#### 1. Series CLJ2, CLM2, CLG1

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

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

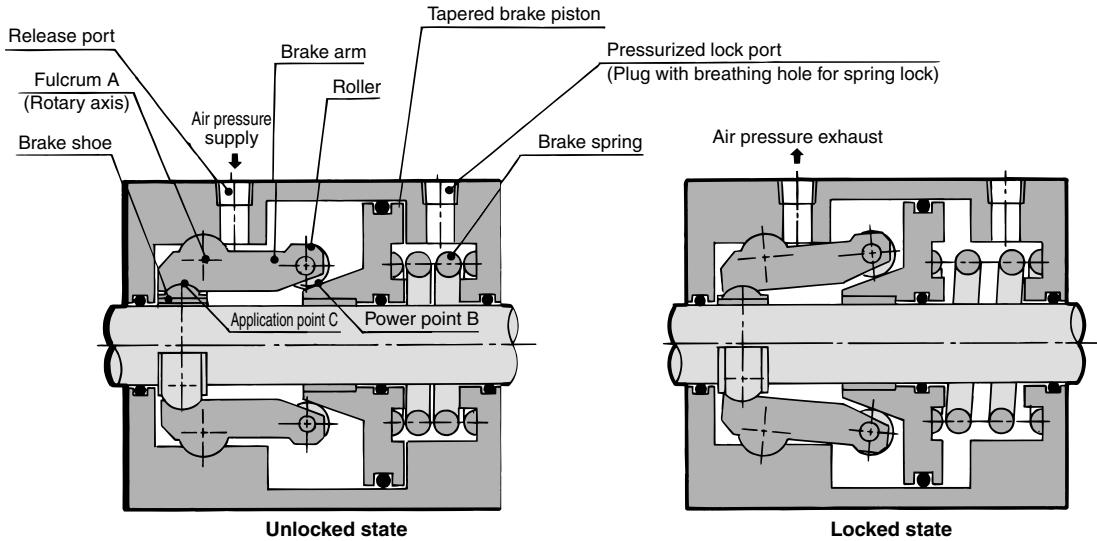
-X□

Individual  
-X□

# Prior to Use

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

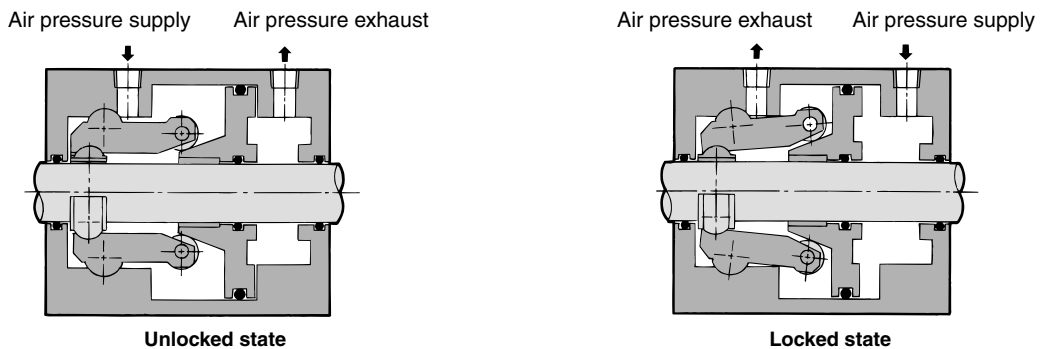
### Spring locking type



#### Spring locking (Exhaust locking)

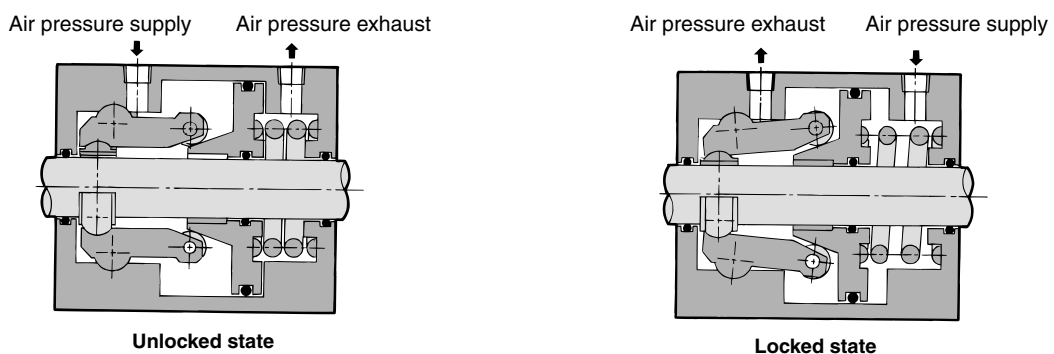
The spring force that is applied to the tapered brake piston becomes amplified through the wedge effect. This force becomes further amplified to the power of  $AB/AC$  through the mechanical advantage of a lever and acts on the brake shoe, which in turn, applies a large force to tighten and lock the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

### Pneumatic locking type



Brake piston is operated by air pressure.

### Spring and pneumatic locking type



Brake piston is operated by air pressure and spring force.

# Fine Lock Cylinder

## Double Acting, Single Rod

# Series *CLM2*

ø20, ø25, ø32, ø40

### How to Order

**CLM2** [ ] [ ] [ ] [ ] - **100** [ ] - **E** - [ ]

**With auto switch** **CDLM2** [ ] [ ] [ ] [ ] - **100** [ ] - **E** - **M9BW** [ ] - [ ]

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

**Type**

|     |           |
|-----|-----------|
| Nil | Pneumatic |
| H   | Air-hydro |

**Port thread type**

|     |     |
|-----|-----|
| Nil | Rc  |
| TN  | NPT |

**Mounting style**

|          |                        |           |                          |
|----------|------------------------|-----------|--------------------------|
| <b>B</b> | Basic style            | <b>T</b>  | Head side trunnion style |
| <b>L</b> | Axial foot style       | <b>E</b>  | Clevis integrated style  |
| <b>F</b> | Rod side flange style  | <b>BZ</b> | Boss-cut basic style     |
| <b>G</b> | Head side flange style | <b>FZ</b> | Boss-cut flange style    |
| <b>C</b> | Single clevis style    |           |                          |
| <b>D</b> | Double clevis style    |           |                          |

**Bore size**

|           |       |
|-----------|-------|
| <b>20</b> | 20 mm |
| <b>25</b> | 25 mm |
| <b>32</b> | 32 mm |
| <b>40</b> | 40 mm |

**Cylinder stroke (mm)**

Refer to "Standard Stroke" on page 612.

**With rod boot**

|          |                          |
|----------|--------------------------|
| Nil      | None                     |
| <b>J</b> | Nylon tarpaulin          |
| <b>K</b> | Heat resistant tarpaulin |

**Auto switch**

|     |                     |
|-----|---------------------|
| Nil | Without auto switch |
|-----|---------------------|

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

**Lock operation**

|          |                                      |
|----------|--------------------------------------|
| <b>E</b> | Spring locking (Exhaust locking)     |
| <b>P</b> | Pneumatic locking (Pressure locking) |
| <b>D</b> | Spring and pneumatic locking         |

**Number of auto switches**

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

**Made to Order**  
Refer to page 612 for details.

### Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.  
(Example) CDLM2F32-100-P

### Applicable Auto Switch/Refer to pages 1719 to 1827 for further information on auto switches.

| Type               | Special function                           | Electrical entry                            | Indicator light | Wiring (Output)         | Load voltage |      | Auto switch model | Lead wire length (m) |       |       |       |          | Pre-wired connector | Applicable load |            |            |            |
|--------------------|--|---|-----------------|-------------------------|--------------|------|-------------------|----------------------|-------|-------|-------|----------|---------------------|-----------------|------------|------------|------------|
|                    |  |   |                 |                         | DC           | AC   |                   | 0.5 (Nil)            | 1 (M) | 3 (L) | 5 (Z) | None (N) |                     |                 |            |            |            |
| Solid state switch | —  | Grommet                                     | Yes             | 3-wire (NPN)            | 5 V, 12 V    | —    | M9N               | ●                    | ●     | ●     | ○     | ○        | ○                   | IC circuit      | Relay, PLC |            |            |
|                    |  |   |                 | 3-wire (PNP)            |              |      |                   | ●                    | ●     | ●     | ○     | ○        |                     |                 |            |            |            |
|                    |  | Connector                                   |                 | 2-wire                  | 12 V         | —    | M9B               | ●                    | —     | ●     | ○     | ○        | —                   |                 |            |            |            |
|                    |  | Terminal conduit                            |                 | 3-wire (NPN)            | 5 V, 12 V    | —    | H7C               | ●                    | —     | ●     | ●     | —        | —                   |                 |            |            |            |
|                    | Diagnostic indication (2-color indication) | Grommet                                     | Yes             | 2-wire                  | 12 V         | —    | G39A              | —                    | —     | —     | —     | ●        | —                   | IC circuit      |            |            |            |
|                    |  |   |                 | 3-wire (NPN)            | 5 V, 12 V    | —    | K39A              | —                    | —     | —     | —     | ●        | —                   | —               |            |            |            |
|                    |  | 3-wire (PNP)                                |                 | 5 V, 12 V               | —            | M9NW | ●                 | ●                    | ●     | ○     | ○     | ○        | IC circuit          |                 |            |            |            |
|                    |  | 2-wire                                      |                 | 12V                     | —            | M9PW | ●                 | ●                    | ●     | ○     | ○     | ○        | IC circuit          |                 |            |            |            |
|                    |  | Water resistant (2-color indication)        |                 | 2-wire                  | 12V          | —    | M9BW              | ●                    | ●     | ●     | ○     | ○        | ○                   | —               |            |            |            |
|                    |  | With diagnostic output (2-color indication) |                 | 4-wire (NPN)            | 5 V, 12 V    | —    | H7BA              | —                    | —     | ●     | ○     | ○        | ○                   | —               |            |            |            |
| Reed switch        | —  | Grommet                                     | Yes             | 3-wire (NPN equivalent) | —            | 5V   | —                 | A96                  | ●     | —     | ●     | —        | —                   | —               | IC circuit | —          |            |
|                    |  |   |                 | Connector               | 2-wire       | 24 V | 12 V              | 100 V                | —     | A93   | ●     | —        | ●                   | —               | —          | —          | —          |
|                    |  | 100 V or less                               |                 |                         |              |      |                   | —                    | A90   | ●     | —     | ●        | —                   | —               | —          | IC circuit |            |
|                    |  | 100 V, 200V                                 |                 |                         |              |      |                   | —                    | B54   | ●     | —     | ●        | ●                   | —               | —          | —          | —          |
|                    |  | 200 V or less                               |                 |                         |              |      |                   | —                    | B64   | ●     | —     | ●        | —                   | —               | —          | —          | —          |
|                    |  | Terminal conduit                            |                 | 2-wire                  | 24 V         | 12 V | —                 | —                    | C73C  | ●     | —     | ●        | ●                   | ●               | —          | —          |            |
|                    |  |   |                 |                         |              |      | 24 V or less      | —                    | C80C  | ●     | —     | ●        | ●                   | ●               | —          | IC circuit |            |
|                    |  |   |                 |                         |              |      | —                 | —                    | A33A  | —     | —     | —        | —                   | ●               | —          | —          | PLC        |
|                    |  |   |                 |                         |              |      | —                 | —                    | A34A  | —     | —     | —        | —                   | ●               | —          | —          | —          |
|                    |  | DIN terminal                                |                 | 2-wire                  | 24 V         | 12 V | 100 V, 200 V      | —                    | A44A  | —     | —     | —        | —                   | ●               | —          | —          | Relay, PLC |
| —                  | —  |   | B59W            |                         |              |      | ●                 | —                    | ●     | —     | —     | —        | —                   |                 |            |            |            |

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW  
 1 m ..... M (Example) M9NWM  
 3 m ..... L (Example) M9NWL  
 5 m ..... Z (Example) M9NWZ  
 None ..... N (Example) H7CN

\* Solid state auto switches marked with "○" are produced upon receipt of order.  
 \* D-A9□V□/M9□V□/M9□WV□/M9□A(V)L types cannot be mounted.  
 \* Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.

\* Since there are other applicable auto switches than listed above, refer to page 624 for details.  
 \* For details about auto switches with pre-wired connector, refer to pages 1784 and 1785.  
 \* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled at the time of shipment.)

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual

-X□

# Series CLM2

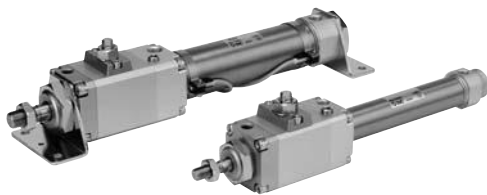
**Provided with a compact lock mechanism, it is suitable for intermediate stop, emergency stop, and drop prevention.**

## Locking in both directions

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

## Maximum piston speed: 500 mm/s

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



**Made to Order Specifications**  
(For details, refer to page 1836.)

| Symbol | Specifications          |
|--------|-------------------------|
| —XA□   | Change of rod end shape |

## Rod Boot Material

| Symbol   | Rod boot material        | Maximum ambient temperature |
|----------|--------------------------|-----------------------------|
| <b>J</b> | Nylon tarpaulin          | 70°C                        |
| <b>K</b> | Heat resistant tarpaulin | 110°C *                     |

\* Maximum ambient temperature for the rod boot itself.

Refer to pages 621 to 624 for cylinders with auto switches.

- Minimum auto switch mounting stroke
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

## Specifications

| Bore size (mm)                       | 20   | 25 | 32     | 40 |
|--------------------------------------|--|----|--------|----|
| <b>Action</b>                        | Double acting, Single rod  |    |        |    |
| <b>Type</b>                          | Air cylinder   |    |        |    |
| <b>Lock operation</b>                | Spring locking (Exhaust locking)<br>Pneumatic locking (Pressurized locking), Spring and pneumatic locking  |    |        |    |
| <b>Fluid</b>                         | Air  |    |        |    |
| <b>Proof pressure</b>                | 1.5 MPa  |    |        |    |
| <b>Maximum operating pressure</b>    | 1.0 MPa  |    |        |    |
| <b>Minimum operating pressure</b>    | 0.08 MPa   |    |        |    |
| <b>Ambient and fluid temperature</b> | Without auto switch: -10 to 70°C (No freezing)<br>With auto switch: -10 to 60°C (No freezing)  |    |        |    |
| <b>Lubrication</b>                   | Not required (Non-lube)  |    |        |    |
| <b>Piston speed</b>                  | 50 to 500 mm/s *   |    |        |    |
| <b>Cushion</b>                       | Rubber bumper (Standard equipment)   |    |        |    |
| <b>Stroke length tolerance</b>       | +1.4<br>0  |    |        |    |
| <b>Piping/Screw-in type</b>          | Rc 1/8   |    | Rc 1/4 |    |
| <b>Mounting</b>                      | Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Head side trunnion style, Clevis integrated style, Boss-cut basic style, Boss-cut flange style |    |        |    |

\* Constraints associated with the allowable kinetic energy are imposed on the speeds at which the piston can be locked. The maximum speed of 750 mm/s can be accommodated if the piston is to be locked in the stationary state for the purpose of drop prevention.

## Fine Lock Specifications

| Lock operation                    | Spring locking (Exhaust locking) | Spring and pneumatic locking | Pneumatic locking (Pressure locking) |
|-----------------------------------|----------------------------------|------------------------------|--------------------------------------|
| <b>Fluid</b>                      | Air                              |                              |                                      |
| <b>Maximum operating pressure</b> | 0.5 MPa                          |                              |                                      |
| <b>Unlocking pressure</b>         | 0.3 MPa or more                  |                              | 0.1 MPa or more                      |
| <b>Lock starting pressure</b>     | 0.25 MPa or less                 |                              | 0.05 MPa or more                     |
| <b>Locking direction</b>          | Both directions                  |                              |                                      |

\* Refer to page 614 for the allowable kinetic energy when locking, holding force of spring locking and stopping accuracy.

## Standard Stroke / Refer to the minimum auto switch mounting stroke (page 623) for those with an auto switch.

| Bore size (mm) | Standard stroke <sup>(1)</sup> (mm)        | Maximum stroke (mm) |
|----------------|--|---------------------|
| <b>20</b>      | 25, 50, 75, 100, 125, 150<br>200, 250, 300 | 1000                |
| <b>25</b>      |  | 1500                |
| <b>32</b>      |  | 2000                |
| <b>40</b>      |  | 2000                |

Note 1) Intermediate strokes other than listed above are produced upon receipt of order. Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Note 2) When exceeding 300 strokes, the allowable maximum stroke length is determined by the stroke selection table (technical data).

# Fine Lock Cylinder Double Acting, Single Rod **Series CLM2**

## Mounting Bracket and Accessory

| Accessory<br>Mounting              | Standard equipment   |             |            | Option               |                                     |                                     |          |
|------------------------------------|----------------------|-------------|------------|----------------------|-------------------------------------|-------------------------------------|----------|
|                                    | Mounting nut         | Rod end nut | Clevis pin | Single knuckle joint | Double <sup>(3)</sup> knuckle joint | Clevis <sup>(4)</sup> pivot bracket | Rod boot |
| Basic style                        | ● (1pc.)             | ●           | —          | ●                    | ●                                   | —                                   | ●        |
| Axial foot style                   | ● (2)                | ●           | —          | ●                    | ●                                   | —                                   | ●        |
| Rod side flange style              | ● (1)                | ●           | —          | ●                    | ●                                   | —                                   | ●        |
| Head side flange style             | ● (1)                | ●           | —          | ●                    | ●                                   | —                                   | ●        |
| Clevis integrated style            | — <sup>(1)</sup>     | ●           | —          | ●                    | ●                                   | ●                                   | ●        |
| Single clevis style                | — <sup>(1)</sup>     | ●           | —          | ●                    | ●                                   | —                                   | ●        |
| Double clevis style <sup>(3)</sup> | — <sup>(1)</sup>     | ●           | ●          | ●                    | ●                                   | —                                   | ●        |
| Head side trunnion style           | ● (1) <sup>(2)</sup> | ●           | —          | ●                    | ●                                   | —                                   | ●        |
| Boss-cut basic style               | ● (1)                | ●           | —          | ●                    | ●                                   | —                                   | ●        |
| Boss-cut flange style              | ● (1)                | ●           | —          | ●                    | ●                                   | —                                   | ●        |
| Note                               |                      |             |            |                      | With pin                            | With pin                            |          |

Note 1) Mounting nut is not equipped with clevis integrated style, single clevis style and double clevis style.

Note 2) Trunnion nuts are attached for head side trunnion style.

Note 3) Pin and retaining ring (ø40: cotter pin) are shipped together with double clevis and double knuckle joint.

Note 4) Pin and retaining ring are shipped together with clevis pivot bracket.

## Mass

(kg)

| Bore size (mm)                           |                                 | 20   | 25   | 32   | 40   |
|--|---------------------------------|------|------|------|------|
| Basic mass                               | Basic style                     | 0.55 | 0.87 | 0.94 | 1.30 |
|  | Axial foot style                | 0.70 | 1.03 | 1.10 | 1.57 |
|  | Flange style                    | 0.61 | 0.96 | 1.03 | 1.42 |
|  | Clevis integrated style         | 0.53 | 0.85 | 0.93 | 1.26 |
|  | Single clevis style             | 0.59 | 0.91 | 0.98 | 1.39 |
|  | Double clevis style             | 0.60 | 0.93 | 0.99 | 1.43 |
|  | Trunnion style                  | 0.59 | 0.94 | 1.00 | 1.40 |
|  | Boss-cut basic style            | 0.54 | 0.85 | 0.92 | 1.27 |
|  | Boss-cut flange style           | 0.60 | 0.94 | 1.01 | 1.39 |
| Additional mass per each 50 mm of stroke |                                 | 0.04 | 0.06 | 0.08 | 0.13 |
| Option bracket                           | Clevis bracket (With pin)       | 0.07 | 0.07 | 0.14 | 0.14 |
|  | Single knuckle joint            | 0.06 | 0.06 | 0.06 | 0.23 |
|  | Double knuckle joint (With pin) | 0.07 | 0.07 | 0.07 | 0.20 |

Calculation: (Example) **CLM2L32-100-E**

- Basic mass ..... 1.10 (Foot, ø32)
- Additional mass ..... 0.08/50 stroke
- Cylinder stroke ..... 100 stroke

$$1.10 + 0.08 \times 100/50 = 1.26 \text{ kg}$$

## Mounting Bracket Part No.

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

\* When ordering foot bracket, order 2 pieces per cylinder.

\*\* Clevis pin and retaining ring (ø40: cotter pin) are shipped together with double clevis style.

## Boss-cut style

Boss for the head side cover bracket is eliminated and the total length of cylinder is shortened.



## Comparison of the full length dimension (Versus standard type)

(mm)

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

## Mounting style

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

## Air-hydro

CLM2H   —

↓ Air-hydro

Low hydraulic cylinder 1 MPa or less

Through the concurrent use of a CC series air-hydro unit, it is possible to operate at a constant or low speeds or to effect an intermediate stop, just like a hydraulic unit, while using pneumatic equipment such as a valve.



## Specifications

|                            |   |
|----------------------------|---|
| Fluid                      | Turbine oil (Lock portion is air)   |
| Action                     | Double acting, Single rod   |
| Bore size (mm)             | ø20, ø25, ø32, ø40  |
| Maximum operating pressure | 1.0 MPa   |
| Minimum operating pressure | 0.2 MPa   |
| Piston speed               | 15 to 300 mm/s  |
| Cushion                    | Rubber bumper (Standard equipment)  |
| Piping                     | Screw-in type   |
| Mounting                   | Basic style, Axial foot style, Rod side flange style<br>Head side flange style, Single clevis style<br>Double clevis style, Head side trunnion style<br>Clevis integrated style, Boss-cut style |

\* Auto switch capable

- For an exterior dimension diagram to identify the mounting support types, refer to pages 616 to 620 as the dimensions are identical to those of standard.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

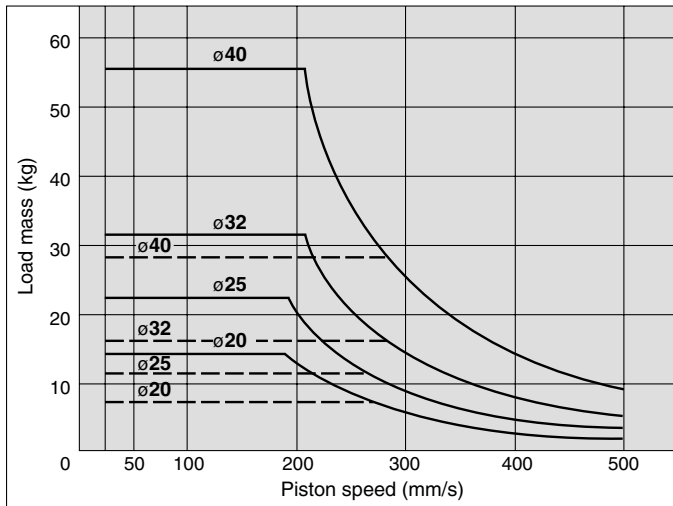
Individual  
-X□

# Series CLM2

## ⚠ Caution/Allowable Kinetic Energy when Locking

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

- In terms of specific load conditions, the allowable kinetic energy indicated in the table above is equivalent to a 50% load ratio at 0.5 MPa, and a piston speed of 300 mm/sec. Therefore, if the operating conditions are below these values, calculations are unnecessary.
- Apply the following formula to obtain the kinetic energy of the load.
 
$$E_k = \frac{1}{2} m v^2$$
 Ek: Kinetic energy of load (J)  
 m: Load mass (kg)  
 v: Piston speed (m/s)
- The piston speed will exceed the average speed immediately before locking. To determine the piston speed for the purpose of obtaining the kinetic energy of load, use 1.2 times the average speed as a guide.
- The relation between the speed and the load of the respective tube bores is indicated in the diagram below. Use the cylinder in the range below the line.
- During locking, the lock mechanism must sustain the thrust of the cylinder itself, in addition to absorbing the energy of the load. Therefore, even within a given allowable kinetic energy level, there is an upper limit to the size of the load that can be sustained. Thus, a horizontally mounted cylinder must be operated below the solid line, and a vertically mounted cylinder must be operated below the dotted line.



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

| Locking method                       | Piston speed (mm/s) |      |      |      |      |
|--------------------------------------|---------------------|------|------|------|------|
|                                      | 20 *                | 50   | 100  | 300  | 500  |
| Spring locking (Exhaust locking)     | ±0.3                | ±0.4 | ±0.5 | ±1.0 | ±2.0 |
| Pneumatic locking (Pressure locking) | ±0.15               | ±0.2 | ±0.3 | ±0.5 | ±1.5 |
| Spring and pneumatic locking         |                     |      |      |      |      |

Conditions: Load: 25% of thrust force at 0.5 MPa

Solenoid valve: Mounted to the lock port

20 mm/s marked with the asterisk is in the case of actuating hydraulically by means of air-hydro type.

## ⚠ Caution

### Recommended Pneumatic Circuit/Caution on Handling

For detailed specifications of the fine lock cylinder, Series CLM2 mentioned above, refer to pages 596 to 599.

## Accessory

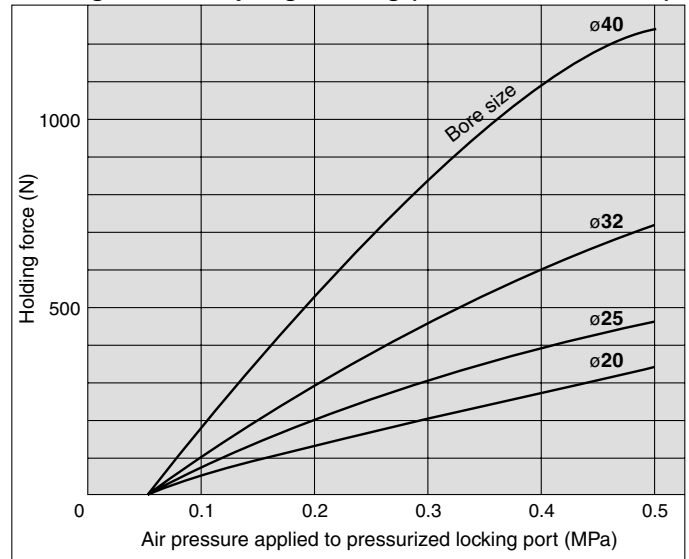
For accessory dimensions, refer to pages 144 and 145 in Best Pneumatics No. 2, since it is same as Series CM2.

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

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

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

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



\* When selecting cylinders, refer to the Precautions and allowable kinetic energy when locking on page 596, and then select a cylinder.

## ⚠ Caution

### Caution when Locking

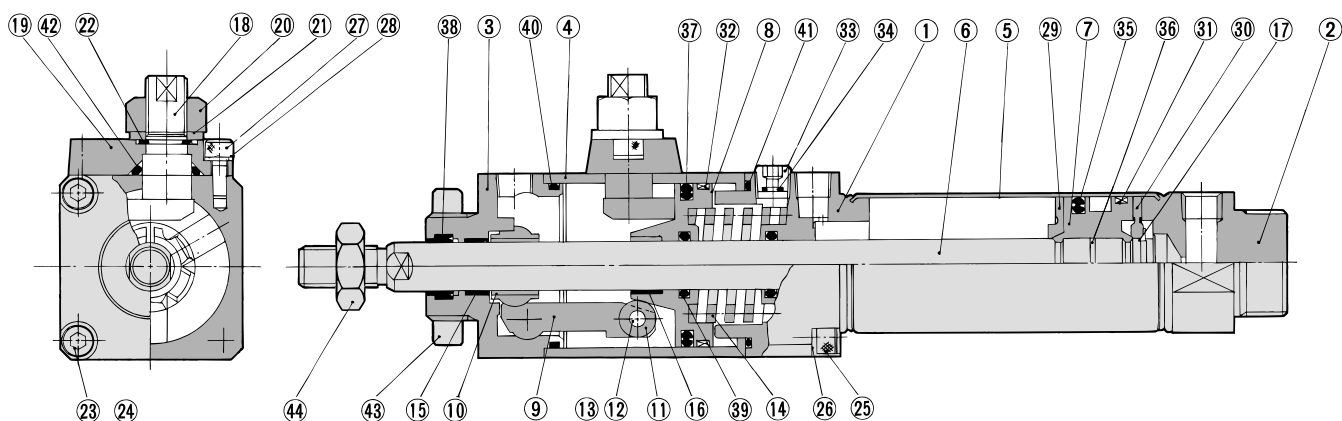
Holding force is the force which can hold a static load, given no vibration or impact in a locked state. Therefore, do not use cylinders around the maximum holding force. Note the following points.

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

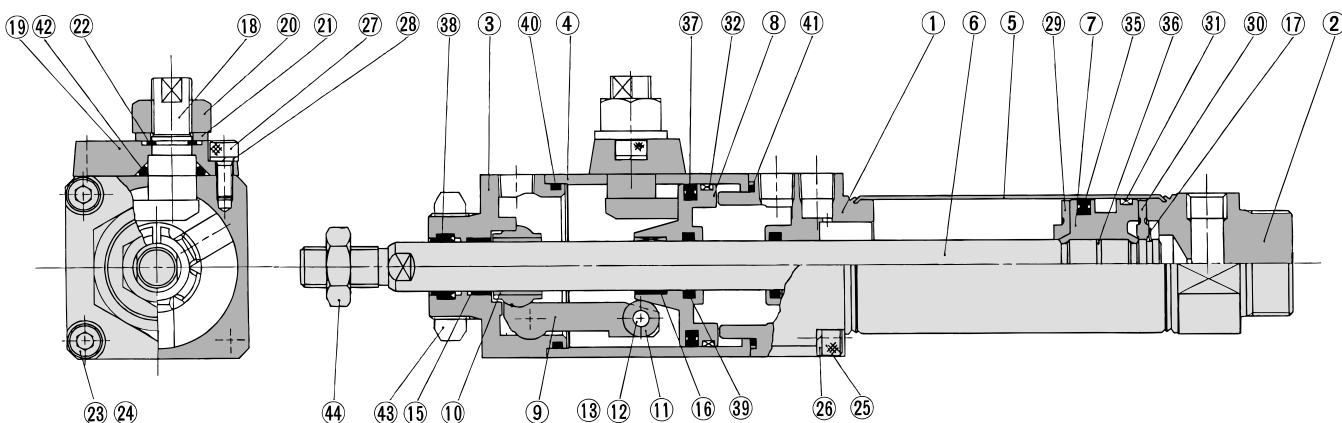


**Construction (Not able to disassemble)**

Spring locking (Exhaust locking)  
Spring and pneumatic locking



Pneumatic locking (Pressure locking)



- CLJ2
- CLM2**
- CLG1
- CL1
- MLGC
- CNG
- MNB
- CNA
- CNS
- CLS
- CLQ
- RLQ
- MLU
- MLGP
- ML1C

**Component Parts**

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

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

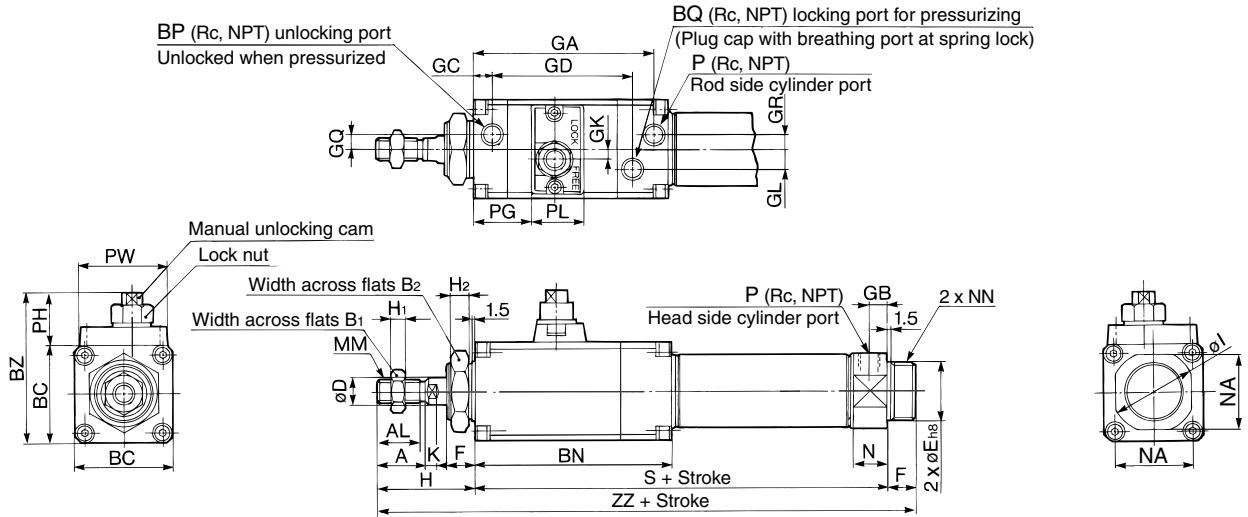
- D-
- X
- Individual
- X

# Series CLM2

## Basic Style (B)

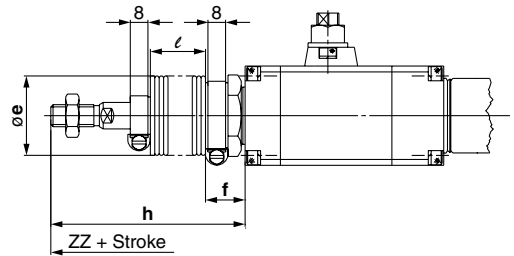
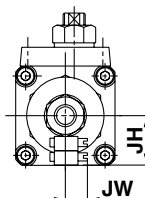
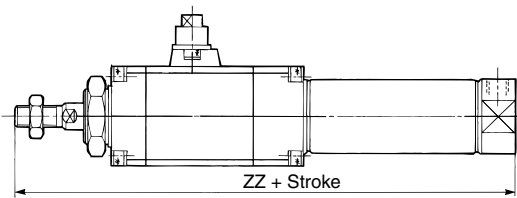
CLM2B  —

### Standard style



### Boss-cut style

### With rod boot



| Bore (mm) | Stroke range | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | BC | BN    | BP  | BQ  | BZ   | D  | E                                 | F  | GA   | GB | GC | GD   | GK  | GL | GQ | GR | H  | H <sub>1</sub> | H <sub>2</sub> | I    |
|-----------|--------------|----|------|----------------|----------------|----|-------|-----|-----|------|----|-----------------------------------|----|------|----|----|------|-----|----|----|----|----|----------------|----------------|------|
| 20        | Up to 300    | 18 | 15.5 | 13             | 26             | 38 | 80    | 1/8 | 1/8 | 57.5 | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 73.5 | 8  | 8  | 55   | 3.5 | 6  | 4  | 4  | 41 | 5              | 8              | 28   |
| 25        | Up to 300    | 22 | 19.5 | 17             | 32             | 45 | 90    | 1/8 | 1/8 | 69   | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 83.5 | 8  | 9  | 64.5 | 4   | 9  | 7  | 7  | 45 | 6              | 8              | 33.5 |
| 32        | Up to 300    | 22 | 19.5 | 17             | 32             | 45 | 90    | 1/8 | 1/8 | 69   | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 83.5 | 8  | 9  | 64.5 | 4   | 9  | 7  | 7  | 45 | 6              | 8              | 37.5 |
| 40        | Up to 300    | 24 | 21   | 22             | 41             | 52 | 100.5 | 1/8 | 1/8 | 76   | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 90.5 | 11 | 8  | 70   | 4   | 11 | 8  | 7  | 50 | 8              | 10             | 46.5 |

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

| Bore (mm) | ZZ  |
|-----------|-----|
| 20        | 168 |
| 25        | 182 |
| 32        | 184 |
| 40        | 217 |

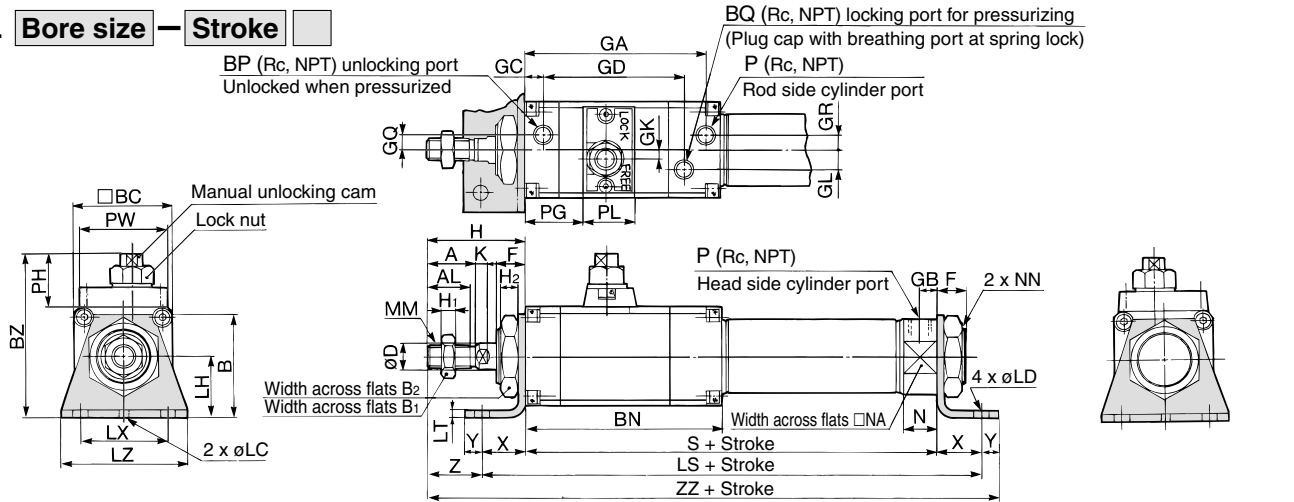
### With Rod Boot

| Bore (mm) | e  | f  | h       |           |            |            |            | ℓ       |           |            |            |            | ZZ      |           |            |            |            | JH<br>(Reference) | JW<br>(Reference) |
|-----------|----|----|---------|-----------|------------|------------|------------|---------|-----------|------------|------------|------------|---------|-----------|------------|------------|------------|-------------------|-------------------|
|           |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 |                   |                   |
| 20        | 36 | 17 | 68      | 81        | 93         | 106        | 131        | 12.5    | 25        | 37.5       | 50         | 75         | 208     | 221       | 233        | 246        | 271        | 23.5              | 10.5              |
| 25        | 36 | 17 | 72      | 85        | 97         | 110        | 135        | 12.5    | 25        | 37.5       | 50         | 75         | 222     | 232       | 247        | 260        | 285        | 23.5              | 10.5              |
| 32        | 36 | 17 | 72      | 85        | 97         | 110        | 135        | 12.5    | 25        | 37.5       | 50         | 75         | 224     | 237       | 249        | 262        | 287        | 23.5              | 10.5              |
| 40        | 46 | 19 | 77      | 90        | 102        | 115        | 140        | 12.5    | 25        | 37.5       | 50         | 75         | 260     | 273       | 285        | 298        | 323        | 23.5              | 10.5              |

# Fine Lock Cylinder Double Acting, Single Rod *Series CLM2*

## Axial Foot Style (L)

CLM2L  —

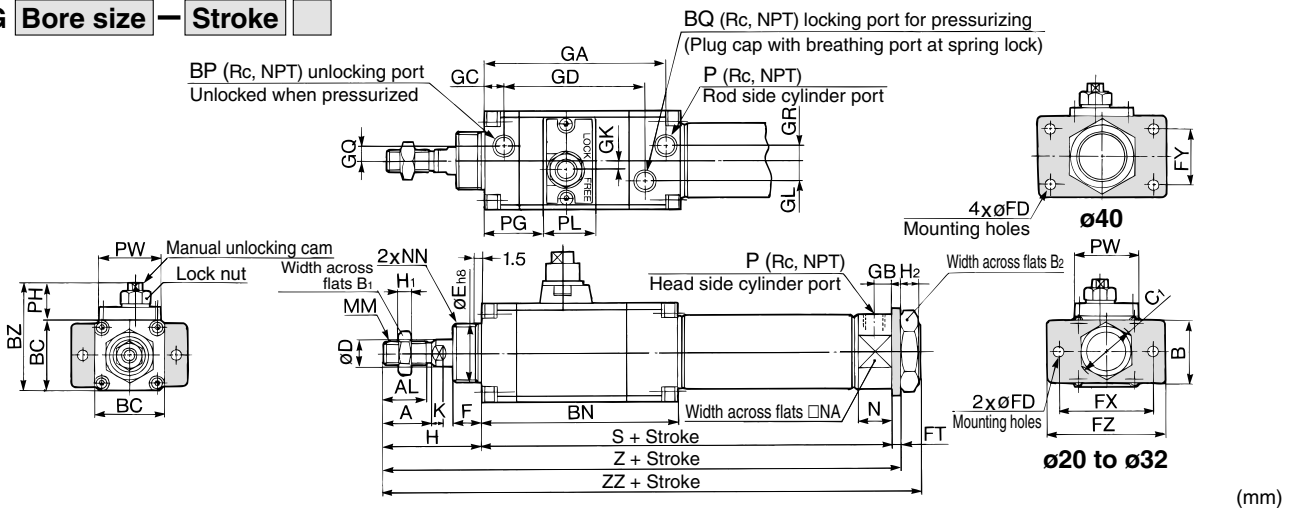


| Bore (mm) | Stroke range | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | BC | BN    | BP  | BQ  | BZ   | D  | F  | GA   | GB | GC | GD   | GK  | GL | GQ | GR | H  | H <sub>1</sub> | H <sub>2</sub> |
|-----------|--------------|----|------|----|----------------|----------------|----|-------|-----|-----|------|----|----|------|----|----|------|-----|----|----|----|----|----------------|----------------|
| 20        | Up to 400    | 18 | 15.5 | 40 | 13             | 26             | 38 | 80    | 1/8 | 1/8 | 63.5 | 8  | 13 | 73.5 | 8  | 8  | 55   | 3.5 | 6  | 4  | 4  | 41 | 5              | 8              |
| 25        | Up to 450    | 22 | 19.5 | 47 | 17             | 32             | 45 | 90    | 1/8 | 1/8 | 74.5 | 10 | 13 | 83.5 | 8  | 9  | 64.5 | 4   | 9  | 7  | 7  | 45 | 6              | 8              |
| 32        | Up to 450    | 22 | 19.5 | 47 | 17             | 32             | 45 | 90    | 1/8 | 1/8 | 74.5 | 12 | 13 | 83.5 | 8  | 9  | 64.5 | 4   | 9  | 7  | 7  | 45 | 6              | 8              |
| 40        | Up to 500    | 24 | 21   | 54 | 22             | 41             | 52 | 100.5 | 1/8 | 1/8 | 80   | 14 | 16 | 90.5 | 11 | 8  | 70   | 4   | 11 | 8  | 7  | 50 | 8              | 10             |

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

## Head Side Flange Style (G)

CLM2G  —



| Bore (mm) | Stroke range | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | BC | BN    | BP  | BQ  | BZ   | C <sub>1</sub> | D  | E                                 | F  | FD | FT | FX | FY | FZ | GA   | GB |
|-----------|--------------|----|------|----|----------------|----------------|----|-------|-----|-----|------|----------------|----|-----------------------------------|----|----|----|----|----|----|------|----|
| 20        | Up to 300    | 18 | 15.5 | 34 | 13             | 26             | 38 | 80    | 1/8 | 1/8 | 57.5 | 30             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 4  | 60 | —  | 75 | 73.5 | 8  |
| 25        | Up to 300    | 22 | 19.5 | 40 | 17             | 32             | 45 | 90    | 1/8 | 1/8 | 69   | 37             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 4  | 60 | —  | 75 | 83.5 | 8  |
| 32        | Up to 300    | 22 | 19.5 | 40 | 17             | 32             | 45 | 90    | 1/8 | 1/8 | 69   | 37             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 4  | 60 | —  | 75 | 83.5 | 8  |
| 40        | Up to 300    | 24 | 21   | 52 | 22             | 41             | 52 | 100.5 | 1/8 | 1/8 | 76   | 47.3           | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 7  | 5  | 66 | 36 | 82 | 90.5 | 11 |

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

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

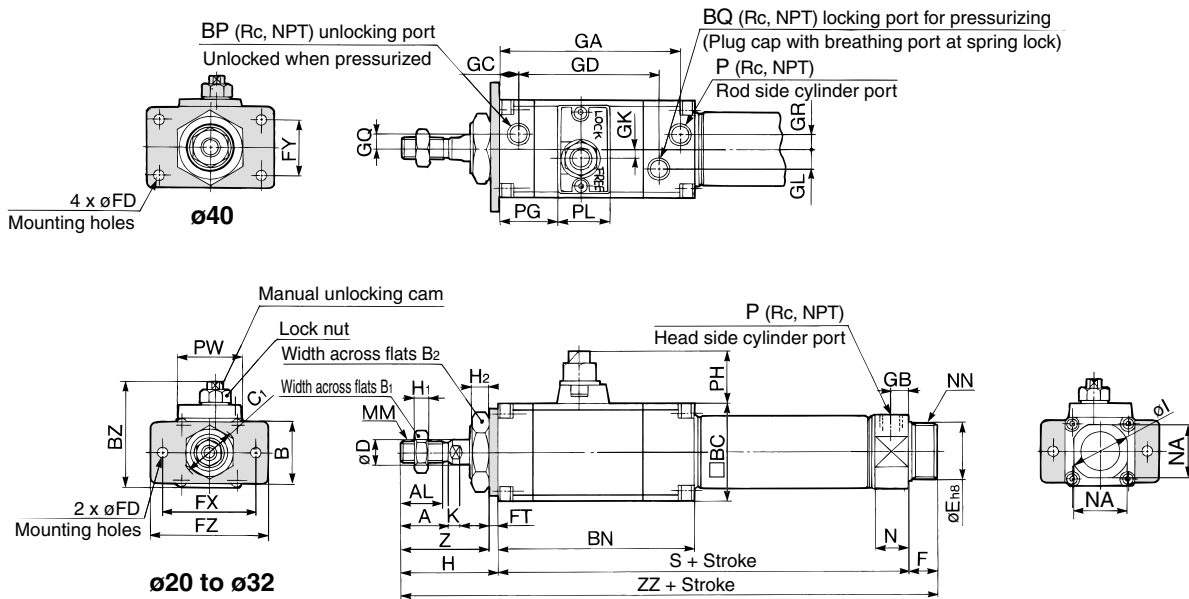
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Individual  
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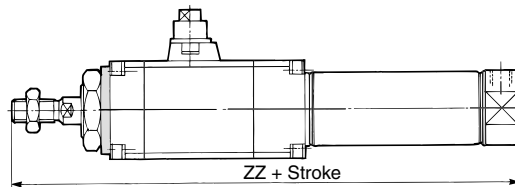
# Series CLM2

## Rod Side Flange Style (F)

CLM2F Bore size — Stroke



### Boss-cut style

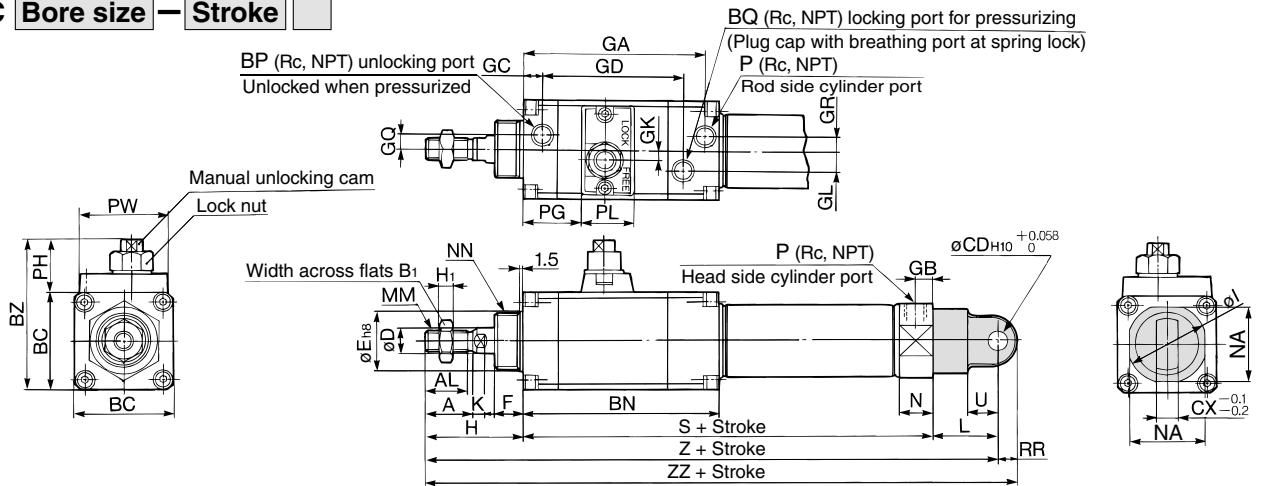


| Bore (mm) | Stroke range | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | BC | BN    | BP  | BQ  | BZ   | C <sub>1</sub> | D  | E                                 | F  | FD | FT | FX | FY | FZ | GA   | GB | GC | GD   | GK  |
|-----------|--------------|----|------|----|----------------|----------------|----|-------|-----|-----|------|----------------|----|-----------------------------------|----|----|----|----|----|----|------|----|----|------|-----|
| 20        | Up to 400    | 18 | 15.5 | 34 | 13             | 26             | 38 | 80    | 1/8 | 1/8 | 57.5 | 30             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 4  | 60 | —  | 75 | 73.5 | 8  | 8  | 55   | 3.5 |
| 25        | Up to 450    | 22 | 19.5 | 40 | 17             | 32             | 45 | 90    | 1/8 | 1/8 | 69   | 37             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 4  | 60 | —  | 75 | 83.5 | 8  | 9  | 64.5 | 4   |
| 32        | Up to 450    | 22 | 19.5 | 40 | 17             | 32             | 45 | 90    | 1/8 | 1/8 | 69   | 37             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 7  | 4  | 60 | —  | 75 | 83.5 | 8  | 9  | 64.5 | 4   |
| 40        | Up to 500    | 24 | 21   | 52 | 22             | 41             | 52 | 100.5 | 1/8 | 1/8 | 76   | 47.3           | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 7  | 5  | 66 | 36 | 82 | 90.5 | 11 | 8  | 70   | 4   |

| Bore (mm) | GL | GQ | GR | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | MM         | N    | NA   | NN        | P   | PG | PH   | PL | PW | S   | Z  | ZZ  | Bore (mm) | ZZ  |
|-----------|----|----|----|----|----------------|----------------|------|-----|------------|------|------|-----------|-----|----|------|----|----|-----|----|-----|-----------|-----|
| 20        | 6  | 4  | 4  | 41 | 5              | 8              | 28   | 5   | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 22 | 19.5 | 20 | 38 | 127 | 37 | 181 | 20        | 168 |
| 25        | 9  | 7  | 7  | 45 | 6              | 8              | 33.5 | 5.5 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 27 | 24   | 24 | 41 | 137 | 41 | 195 | 25        | 182 |
| 32        | 9  | 7  | 7  | 45 | 6              | 8              | 37.5 | 5.5 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 27 | 24   | 24 | 41 | 139 | 41 | 197 | 32        | 184 |
| 40        | 11 | 8  | 7  | 50 | 8              | 10             | 46.5 | 7   | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 29 | 24   | 24 | 41 | 167 | 45 | 233 | 40        | 217 |

**Single Clevis Style (C)**

CLM2C  Bore size —  Stroke



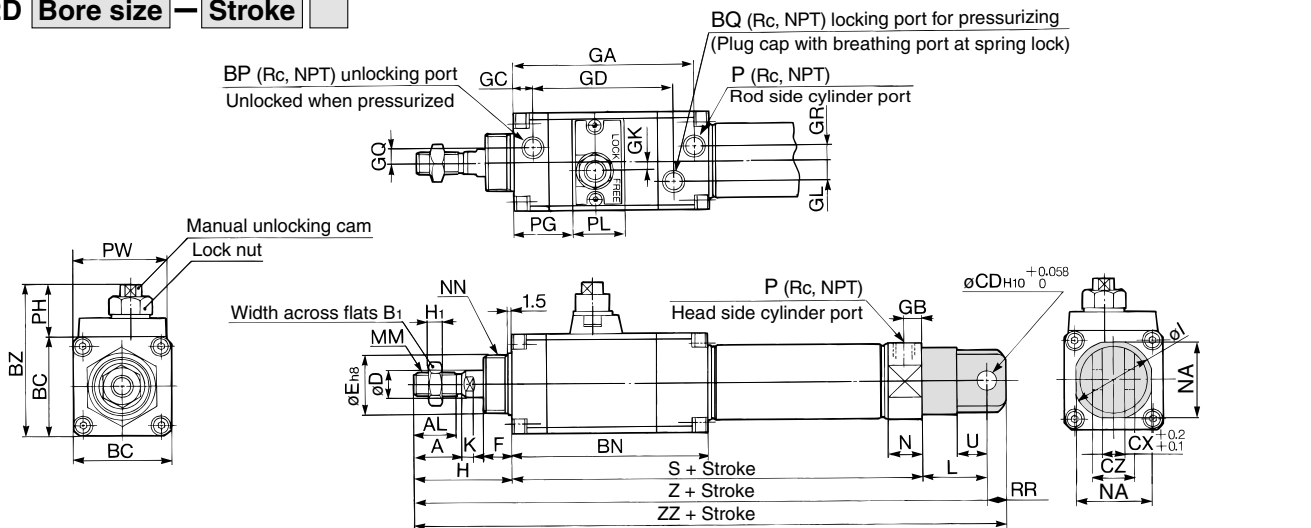
| Bore (mm) | Stroke range | A  | AL   | B <sub>1</sub> | BC | BN    | BP  | BQ  | BZ   | CD | CX | D  | E                                 | F  | GA   | GB | GC | GD   | GK  | GL | GQ |
|-----------|--------------|----|------|----------------|----|-------|-----|-----|------|----|----|----|-----------------------------------|----|------|----|----|------|-----|---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

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

**Double Clevis Style (D)**

CLM2D  Bore size —  Stroke



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

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

\* Clevis pin and snap ring (ø40: cotter pin) are shipped together.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

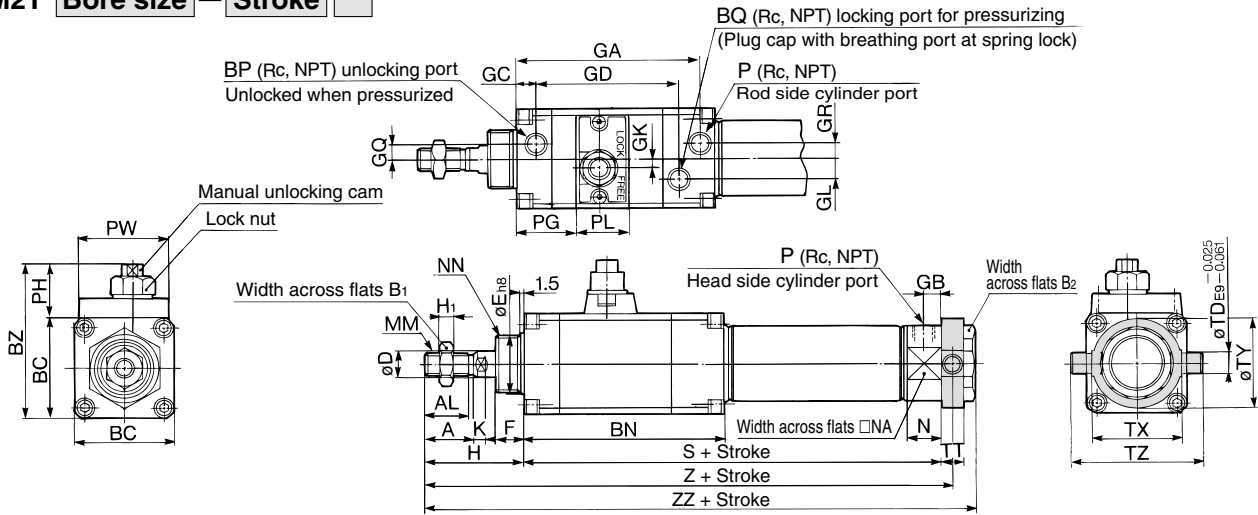
Individual

-X□

# Series CLM2

## Head Side Trunnion Style (T)

CLM2T  —



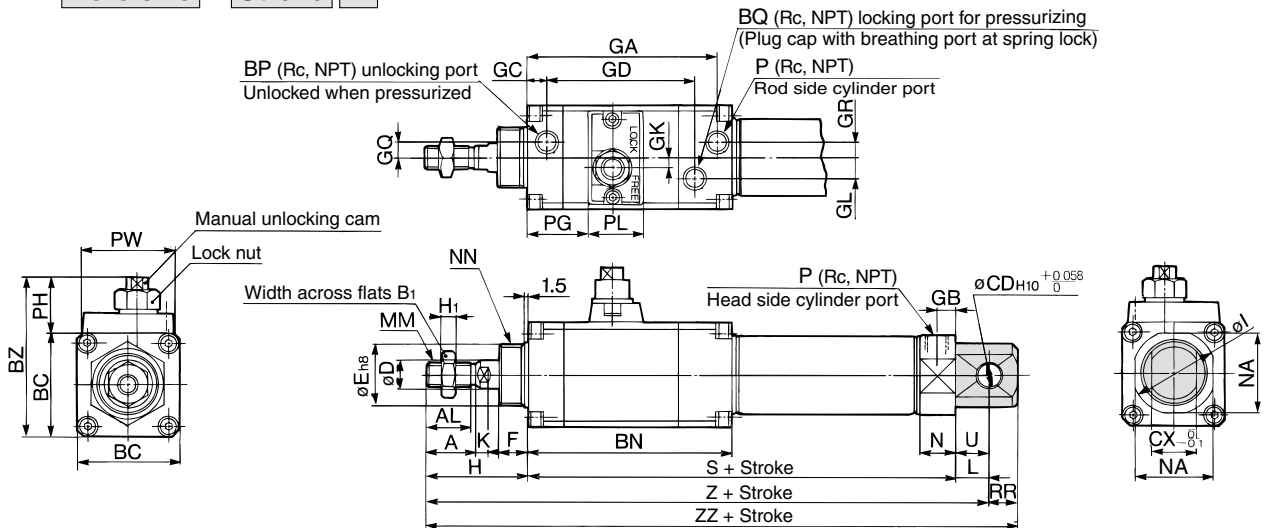
| Bore (mm) | Stroke range | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | BC | BN    | BP  | BQ  | BZ   | D  | E                                 | F  | GA   | GB | GC | GD   | GK  | GL | GQ |
|-----------|--------------|----|------|----------------|----------------|----|-------|-----|-----|------|----|-----------------------------------|----|------|----|----|------|-----|----|----|
| 20        | Up to 300    | 18 | 15.5 | 13             | 26             | 38 | 80    | 1/8 | 1/8 | 57.5 | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 73.5 | 8  | 8  | 55   | 3.5 | 6  | 4  |
| 25        | Up to 300    | 22 | 19.5 | 17             | 32             | 45 | 90    | 1/8 | 1/8 | 69   | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 83.5 | 8  | 9  | 64.5 | 4   | 9  | 7  |
| 32        | Up to 300    | 22 | 19.5 | 17             | 32             | 45 | 90    | 1/8 | 1/8 | 69   | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 83.5 | 8  | 9  | 64.5 | 4   | 9  | 7  |
| 40        | Up to 300    | 24 | 21   | 22             | 41             | 52 | 100.5 | 1/8 | 1/8 | 76   | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 90.5 | 11 | 8  | 70   | 4   | 11 | 8  |

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

## Clevis Integrated Style (E)

CLM2E  —



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

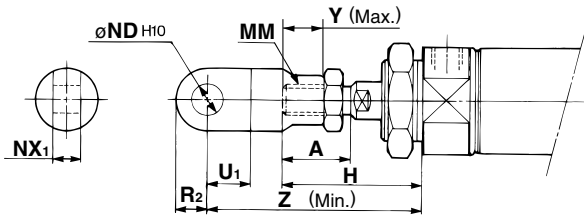
| Bore (mm) | GR | H  | H <sub>1</sub> | I    | K   | L  | MM         | N    | NA   | NN        | P   | PG | PH   | PL | PW | RR | S   | U    | Z   | ZZ  |
|-----------|----|----|----------------|------|-----|----|------------|------|------|-----------|-----|----|------|----|----|----|-----|------|-----|-----|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

# Series CLM2

# Accessory Bracket Dimensions

## Single Knuckle Joint

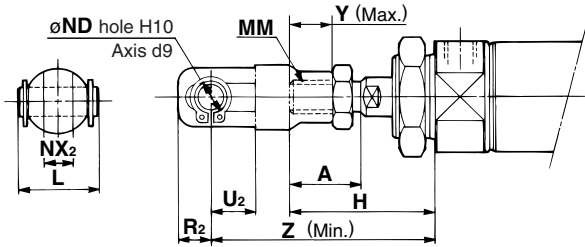
(mm)



| Bore size | A  | H  | MM         | NDH10                             | NX1                                | U1 | R2 | Y  | Z  |
|-----------|----|----|------------|-----------------------------------|------------------------------------|----|----|----|----|
| 20        | 18 | 41 | M8 x 1.25  | 9 <sup>+0.058</sup> <sub>0</sub>  | 9 <sup>-0.1</sup> <sub>-0.2</sub>  | 14 | 10 | 11 | 66 |
| 25, 32    | 22 | 45 | M10 x 1.25 | 9 <sup>+0.058</sup> <sub>0</sub>  | 9 <sup>-0.1</sup> <sub>-0.2</sub>  | 14 | 10 | 14 | 69 |
| 40        | 24 | 50 | M14 x 1.5  | 12 <sup>+0.070</sup> <sub>0</sub> | 16 <sup>-0.1</sup> <sub>-0.3</sub> | 20 | 14 | 13 | 92 |

## Double Knuckle Joint

(mm)



| Bore size | A  | H  | L    | MM         | ND | NX2                                | R2 | U2 | Y  | Z  |
|-----------|----|----|------|------------|----|------------------------------------|----|----|----|----|
| 20        | 18 | 41 | 25   | M8 x 1.25  | 9  | 9 <sup>+0.2</sup> <sub>+0.1</sub>  | 10 | 14 | 11 | 66 |
| 25, 32    | 22 | 45 | 25   | M10 x 1.25 | 9  | 9 <sup>+0.2</sup> <sub>+0.1</sub>  | 10 | 14 | 14 | 69 |
| 40        | 24 | 50 | 49.7 | M14 x 1.5  | 12 | 16 <sup>+0.3</sup> <sub>+0.1</sub> | 13 | 25 | 13 | 92 |

## Double Knuckle Joint

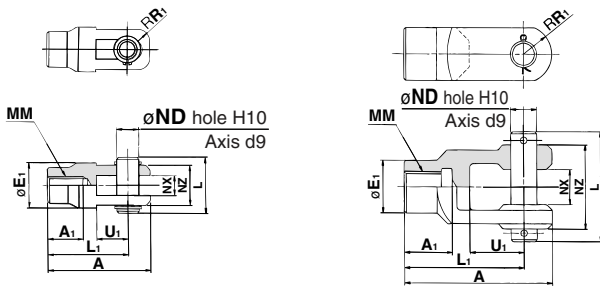
(mm)

### Y-020B/Y-032B

Material: Rolled steel

### Y-040B

Material: Cast iron



| Part no. | Applicable bore size | A  | A1 | E1 | L    | L1 | MM         | ND | NX                                 | NZ | R1 | U1 | Applicable pin part number | Retaining ring Cotter pin size |
|----------|----------------------|----|----|----|------|----|------------|----|------------------------------------|----|----|----|----------------------------|--------------------------------|
| Y-020B   | 20                   | 46 | 16 | 20 | 25   | 36 | M8 x 1.25  | 9  | 9 <sup>+0.2</sup> <sub>+0.1</sub>  | 18 | 5  | 14 | CDP-1                      | Type C 9 for axis              |
| Y-032B   | 25, 32               | 48 | 18 | 20 | 25   | 38 | M10 x 1.25 | 9  | 9 <sup>+0.2</sup> <sub>+0.1</sub>  | 18 | 5  | 14 | CDP-1                      | Type C 9 for axis              |
| Y-040B   | 40                   | 68 | 22 | 24 | 49.7 | 55 | M14 x 1.5  | 12 | 16 <sup>+0.3</sup> <sub>+0.1</sub> | 38 | 13 | 25 | CDP-3                      | ø3 x 18ℓ                       |

\* Clevis pin and retaining ring (cotter pin for 40) are attached.

## Double Clevis Pin

Material: Carbon steel

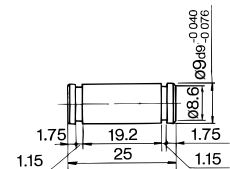
(mm)

Bore size/ø20, ø25, ø32

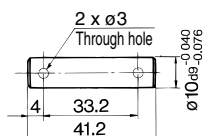
CDP-1

Bore size/ø40

CDP-2



Retaining ring: Type C9 for axis



Cotter pin ø3 x 18ℓ

\* Retaining rings (cotter pins for ø40) are attached.

## Double Knuckle Pin

Material: Carbon steel

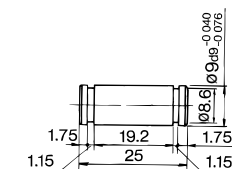
(mm)

Bore size/ø20, ø25, ø32

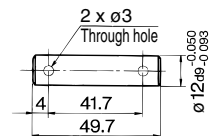
CDP-1

Bore size/ø40

CDP-3



Retaining ring: Type C9 for axis



Cotter pin ø3 x 18ℓ

\* Retaining rings (cotter pins for ø40) are attached.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

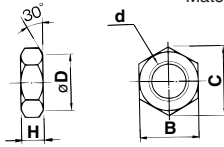
-X□

Individual -X□

# Series CLM2

## Rod End Nut (mm)

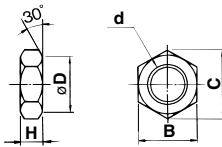
Material: Carbon steel



| Part no. | Applicable bore size | B  | C    | D    | d          | H |
|----------|----------------------|----|------|------|------------|---|
| NT-02    | 20                   | 13 | 15.0 | 12.5 | M8 x 1.25  | 5 |
| NT-03    | 25, 32               | 17 | 19.6 | 16.5 | M10 x 1.25 | 6 |
| NT-04    | 40                   | 22 | 25.4 | 21.0 | M14 x 1.5  | 8 |

## Mounting Nut (mm)

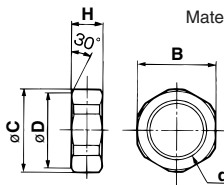
Material: Carbon steel



| Part no. | Applicable bore size | B  | C    | D    | d         | H  |
|----------|----------------------|----|------|------|-----------|----|
| SN-020B  | 20                   | 26 | 30   | 25.5 | M20 x 1.5 | 8  |
| SN-032B  | 25, 32               | 32 | 37   | 31.5 | M26 x 1.5 | 8  |
| SN-040B  | 40                   | 41 | 47.3 | 40.5 | M32 x 2.0 | 10 |

## Trunnion Nut (mm)

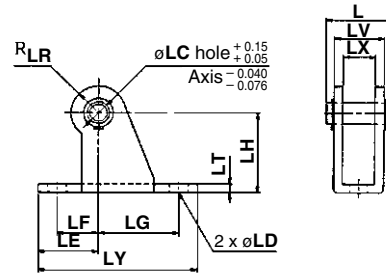
Material: Carbon steel



| Part no. | Applicable bore size | B  | C  | D    | d         | H  |
|----------|----------------------|----|----|------|-----------|----|
| TN-020B  | 20                   | 26 | 28 | 25.5 | M20 x 1.5 | 10 |
| TN-032B  | 25, 32               | 32 | 34 | 31.5 | M26 x 1.5 | 10 |
| TN-040B  | 40                   | 41 | 45 | 40.5 | M32 x 2   | 10 |

## Clevis Pivot Bracket (For CLM2E) (mm)

Material: Rolled steel plate

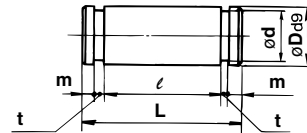


| Part no. | Applicable bore size | L    | LC | LD  | LE | LF | LG | LH | LR | LT  | LX | LY | LV   | Applicable pin part no. |
|----------|----------------------|------|----|-----|----|----|----|----|----|-----|----|----|------|-------------------------|
| CM-E020B | 20, 25               | 24.5 | 8  | 6.8 | 22 | 15 | 30 | 30 | 10 | 3.2 | 12 | 59 | 18.4 | CD-S02                  |
| CM-E032B | 32, 40               | 34   | 10 | 9   | 25 | 15 | 40 | 40 | 13 | 4   | 20 | 75 | 28   | CD-S03                  |

Note 1) Clevis pins and retaining rings (cotter pins for ø40) are attached.  
 Note 2) It cannot be used for single clevis style (CM2C) and double clevis style (CM2D).

## Clevis Pin (For CLM2E) (mm)

Material: Carbon steel



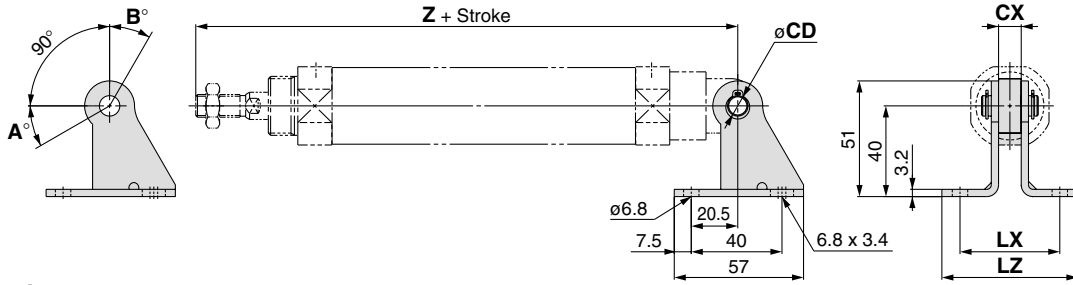
| Part no. | Applicable bore size | D <sub>ø9</sub>                          | d   | L    | l    | m    | t    | Applicable retaining ring part no. |
|----------|----------------------|--|-----|------|------|------|------|------------------------------------|
| CD-S02   | 20, 25               | 8 <sup>-0.040</sup> / <sub>-0.076</sub>  | 7.6 | 24.5 | 19.5 | 1.6  | 0.9  | Type C 8 for axis                  |
| CD-S03   | 32, 40               | 10 <sup>-0.040</sup> / <sub>-0.076</sub> | 9.6 | 34   | 29   | 1.35 | 1.15 | Type C 10 for axis                 |

Note) Retaining rings are attached.

Regarding mounting bracket, accessory made of stainless steel (Some are not available.), refer to page 1864 for -XB12, External stainless steel cylinder.



### Single Clevis



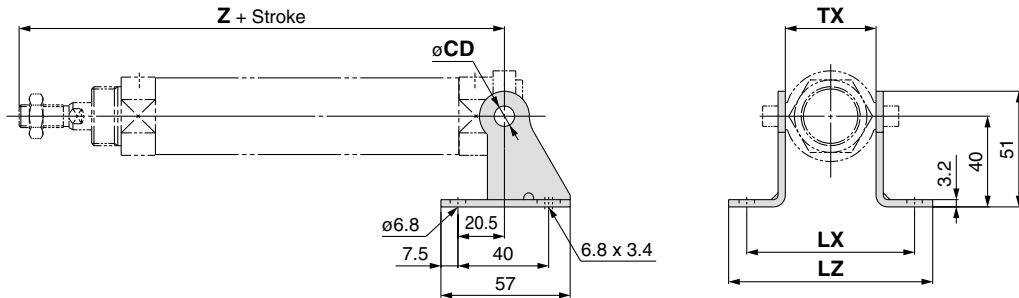
#### Rotation Angle

| Bore size (mm) | A° | B° | A° + B° + 90° |
|----------------|----|----|---------------|
| 20             | 25 | 85 | 200           |
| 25, 32         | 21 | 81 | 192           |
| 40             | 26 | 86 | 202           |

| Mounting                       | Part no. | Applicable bore size | CX | Z + Stroke | CD | LX | LZ |
|--------------------------------|----------|----------------------|----|------------|----|----|----|
| CLM2C<br>(Single clevis style) | CM-B032  | 20                   | 10 | 198        | 9  | 44 | 60 |
|                                |          | 25                   |    | 212        |    |    |    |
|                                |          | 32                   |    | 214        |    |    |    |
|                                | CM-B040  | 40                   | 15 | 256        | 10 | 49 | 65 |

Note) Pivot brackets do not come with pivot bracket pins and retaining rings.

### Head Side Trunnion

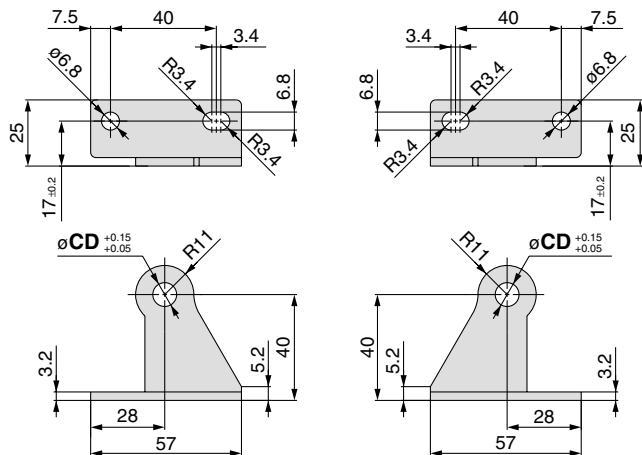


| Mounting                      | Part no. | Applicable bore size | TX | Head side trunnion (mm) |    |    |     |
|-------------------------------|----------|----------------------|----|-------------------------|----|----|-----|
|                               |          |                      |    | Z + Stroke              | CD | LX | LZ  |
| CLM2T<br>(Head side trunnion) | CM-B020  | 20                   | 32 | 173                     | 8  | 66 | 82  |
|                               | CM-B032  | 25                   | 40 | 187                     | 9  | 74 | 90  |
|                               |          | 32                   |    | 189                     |    |    |     |
|                               | CM-B040  | 40                   | 53 | 222.5                   | 10 | 87 | 103 |

Note) Pivot brackets do not come with pivot bracket pins and retaining rings.

### Pivot Bracket

\* 2 brackets per set

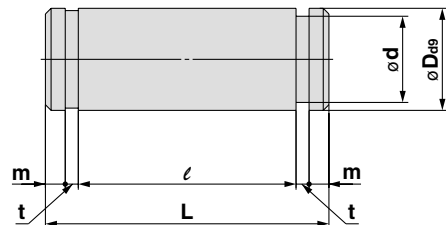


| Part no.    | CD |
|-------------|----|
| CM-B020 (2) | 8  |
| CM-B032     | 9  |
| CM-B040     | 10 |

Note 1) Pivot brackets do not come with pivot bracket pins and retaining rings.

Note 2) Only for trunnion type

### Pivot Bracket Pin (For CM2C)



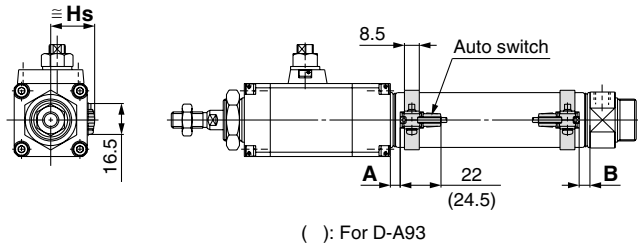
| Applicable bore size | Part no. | D <sub>d9</sub>                        | d   | L  | ℓ    | m    | t    | Applicable retaining ring part no. |
|----------------------|----------|--|-----|----|------|------|------|------------------------------------|
| 20 to 32             | CDP-1    | 9 <sup>+0.040</sup> <sub>-0.076</sub>  | 8.6 | 25 | 19.2 | 1.75 | 1.15 | Type C 9 for axis                  |
| 40                   | CD-S03   | 10 <sup>+0.040</sup> <sub>-0.076</sub> | 9.6 | 34 | 29   | 1.75 | 1.15 | Type C 10 for axis                 |

Note) Pivot bracket pins come with retaining rings.

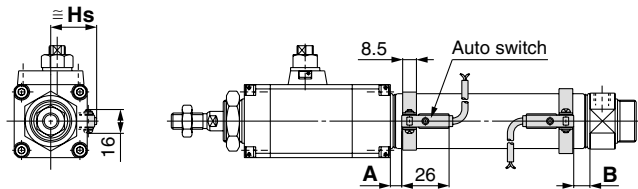
**Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height**

**Reed auto switch**

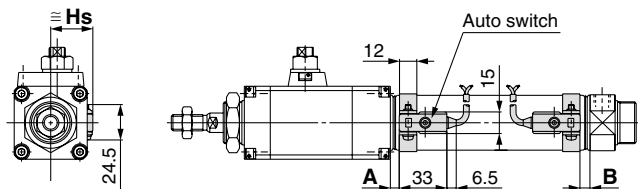
**D-A9□**



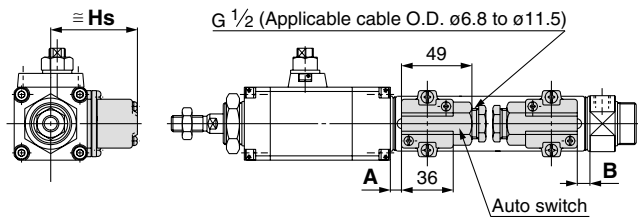
**D-C7/C8**



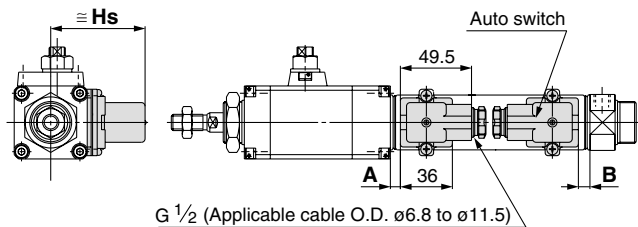
**D-B5/B6/B59W**



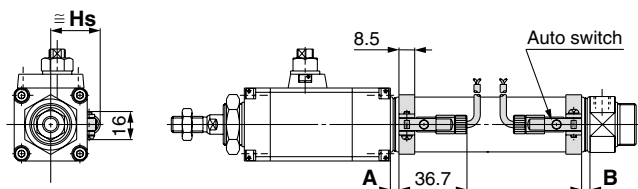
**D-A33A/A34A**



**D-A44A**

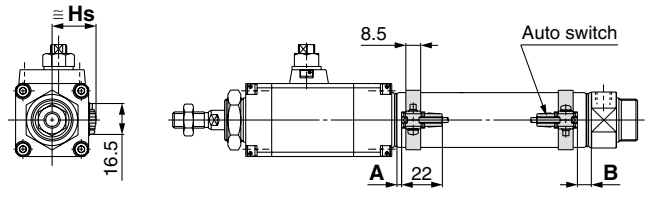


**D-C73C/C80C**

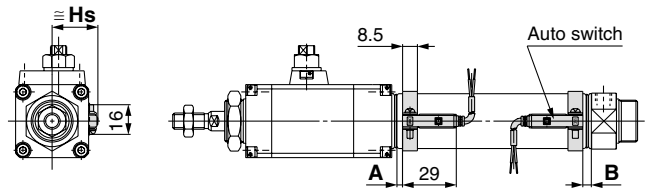


**Solid state auto switch**

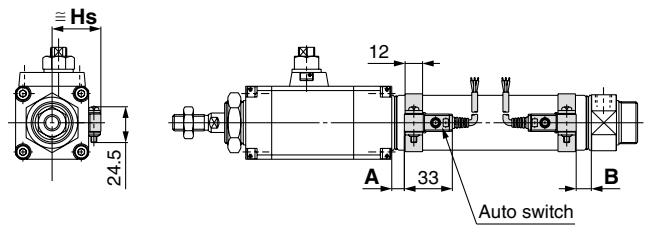
**D-M9□  
D-M9□W**



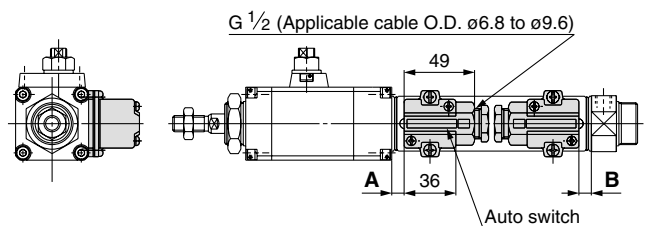
**D-H7□/H7□W/H7NF/H7BAL**



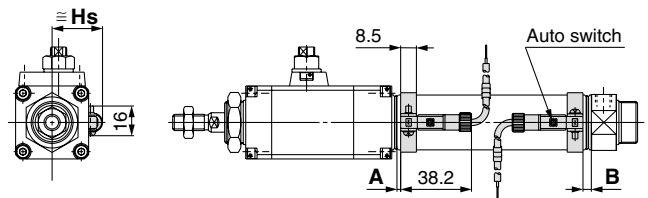
**D-G5NTL**



**D-G39A/K39A**



**D-H7C**



CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual  
-X□

# Series CLM2

## Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

### Auto Switch Proper Mounting Position

(mm)

| Auto switch model | D-A9□ |      | D-M9□<br>D-M9□W |      | D-B5□<br>D-B64 |   | D-C7□<br>D-C80<br>D-C73C<br>D-C80C |    | D-B59W |   | D-A3□A<br>D-G39A<br>D-K39A<br>D-A44A |     | D-H7□<br>D-H7C<br>D-H7□W<br>D-H7BAL<br>D-H7NF |    | D-G5NTL |     |
|-------------------|-------|------|-----------------|------|----------------|---|------------------------------------|----|--------|---|--------------------------------------|-----|---|----|---------|-----|
|                   | A     | B    | A               | B    | A              | B | A                                  | B  | A      | B | A                                    | B   | A   | B  | A       | B   |
| 20                | 6.5   | 5.5  | 10.5            | 9.5  | 1              | 0 | 7                                  | 6  | 4      | 3 | 0.5                                  | 0   | 6   | 5  | 2.5     | 1.5 |
| 25                | 6.5   | 5.5  | 10.5            | 9.5  | 1              | 0 | 7                                  | 6  | 4      | 3 | 0.5                                  | 0   | 6   | 5  | 2.5     | 1.5 |
| 32                | 7.5   | 6.5  | 11.5            | 10.5 | 2              | 1 | 8                                  | 7  | 5      | 4 | 1.5                                  | 0.5 | 7   | 6  | 3.5     | 2.5 |
| 40                | 13.5  | 11.5 | 17.5            | 15.5 | 7              | 6 | 13                                 | 12 | 10     | 9 | 6.5                                  | 5.5 | 12  | 11 | 8.5     | 7.5 |

Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

### Auto Switch Mounting Height

(mm)

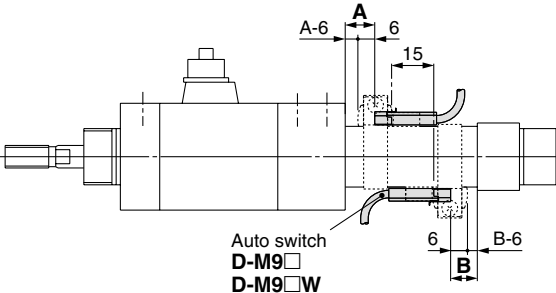
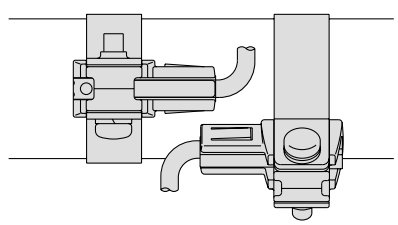
| Auto switch model | D-A9□<br>D-M9□<br>D-M9□W |      | D-B5□<br>D-B64<br>D-B59W<br>D-G5NTL<br>D-H7C |      | D-C7□<br>D-C80<br>D-H7□<br>D-H7□W<br>D-H7BAL<br>D-H7NF |      | D-C73C<br>D-C80C |    | D-A3□A<br>D-G39A<br>D-K39A |    | D-A44A |  |
|-------------------|--------------------------|------|--|------|--|------|------------------|----|----------------------------|----|--------|--|
|                   | Hs                       | Hs   | Hs   | Hs   | Hs   | Hs   | Hs               | Hs | Hs                         | Hs | Hs     |  |
| 20                | 22                       | 25.5 | 22.5   | 25   | 60   | 69.5 |                  |    |                            |    |        |  |
| 25                | 24.5                     | 28   | 25   | 27.5 | 62.5   | 72   |                  |    |                            |    |        |  |
| 32                | 28                       | 31.5 | 28.5   | 31   | 66   | 75.5 |                  |    |                            |    |        |  |
| 40                | 32                       | 35.5 | 32.5   | 35   | 70   | 79.5 |                  |    |                            |    |        |  |

## Minimum Auto Switch Mounting Stroke

n: No. of auto switches (mm)

| Auto switch model               | No. of auto switches mounted |                    |              |   |                   |
|---------------------------------|------------------------------|--------------------|--------------|---|-------------------|
|                                 | 1                            | 2                  |              | n   |                   |
|                                 |                              | Different surfaces | Same surface | Different surfaces                            | Same surface      |
| D-A9□<br>D-M9□<br>D-M9□W        | 10                           | 15 Note 1)         | 45 Note 1)   | $15 + 45 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 45 + 45 (n - 2)   |
| D-C7□<br>D-C80                  | 10                           | 15                 | 50           | $15 + 45 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 50 + 45 (n - 2)   |
| D-H7□<br>D-H7□W<br>D-H7BAL/H7NF | 10                           | 15                 | 60           | $15 + 45 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 60 + 45 (n - 2)   |
| D-C73C<br>D-C80C<br>D-H7C       | 10                           | 15                 | 65           | $15 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 65 + 50 (n - 2)   |
| D-B5□/B64<br>D-G5NTL            | 10                           | 15                 | 75           | $15 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 75 + 55 (n - 2)   |
| D-B59W                          | 15                           | 20                 | 75           | $20 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 75 + 55 (n - 2)   |
| D-A3□A/G39A<br>D-K39A/A44A      | 10                           | 35                 | 100          | 35 + 30 (n - 2)                               | 100 + 100 (n - 2) |

Note 1) Auto switch mounting (The adjustment as shown in the figures below is required with the following stroke ranges.)

| Auto switch model   | With 2 auto switches   |                           |
|---|--|---------------------------|
|   | Different surfaces Note 1)   | Same surface Note 1)      |
|  <p>The proper auto switch mounting position is 6 mm inward from the switch holder edge.</p> |  <p>The auto switch is mounted by slightly displacing it in a direction (cylinder tube circumferential exterior) so that the auto switch and lead wire do not interfere with each other.</p> |                           |
| D-A93   | —  | 45 to less than 50 stroke |
| D-M9□<br>D-M9□W   | 15 to less than 20 stroke  | 45 to less than 55 stroke |

## Operating Range

(mm)

| Auto switch model                | Bore size (mm) |     |     |    |
|----------------------------------|----------------|-----|-----|----|
|                                  | 20             | 25  | 32  | 40 |
| D-A9□                            | 6              | 6   | 6   | 6  |
| D-M9□<br>D-M9□W                  | 3.5            | 3   | 3.5 | 3  |
| D-C7□/C80<br>D-C73C/C80C         | 7              | 8   | 8   | 8  |
| D-B5□/B64<br>D-A3□A/A44A         | 8              | 8   | 9   | 9  |
| D-B59W                           | 12             | 12  | 13  | 13 |
| D-H7□/H7□W/H7BAL<br>D-G5NTL/H7NF | 4              | 4   | 4.5 | 5  |
| D-H7C                            | 7              | 8.5 | 9   | 10 |
| D-G39A/K39A                      | 8              | 9   | 9   | 9  |

\* Since the operating range is provided as a guideline including hysteresis, it cannot be guaranteed (assuming approximately ±30% dispersion). It may vary substantially depending on an ambient environment.

# Series CLM2

## Auto Switch Mounting Bracket: Part No.

| Auto switch model  | Bore size (mm)           |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
|  | ø20                      | ø25                      | ø32                      | ø40                      |
| D-A9□<br>D-M9□<br>D-M9□W   | ① BM2-020 (1)<br>② BJ3-1 | ① BM2-025 (1)<br>② BJ3-1 | ① BM2-032 (1)<br>② BJ3-1 | ① BM2-040 (1)<br>② BJ3-1 |
| D-C7□/C80<br>D-C73C/C80C<br>D-H7□<br>D-H7□W<br>D-H7BAL<br>D-H7NF | BM2-020                  | BM2-025                  | BM2-032                  | BM2-040                  |
| D-B5□/B64<br>D-B59W<br>D-G5NTL<br>D-G5NBL                        | BA2-020                  | BA2-025                  | BA2-032                  | BA2-040                  |
| D-A3□A/A44A<br>D-G39A/K39A                                       | BM3-020                  | BM3-025                  | BM3-032                  | BM3-040                  |

Note 1) Two kinds of auto switch mounting brackets are used as a set.

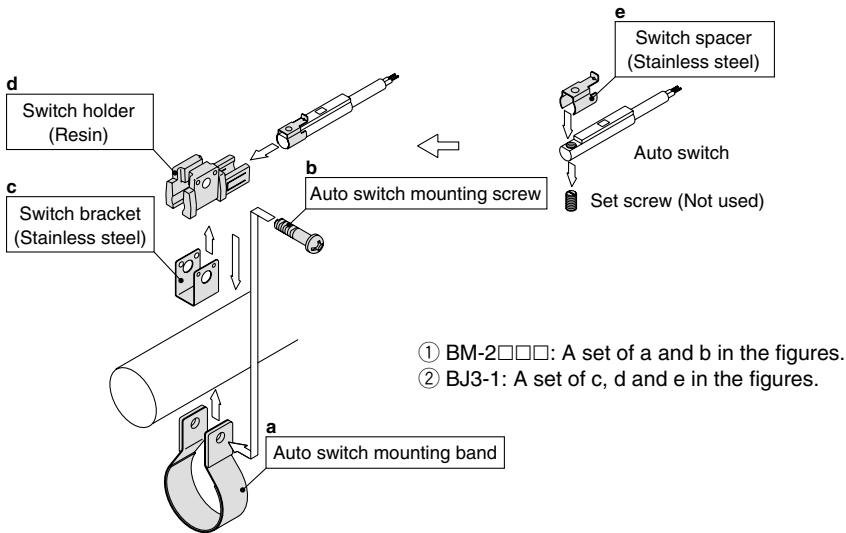
### [Mounting screw set made of stainless steel]

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

BBA4: For D-C7/C8/H7 types

Note 2) Refer to page 1814 for the details of BBA4.

D-H7BAL auto switch is set on the cylinder with the stainless steel screws above when shipped. When an auto switch is shipped independently, BBA4 is attached.



Besides the models listed in How to Order, the following auto switches are applicable. Refer to pages 1719 to 1827 for the detailed specifications.

| Auto switch type | Part no.           | Electrical entry (Fetching direction) | Features                        |
|------------------|--------------------|---------------------------------------|---------------------------------|
| Reed             | D-B53, C73, C76    | Grommet (In-line)                     | —                               |
|                  | D-C80              |                                       | Without indicator light         |
| Solid state      | D-H7A1, H7A2, H7B  |                                       | —                               |
|                  | D-H7NW, H7PW, H7BW |                                       | Diagnostic indication (2-color) |
|                  | D-G5NTL            |                                       | With timer                      |

\* For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1784 and 1785 for details.

\* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H types) are also available. Refer to page 1746 for details.

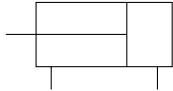
\* Wide range detection type, solid state auto switches (D-G5NBL type) are also available. Refer to page 1776 for details.



## Specifications



**JIS Symbol**  
Double acting  
Single rod



## Standard Stroke

| Bore size (mm) | Standard stroke (mm)                       |
|----------------|--|
| 20             | 25, 50, 75, 100, 125, 150<br>200, 250, 300 |
| 25             |  |
| 32             |  |
| 40             |  |

\* Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

## ⚠ Precautions

**Be sure to read before handling. Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.**

### Operating Precautions

#### ⚠ Warning

- Do not rotate the cover.**
  - When installing a cylinder or screwing a pipe fitting into the port, the coupling portion of the cover could break if the cover rotated.

#### ⚠ Caution

- Be careful of the retaining ring to pop out.**
  - When replacing the rod seal, take care that the retaining ring does not spring out while you are removing it.

### Maintenance

#### ⚠ Caution

- Replacement parts/Seal kit**  
Order it in accordance with the bore size.

| Bore size (mm) | Kit no.   | Contents                  |
|----------------|-----------|---------------------------|
| 20             | CM2X20-PS | Rod seal: 1 pc.           |
| 25             | CM2X25-PS |                           |
| 32             | CM2X32-PS | Grease pack (10 g): 1 pc. |
| 40             | CM2X40-PS |                           |

- Grease pack**

When maintenance requires only grease, use the following part numbers to order.

**Grease pack part no.:**

- GR-L-005 (5 g)
- GR-L-010 (10 g)
- GR-L-150 (150 g)

| Bore size (mm)                       | 20  | 25 | 32 | 40 |
|--------------------------------------|---|----|----|----|
| <b>Type</b>                          | Pneumatic   |    |    |    |
| <b>Action</b>                        | Double acting, Single rod   |    |    |    |
| <b>Fluid</b>                         | Air   |    |    |    |
| <b>Proof pressure</b>                | 1.5 MPa   |    |    |    |
| <b>Maximum operating pressure</b>    | 1.0 MPa   |    |    |    |
| <b>Minimum operating pressure</b>    | 0.025 MPa   |    |    |    |
| <b>Ambient and fluid temperature</b> | Without auto switch: -10 to 70°C (No freezing)<br>With auto switch: -10 to 60°C (No freezing) |    |    |    |
| <b>Cushion</b>                       | Rubber bumper   |    |    |    |
| <b>Lubrication</b>                   | Not required (Non-lube)   |    |    |    |
| <b>Stroke length tolerance</b>       | +1.4 mm<br>0  |    |    |    |

## Piston Speed

| Bore size (mm)               | 20         | 25  | 32   | 40  |
|------------------------------|------------|-----|------|-----|
| Piston speed (mm/s)          | 0.5 to 300 |     |      |     |
| Allowable kinetic energy (J) | 0.27       | 0.4 | 0.65 | 1.2 |

## Mounting Bracket Part No.

| Mounting bracket            | Minimum order | Bore size (mm) |          |          |    | Description (when ordering a minimum number)                               |
|-----------------------------|---------------|----------------|----------|----------|----|--|
|                             |               | 20             | 25       | 32       | 40 |  |
| Axial foot*                 | 2             | CM-L020B       | CM-L032B | CM-L040B |    | Foot 2 pcs., Mounting nut 1 pc.  |
| Flange                      | 1             | CM-F020B       | CM-F032B | CM-F040B |    | Flange 1 pc., Mounting nut 1 pc.   |
| Single clevis**             | 1             | CM-C020B       | CM-C032B | CM-C040B |    | Single clevis 1 pc., Liner 3 pcs.  |
| Double clevis (with pin)*** | 1             | CM-D020B       | CM-D032B | CM-D040B |    | Double clevis 1 pc., Liner 3 pcs., Clevis pin 1 pc., Retaining ring 2 pcs. |
| Trunnion (with nut)         | 1             | CM-T020B       | CM-T032B | CM-T040B |    | Trunnion 1 pc., Trunnion nut 1 pc.   |

\* When ordering foot brackets, order 2 pieces per cylinder unit.

\*\* Three liners are included in the clevis bracket for adjusting an angle when mounting it.

\*\*\* Clevis pin and retaining ring (cotter pin for ø40) are shipped together.

## Mounting Style and Accessory

| Mounting                           | Accessory     | Standard equipment |            |                      | Option                              |                               |  |
|------------------------------------|---------------|--------------------|------------|----------------------|-------------------------------------|-------------------------------|--|
|                                    | Mounting nut  | Rod end nut        | Clevis pin | Single knuckle joint | Double <sup>(3)</sup> knuckle joint | Clevis <sup>(4)</sup> bracket |  |
| Basic style                        | ● (1 pc.)     | ●                  | —          | ●                    | ●                                   | —                             |  |
| Axial foot style                   | ● (2)         | ●                  | —          | ●                    | ●                                   | —                             |  |
| Rod side flange style              | ● (1)         | ●                  | —          | ●                    | ●                                   | —                             |  |
| Head side flange style             | ● (1)         | ●                  | —          | ●                    | ●                                   | —                             |  |
| Clevis integrated style            | — Note 1)     | ●                  | —          | ●                    | ●                                   | ●                             |  |
| Single clevis style                | — Note 1)     | ●                  | —          | ●                    | ●                                   | —                             |  |
| Double clevis style <sup>(3)</sup> | — Note 1)     | ●                  | ● Note 5)  | ●                    | ●                                   | —                             |  |
| Rod side trunnion style            | ● (1) Note 2) | ●                  | —          | ●                    | ●                                   | —                             |  |
| Head side trunnion style           | ● (1) Note 2) | ●                  | —          | ●                    | ●                                   | —                             |  |
| Boss-cut basic style               | ● (1)         | ●                  | —          | ●                    | ●                                   | —                             |  |
| Boss-cut flange style              | ● (1)         | ●                  | —          | ●                    | ●                                   | —                             |  |
| Boss-cut trunnion style            | ● (1)         | ●                  | —          | ●                    | ●                                   | —                             |  |

Note 1) Mounting nut is not equipped with clevis integrated style, single clevis style and double clevis style.

Note 2) Trunnion nuts are attached for rod side trunnion and head side trunnion styles.

Note 3) Pin and retaining ring are shipped together with double clevis and double knuckle joint. (ø40 is cotter pin.)

Note 4) Pins and retaining rings are packed with clevis brackets.

Note 5) Retaining rings (cotter pins for ø40) are included in the clevis pins.

REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

D-□

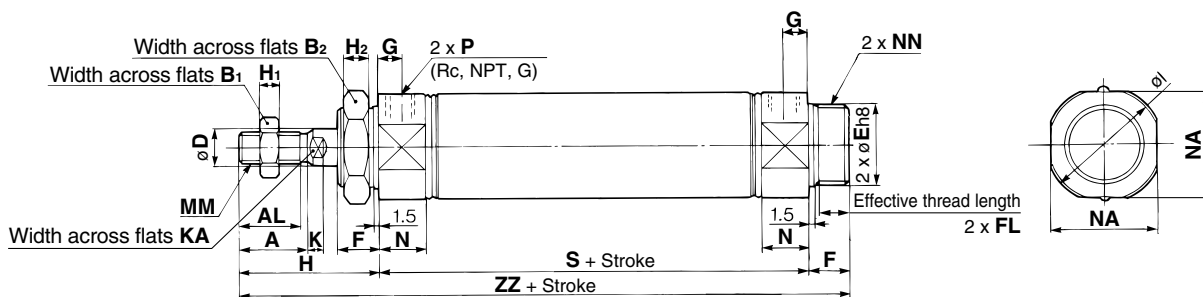
-X□

Individual  
-X□

# Series CM2X

## Basic Style (B)

CM2XB Bore size — Stroke



## Boss-cut style



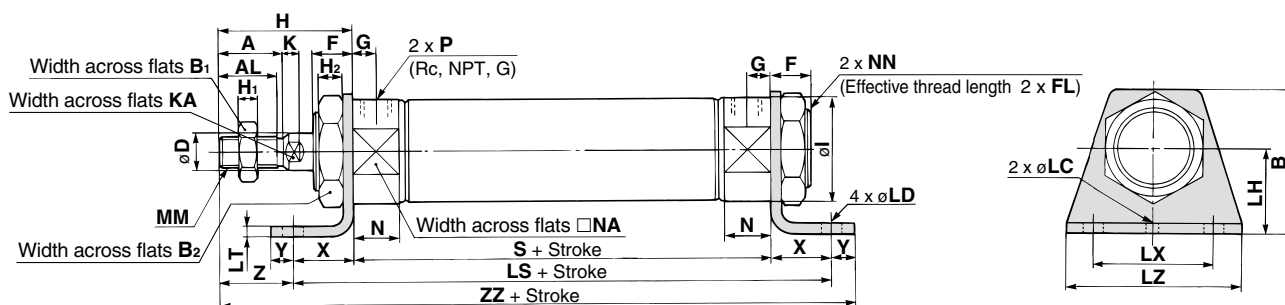
| Bore size (mm) | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   | S  | ZZ  |
|----------------|----|------|----------------|----------------|----|-----------------------------------|----|------|----|----|----------------|----------------|------|-----|----|------------|------|------|-----------|-----|----|-----|
| 20             | 18 | 15.5 | 13             | 26             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 116 |
| 25             | 22 | 19.5 | 17             | 32             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 120 |
| 32             | 22 | 19.5 | 17             | 32             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 122 |
| 40             | 24 | 21   | 22             | 41             | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 154 |

## Boss-cut Style (mm)

| Bore size (mm) | ZZ  |
|----------------|-----|
| 20             | 103 |
| 25             | 107 |
| 32             | 109 |
| 40             | 138 |

## Axial Foot Style (L)

CM2XL Bore size — Stroke

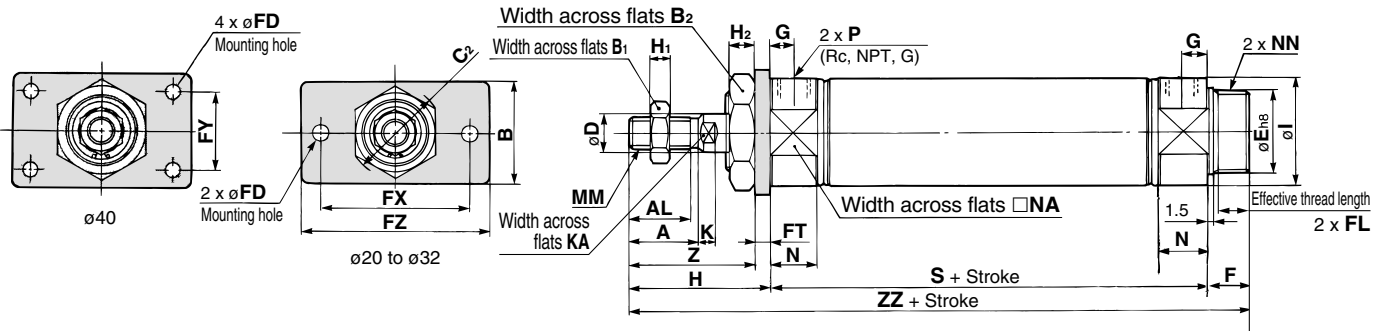


| Bore size (mm) | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | D  | F  | FL   | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | LC | LD  | LH | LS  | LT  | LX | LZ | MM         | N    | NA   | NN        | P   | S  | X  | Y  | Z  | ZZ  |
|----------------|----|------|----|----------------|----------------|----|----|------|----|----|----------------|----------------|------|-----|----|----|-----|----|-----|-----|----|----|------------|------|------|-----------|-----|----|----|----|----|-----|
| 20             | 18 | 15.5 | 40 | 13             | 26             | 8  | 13 | 10.5 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | 4  | 6.8 | 25 | 102 | 3.2 | 40 | 55 | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 20 | 8  | 21 | 131 |
| 25             | 22 | 19.5 | 47 | 17             | 32             | 10 | 13 | 10.5 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | 4  | 6.8 | 28 | 102 | 3.2 | 40 | 55 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 20 | 8  | 25 | 135 |
| 32             | 22 | 19.5 | 47 | 17             | 32             | 12 | 13 | 10.5 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | 4  | 6.8 | 28 | 104 | 3.2 | 40 | 55 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 20 | 8  | 25 | 137 |
| 40             | 24 | 21   | 54 | 22             | 41             | 14 | 16 | 13.5 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | 4  | 7   | 30 | 134 | 3.2 | 55 | 75 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 23 | 10 | 27 | 171 |

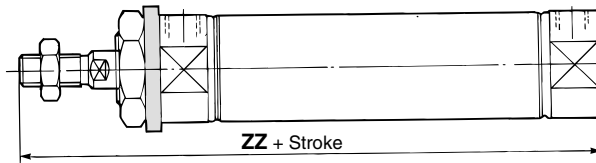


### Rod Side Flange Style (F)

CM2XF Bore size — Stroke



### Boss-cut style



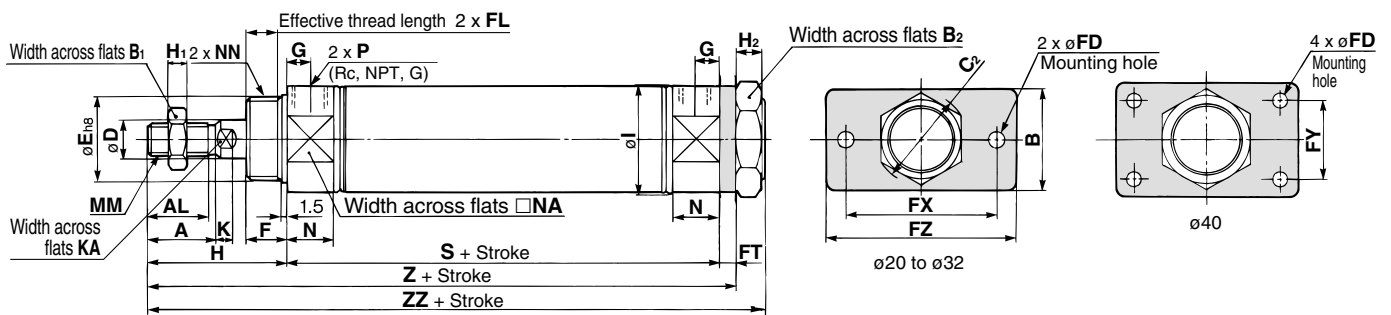
| Bore size (mm) | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | C <sub>2</sub> | D  | E                                 | F  | FL   | FD | FT | FX | FY | FZ | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   | S  | Z  | ZZ  |
|----------------|----|------|----|----------------|----------------|----------------|----|-----------------------------------|----|------|----|----|----|----|----|----|----|----------------|----------------|------|-----|----|------------|------|------|-----------|-----|----|----|-----|
| 20             | 18 | 15.5 | 34 | 13             | 26             | 30             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 37 | 116 |
| 25             | 22 | 19.5 | 40 | 17             | 32             | 37             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 41 | 120 |
| 32             | 22 | 19.5 | 40 | 17             | 32             | 37             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 41 | 122 |
| 40             | 24 | 21   | 52 | 22             | 41             | 47.3           | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 7  | 5  | 66 | 36 | 82 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 45 | 154 |

### Boss-cut Style (mm)

| Bore size (mm) | ZZ  |
|----------------|-----|
| 20             | 103 |
| 25             | 107 |
| 32             | 109 |
| 40             | 138 |

### Head Side Flange Style (G)

CM2XG Bore size — Stroke



| Bore size (mm) | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | C <sub>2</sub> | D  | E                                 | F  | FL   | FD | FT | FX | FY | FZ | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    |
|----------------|----|------|----|----------------|----------------|----------------|----|-----------------------------------|----|------|----|----|----|----|----|----|----|----------------|----------------|------|
| 20             | 18 | 15.5 | 34 | 13             | 26             | 30             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 41 | 5              | 8              | 28   |
| 25             | 22 | 19.5 | 40 | 17             | 32             | 37             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 33.5 |
| 32             | 22 | 19.5 | 40 | 17             | 32             | 37             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 37.5 |
| 40             | 24 | 21   | 52 | 22             | 41             | 47.3           | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 7  | 5  | 66 | 36 | 82 | 11 | 50 | 8              | 10             | 46.5 |

| Bore size (mm) | K   | KA | MM         | N    | NA   | NN        | P   | S  | Z   | ZZ  |
|----------------|-----|----|------------|------|------|-----------|-----|----|-----|-----|
| 20             | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 107 | 116 |
| 25             | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 111 | 120 |
| 32             | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 113 | 122 |
| 40             | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 143 | 154 |

REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

D-□

-X□

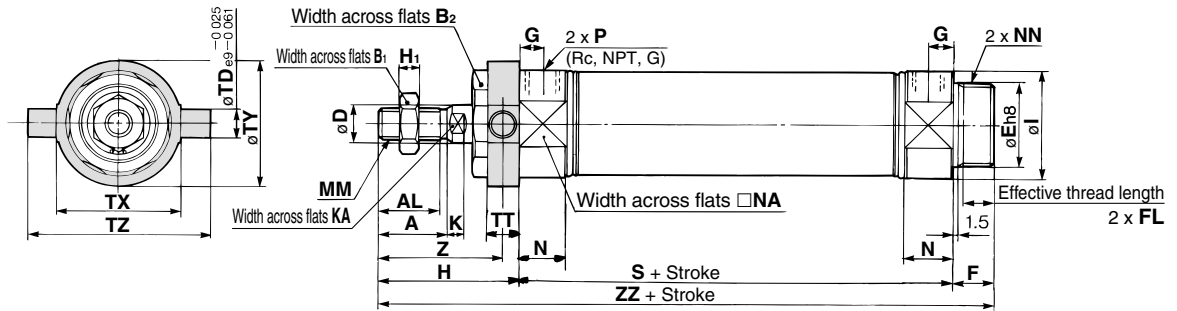
Individual

-X□

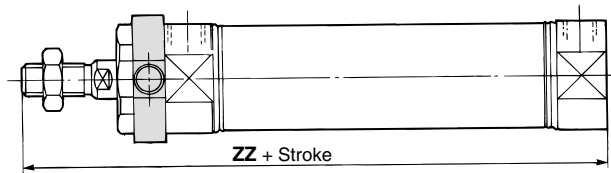


**Rod Side Trunnion Style (U)**

CM2XU  —



**Boss-cut style**



| Bore size (mm) | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   |
|----------------|----|------|----------------|----------------|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|------------|------|------|-----------|-----|
| 20             | 18 | 15.5 | 13             | 26             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 |
| 25             | 22 | 19.5 | 17             | 32             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 |
| 32             | 22 | 19.5 | 17             | 32             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 |
| 40             | 24 | 21   | 22             | 41             | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 |

| Bore size (mm) | S  | TD | TT | TX | TY | TZ | Z    | ZZ  |
|----------------|----|----|----|----|----|----|------|-----|
| 20             | 62 | 8  | 10 | 32 | 32 | 52 | 36   | 116 |
| 25             | 62 | 9  | 10 | 40 | 40 | 60 | 40   | 120 |
| 32             | 64 | 9  | 10 | 40 | 40 | 60 | 40   | 122 |
| 40             | 88 | 10 | 11 | 53 | 53 | 77 | 44.5 | 154 |

**Boss-cut Style (mm)**

| Bore size (mm) | ZZ  |
|----------------|-----|
| 20             | 103 |
| 25             | 107 |
| 32             | 109 |
| 40             | 138 |

REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

D-□

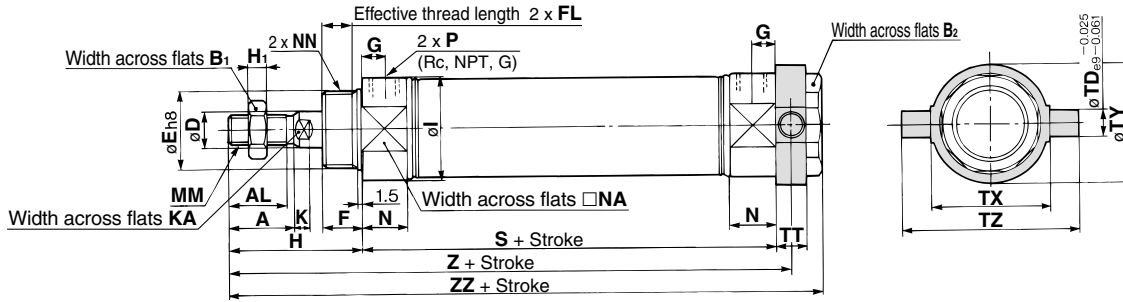
-X□

Individual  
-X□

# Series CM2X

## Head Side Trunnion Style (T)

CM2XT  —

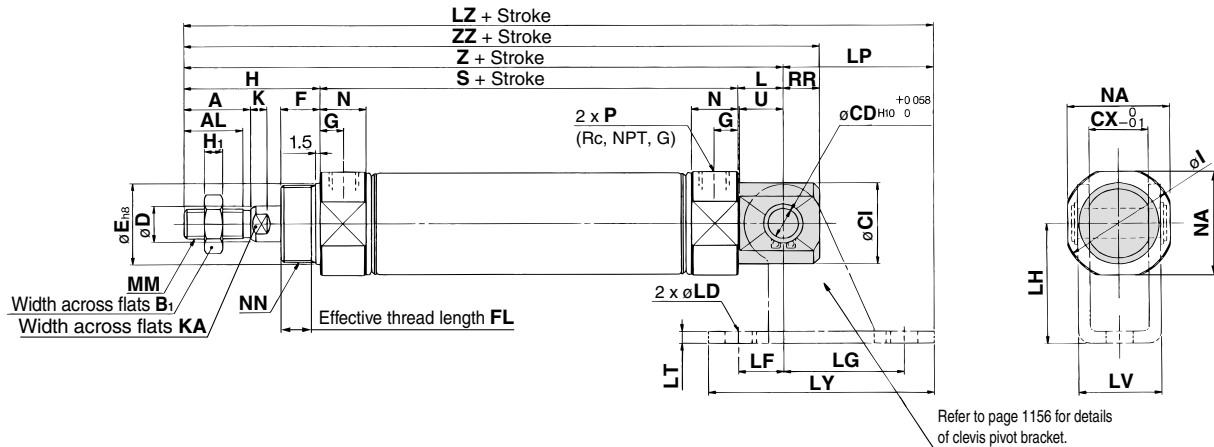


| Bore size (mm) | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   |
|----------------|----|------|----------------|----------------|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|------------|------|------|-----------|-----|
| 20             | 18 | 15.5 | 13             | 26             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 |
| 25             | 22 | 19.5 | 17             | 32             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 |
| 32             | 22 | 19.5 | 17             | 32             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 |
| 40             | 24 | 21   | 22             | 41             | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 |

| Bore size (mm) | S  | TD | TT | TX | TY | TZ | Z     | ZZ  |
|----------------|----|----|----|----|----|----|-------|-----|
| 20             | 62 | 8  | 10 | 32 | 32 | 52 | 108   | 118 |
| 25             | 62 | 9  | 10 | 40 | 40 | 60 | 112   | 122 |
| 32             | 64 | 9  | 10 | 40 | 40 | 60 | 114   | 124 |
| 40             | 88 | 10 | 11 | 53 | 53 | 77 | 143.5 | 154 |

**Clevis Integrated Style (E)**

CM2XE  —



(mm)

| Bore size (mm) | A  | AL   | B <sub>1</sub> | CD | CI | CX | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | L  | MM         | N    | NA   | NN        |
|----------------|----|------|----------------|----|----|----|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|----|------------|------|------|-----------|
| 20             | 18 | 15.5 | 13             | 8  | 20 | 12 | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | 12 | M8 x 1.25  | 15   | 24   | M20 x 1.5 |
| 25             | 22 | 19.5 | 17             | 8  | 22 | 12 | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | 12 | M10 x 1.25 | 15   | 30   | M26 x 1.5 |
| 32             | 22 | 19.5 | 17             | 10 | 27 | 20 | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | 15 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 |
| 40             | 24 | 21   | 22             | 10 | 33 | 20 | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | 15 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   |

(mm)

| Bore size (mm) | P   | RR | S  | U    | Z   | ZZ  |
|----------------|-----|----|----|------|-----|-----|
| 20             | 1/8 | 9  | 62 | 11.5 | 115 | 124 |
| 25             | 1/8 | 9  | 62 | 11.5 | 119 | 128 |
| 32             | 1/8 | 12 | 64 | 14.5 | 124 | 136 |
| 40             | 1/4 | 12 | 88 | 14.5 | 153 | 165 |

REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

D-□

-X□

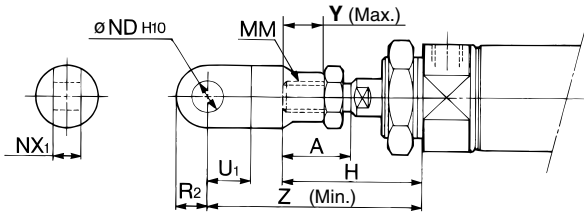
Individual  
-X□

# Series CM2X

# Accessory Bracket Dimensions

## Single Knuckle Joint

(mm)

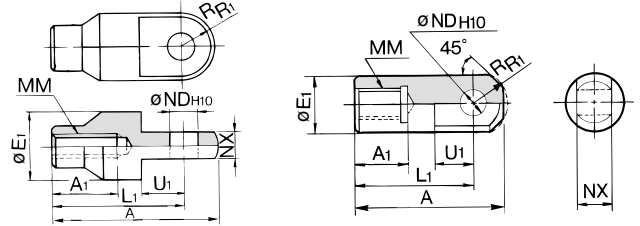


| Bore size (mm) | A  | H  | MM         | ND <sub>H10</sub>                 | NX <sub>1</sub>                    | U <sub>1</sub> | R <sub>2</sub> | Y  | Z  |
|----------------|----|----|------------|-----------------------------------|------------------------------------|----------------|----------------|----|----|
| 20             | 18 | 41 | M8 x 1.25  | 9 <sup>+0.058</sup> <sub>0</sub>  | 9 <sup>-0.1</sup> <sub>-0.2</sub>  | 14             | 10             | 11 | 66 |
| 25, 32         | 22 | 45 | M10 x 1.25 | 9 <sup>+0.058</sup> <sub>0</sub>  | 9 <sup>-0.1</sup> <sub>-0.2</sub>  | 14             | 10             | 14 | 69 |
| 40             | 24 | 50 | M14 x 1.5  | 12 <sup>+0.070</sup> <sub>0</sub> | 16 <sup>-0.1</sup> <sub>-0.3</sub> | 20             | 14             | 13 | 92 |

## Single Knuckle Joint

(mm)

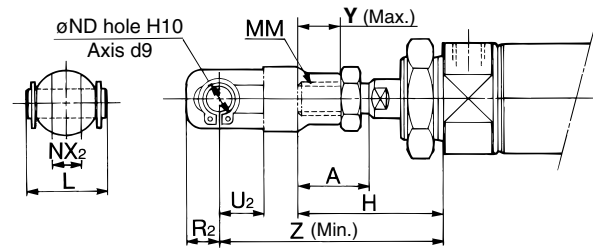
**I-020B, 032B** Material: Rolled steel **I-040B** Material: Free cutting sulfur steel



| Part no.      | Applicable bore size (mm) | A  | A <sub>1</sub> | E <sub>1</sub> | L <sub>1</sub> | MM         | ND <sub>H10</sub>                 | NX                                 | R <sub>1</sub> | U <sub>1</sub> |
|---------------|---------------------------|----|----------------|----------------|----------------|------------|-----------------------------------|------------------------------------|----------------|----------------|
| <b>I-020B</b> | 20                        | 46 | 16             | 20             | 36             | M8 x 1.25  | 9 <sup>+0.058</sup> <sub>0</sub>  | 9 <sup>-0.1</sup> <sub>-0.2</sub>  | 10             | 14             |
| <b>I-032B</b> | 25, 32                    | 48 | 18             | 20             | 38             | M10 x 1.25 | 9 <sup>+0.058</sup> <sub>0</sub>  | 9 <sup>-0.1</sup> <sub>-0.2</sub>  | 10             | 14             |
| <b>I-040B</b> | 40                        | 69 | 22             | 24             | 55             | M14 x 1.5  | 12 <sup>+0.070</sup> <sub>0</sub> | 16 <sup>-0.1</sup> <sub>-0.3</sub> | 15.5           | 20             |

## Double Knuckle Joint

(mm)

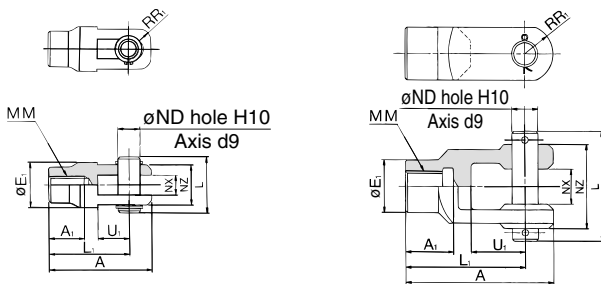


| Bore size (mm) | A  | H  | L    | MM         | ND | NX <sub>2</sub>                    | R <sub>2</sub> | U <sub>2</sub> | Y  | Z  |
|----------------|----|----|------|------------|----|------------------------------------|----------------|----------------|----|----|
| 20             | 18 | 41 | 25   | M8 x 1.25  | 9  | 9 <sup>+0.2</sup> <sub>+0.1</sub>  | 10             | 14             | 11 | 66 |
| 25, 32         | 22 | 45 | 25   | M10 x 1.25 | 9  | 9 <sup>+0.2</sup> <sub>+0.1</sub>  | 10             | 14             | 14 | 69 |
| 40             | 24 | 50 | 49.7 | M14 x 1.5  | 12 | 16 <sup>+0.3</sup> <sub>+0.1</sub> | 13             | 25             | 13 | 92 |

## Double Knuckle Joint

(mm)

**Y-020B, Y-032B** Material: Rolled steel **Y-040B** Material: Cast iron



| Part no.      | Applicable bore size (mm) | A  | A <sub>1</sub> | E <sub>1</sub> | L    | L <sub>1</sub> | MM         | ND | NX                                 | NZ | R <sub>1</sub> | U <sub>1</sub> | Applicable pin part number | Retaining ring Cotter pin size |
|---------------|---------------------------|----|----------------|----------------|------|----------------|------------|----|------------------------------------|----|----------------|----------------|----------------------------|--------------------------------|
| <b>Y-020B</b> | 20                        | 46 | 16             | 20             | 25   | 36             | M8 x 1.25  | 9  | 9 <sup>+0.2</sup> <sub>+0.1</sub>  | 18 | 5              | 14             | CDP-1                      | Type C9 for axis               |
| <b>Y-032B</b> | 25, 32                    | 48 | 18             | 20             | 25   | 38             | M10 x 1.25 | 9  | 9 <sup>+0.2</sup> <sub>+0.1</sub>  | 18 | 5              | 14             | CDP-1                      | Type C9 for axis               |
| <b>Y-040B</b> | 40                        | 68 | 22             | 24             | 49.7 | 55             | M14 x 1.5  | 12 | 16 <sup>+0.3</sup> <sub>+0.1</sub> | 38 | 13             | 25             | CDP-3                      | ø3 x 18ℓ                       |

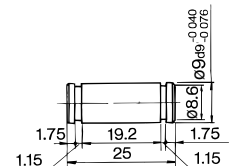
\* Clevis pin and retaining ring (cotter pin for ø40) are attached.

## Double Clevis Pin

Material: Carbon steel (mm)

Bore size: ø20, ø25, ø32

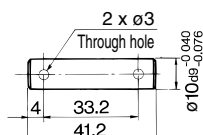
CDP-1



Retaining ring: Type C9 for axis

Bore size: ø40

CDP-2



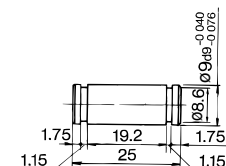
Cotter pin ø3 x 18ℓ

## Double Knuckle Pin

Material: Carbon steel (mm)

Bore size: ø20, ø25, ø32

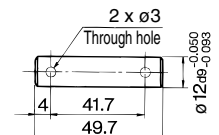
CDP-1



Retaining ring: Type C9 for axis

Bore size: ø40

CDP-3

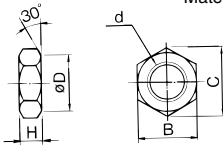


Cotter pin ø3 x 18ℓ

\* Retaining rings (copper pins for ø40) are included.

**Rod End Nut** (mm)

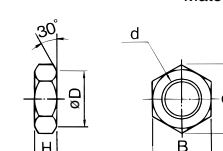
Material: Carbon steel



| Part no. | Applicable bore size (mm) | B  | C    | D    | d          | H |
|----------|---------------------------|----|------|------|------------|---|
| NT-02    | 20                        | 13 | 15.0 | 12.5 | M8 x 1.25  | 5 |
| NT-03    | 25, 32                    | 17 | 19.6 | 16.5 | M10 x 1.25 | 6 |
| NT-04    | 40                        | 22 | 25.4 | 21.0 | M14 x 1.5  | 8 |

**Mounting Nut** (mm)

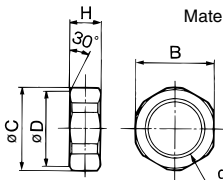
Material: Carbon steel



| Part no. | Applicable bore size (mm) | B  | C    | D    | d         | H  |
|----------|---------------------------|----|------|------|-----------|----|
| SN-020B  | 20                        | 26 | 30   | 25.5 | M20 x 1.5 | 8  |
| SN-032B  | 25, 32                    | 32 | 37   | 31.5 | M26 x 1.5 | 8  |
| SN-040B  | 40                        | 41 | 47.3 | 40.5 | M32 x 2.0 | 10 |

**Trunnion Nut** (mm)

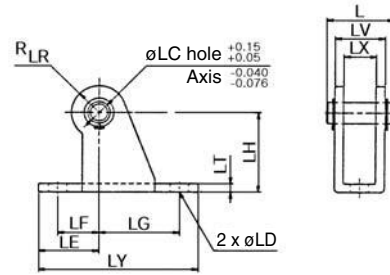
Material: Carbon steel



| Part no. | Applicable bore size (mm) | B  | C  | D    | d         | H  |
|----------|---------------------------|----|----|------|-----------|----|
| TN-020B  | 20                        | 26 | 28 | 25.5 | M20 x 1.5 | 10 |
| TN-032B  | 25, 32                    | 32 | 34 | 31.5 | M26 x 1.5 | 10 |
| TN-040B  | 40                        | 41 | 45 | 40.5 | M32 x 2   | 10 |

**Clevis Pivot Bracket (For CM2XE)** (mm)

Material: Rolled steel plate

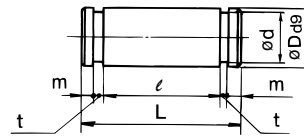


| Part no. | Applicable bore size (mm) | L    | LC | LD  | LE | LF | LG | LH | LR | LT  | LX | LY | LV   | Applicable pin part no. |
|----------|---------------------------|------|----|-----|----|----|----|----|----|-----|----|----|------|-------------------------|
| CM-E020B | 20, 25                    | 24.5 | 8  | 6.8 | 22 | 15 | 30 | 30 | 10 | 3.2 | 12 | 59 | 18.4 | CD-S02                  |
| CM-E032B | 32, 40                    | 34   | 10 | 9   | 25 | 15 | 40 | 40 | 13 | 4   | 20 | 75 | 28   | CD-S03                  |

Note 1) Clevis bracket pins and retaining rings are included.  
Note 2) It cannot be used for single clevis style (CM2C) and double clevis style (CM2D).

**Clevis Pin (For CM2XE)** (mm)

Material: Carbon steel



| Part no. | Applicable bore size (mm) | Dø9                                    | d   | L    | l    | m    | t    | Applicable retaining ring part no. |
|----------|---------------------------|--|-----|------|------|------|------|------------------------------------|
| CD-S02   | 20, 25                    | 8 <sup>-0.040</sup> <sub>-0.076</sub>  | 7.6 | 24.5 | 19.5 | 1.6  | 0.9  | Type C 8 for axis                  |
| CD-S03   | 32, 40                    | 10 <sup>-0.040</sup> <sub>-0.076</sub> | 9.6 | 34   | 29   | 1.35 | 1.15 | Type C 10 for axis                 |

Note) Retaining rings are included.

Regarding mounting bracket, accessory made of stainless steel (Some are not available.), refer to page 1864 for -XB12, External stainless steel cylinder.

REA

REB

REC

Y

X

MQ

RHC

RZQ

D-

-X

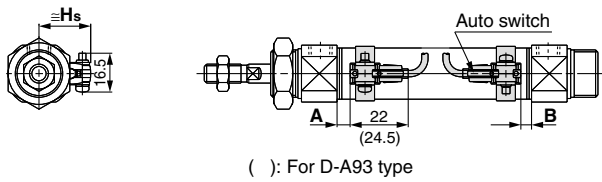
Individual  
-X

# Series CM2X

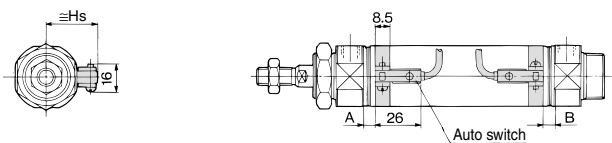
## Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

### Reed auto switch

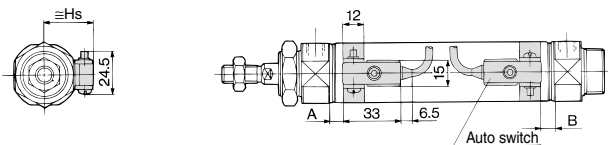
#### D-A9□



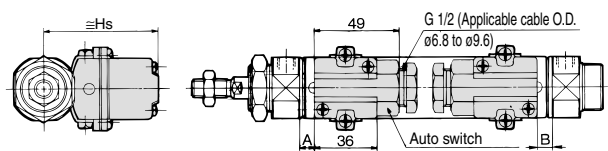
#### D-C7/C8



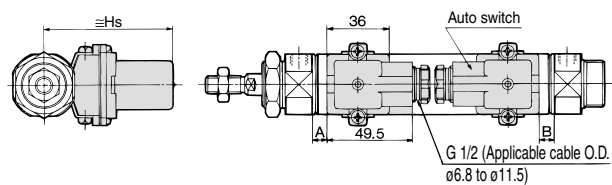
#### D-B5/B6/B59W



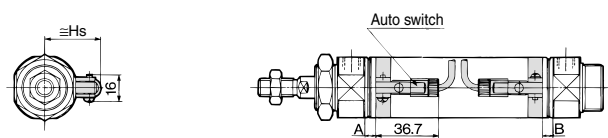
#### D-A33A/A34A



#### D-A44A



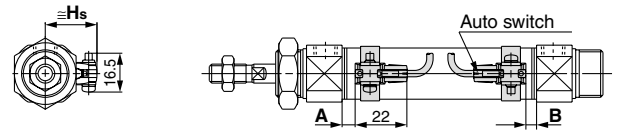
#### D-C73C/C80C



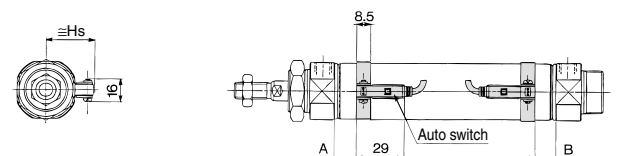
### Solid state auto switch

#### D-M9□

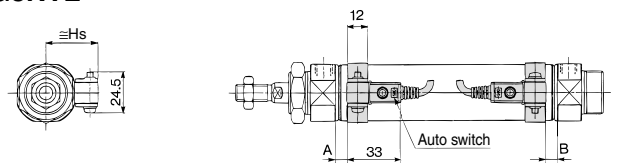
#### D-M9□W



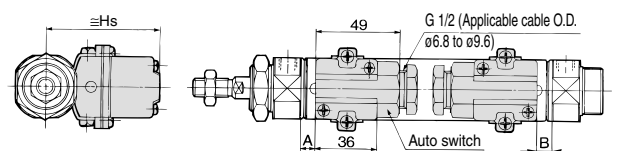
#### D-H7□/H7□W/H7NF



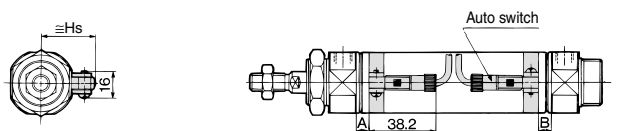
#### D-G5NTL



#### D-G39A/K39A



#### D-H7C





## Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

### Auto Switch Proper Mounting Position

(mm)

| Auto switch model<br>Bore size (mm) | D-A9□ |      | D-M9□<br>D-M9□W |      | D-B5□<br>D-B64 |   | D-C7□<br>D-C80<br>D-C73C<br>D-C80C |    | D-B59W |   | D-A3□A<br>D-G39A<br>D-K39A<br>D-A44A |     | D-H7□<br>D-H7C<br>D-H7□W<br>D-H7NF |    | D-G5NTL |     |
|-------------------------------------|-------|------|-----------------|------|----------------|---|------------------------------------|----|--------|---|--------------------------------------|-----|------------------------------------|----|---------|-----|
|                                     | A     | B    | A               | B    | A              | B | A                                  | B  | A      | B | A                                    | B   | A                                  | B  | A       | B   |
| <b>20</b>                           | 6.5   | 5.5  | 10.5            | 9.5  | 1              | 0 | 7                                  | 6  | 4      | 3 | 0.5                                  | 0   | 6                                  | 5  | 2.5     | 1.5 |
| <b>25</b>                           | 6.5   | 5.5  | 10.5            | 9.5  | 1              | 0 | 7                                  | 6  | 4      | 3 | 0.5                                  | 0   | 6                                  | 5  | 2.5     | 1.5 |
| <b>32</b>                           | 7.5   | 6.5  | 11.5            | 10.5 | 2              | 1 | 8                                  | 7  | 5      | 4 | 1.5                                  | 0.5 | 7                                  | 6  | 3.5     | 2.5 |
| <b>40</b>                           | 13.5  | 11.5 | 17.5            | 15.5 | 7              | 6 | 13                                 | 12 | 10     | 9 | 6.5                                  | 5.5 | 12                                 | 11 | 8.5     | 7.5 |

Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

### Auto Switch Mounting Height

(mm)

| Auto switch model<br>Bore size (mm) | D-A9□<br>D-M9□<br>D-M9□W | D-B5□<br>D-B64<br>D-B59W<br>D-G5NTL<br>D-H7C | D-C7□<br>D-C80<br>D-H7□<br>D-H7□W<br>D-H7NF | D-C73C<br>D-C80C | D-A3□A<br>D-G39A<br>D-K39A | D-A44A |
|-------------------------------------|--------------------------|--|---|------------------|----------------------------|--------|
|                                     | Hs                       | Hs   | Hs  | Hs               | Hs                         | Hs     |
| <b>20</b>                           | 22                       | 25.5   | 22.5  | 25               | 60                         | 69.5   |
| <b>25</b>                           | 24.5                     | 28   | 25  | 27.5             | 62.5                       | 72     |
| <b>32</b>                           | 28                       | 31.5   | 28.5  | 31               | 66                         | 75.5   |
| <b>40</b>                           | 32                       | 35.5   | 32.5  | 35               | 70                         | 79.5   |

REA

REB

REC

C□Y

**C□X**

MQ

RHC

RZQ

D-□

-X□

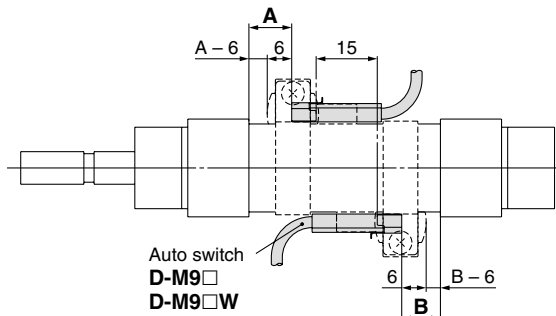
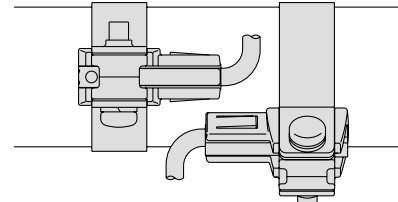
Individual  
-X□

# Series CM2X

## Minimum Auto Switch Mounting Stroke

| Auto switch model          | No. of auto switch mounted |                         |                         |   |                 |
|----------------------------|----------------------------|-------------------------|-------------------------|---|-----------------|
|                            | 1 pc.                      | 2 pcs.                  |                         | n pcs.  |                 |
|                            |                            | Different surfaces      | Same surface            | Different surfaces                            | Same surface    |
| D-A9□<br>D-M9□<br>D-M9□W   | 10                         | 15 <small>Note)</small> | 45 <small>Note)</small> | $15 + 45 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 45 + 45 (n-2)   |
| D-C7□<br>D-C80             | 10                         | 15                      | 50                      | $15 + 45 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 50 + 45 (n-2)   |
| D-H7□<br>D-H7□W<br>D-H7NF  | 10                         | 15                      | 60                      | $15 + 45 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 60 + 45 (n-2)   |
| D-C73C<br>D-C80C<br>D-H7C  | 10                         | 15                      | 65                      | $15 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 65 + 50 (n-2)   |
| D-B5□/B64<br>D-G5NTL       | 10                         | 15                      | 75                      | $15 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 75 + 55 (n-2)   |
| D-B59W                     | 15                         | 20                      | 75                      | $20 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 75 + 55(n-2)    |
| D-A3□A/G39A<br>D-K39A/A44A | 10                         | 35                      | 100                     | 35 + 30(n-2)                                  | 100 + 100 (n-2) |

Note) When 2 D-A93/M9□/M9□W auto switches are included.

| Auto switch model | With 2 auto switches  |  |
|-------------------|---|--|
|                   | Different surfaces  | Same surface   |
|                   |  <p>The proper auto switch mounting position is 6 mm inward from the switch holder edge.</p> |  <p>The auto switch is mounted by slightly displacing it in a direction (cylinder tube circumferential exterior) so that the auto switch and lead wire do not interfere with each other.</p> |
| D-A93             | —   | Less than 50 strokes   |
| D-M9□<br>D-M9□W   | Less than 20 strokes  | Less than 55 strokes   |

## Operating Range

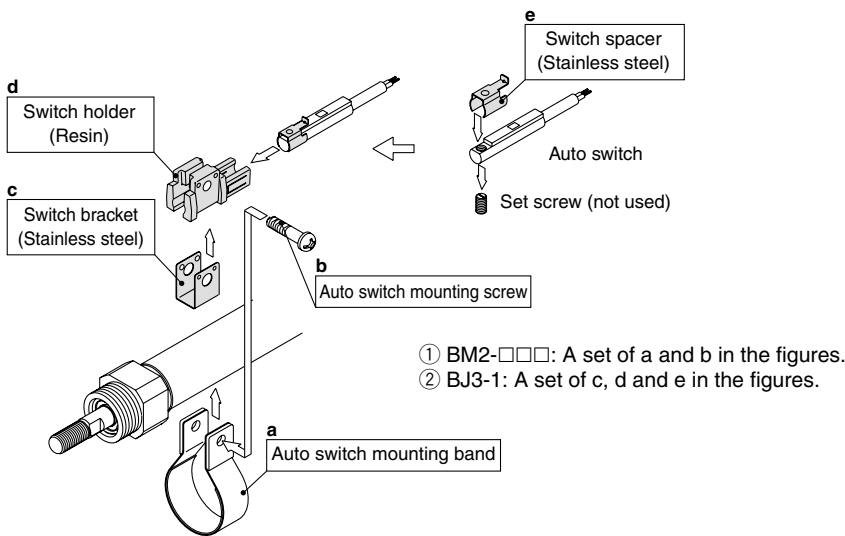
| Auto switch model          | (mm)           |     |     |    |
|----------------------------|----------------|-----|-----|----|
|                            | Bore size (mm) |     |     |    |
|                            | 20             | 25  | 32  | 40 |
| D-A9□                      | 6              | 6   | 6   | 6  |
| D-M9□<br>D-M9□W            | 3.5            | 3   | 3.5 | 3  |
| D-C7□/C80<br>D-C73C/C80C   | 7              | 8   | 8   | 8  |
| D-B5□/B64<br>D-A3□A/A44A   | 8              | 8   | 9   | 9  |
| D-B59W                     | 12             | 12  | 13  | 13 |
| D-H7□/H7□W<br>D-G5NTL/H7NF | 4              | 4   | 4.5 | 5  |
| D-H7C                      | 7              | 8.5 | 9   | 10 |
| D-G39A/K39A                | 8              | 9   | 9   | 9  |

\* 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.

**Auto Switch Mounting Bracket Part No.**

| Auto switch model                                     | Bore size (mm)              |                             |                             |                             |
|---|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|   | ø20                         | ø25                         | ø32                         | ø40                         |
| D-A9□<br>D-M9□<br>D-M9□W                              | Note)<br>①BM2-020<br>②BJ3-1 | Note)<br>①BM2-025<br>②BJ3-1 | Note)<br>①BM2-032<br>②BJ3-1 | Note)<br>①BM2-040<br>②BJ3-1 |
| D-C7□/C80<br>D-C73C/C80C<br>D-H7□<br>D-H7□W<br>D-H7NF | BM2-020                     | BM2-025                     | BM2-032                     | BM2-040                     |
| D-B5□/B64<br>D-B59W<br>D-G5NTL<br>D-G5NBL             | BA2-020                     | BA2-025                     | BA2-032                     | BA2-040                     |
| D-A3□A/A44A<br>D-G39A/K39A                            | BM3-020                     | BM3-025                     | BM3-032                     | BM3-040                     |

Note) Two kinds of auto switch mounting brackets are used as a set.



Other than the applicable auto switches listed in “How to Order”, the following auto switches can be mounted. For detailed specifications, refer to pages 1719 to 1827.

| Auto switch type | Model              | Electrical entry (Direction) | Features                                   |
|------------------|--------------------|------------------------------|--|
| Reed             | D-B53, C73, C76    | Grommet (In-line)            | —  |
|                  | D-C80              |                              | Without indicator light                    |
| Solid state      | D-H7A1, H7A2, H7B  |                              | —  |
|                  | D-H7NW, H7PW, H7BW |                              | Diagnostic indication (2-color indication) |
|                  | D-G5NTL            | With timer                   |  |

- \* With pre-wired connector is available for solid state auto switches. For details, refer to pages 1784 to 1785.
- \* Normally closed (NC = b contact), solid state auto switches (D-F9G, F9H type) are also available. For details, refer to page 1746.
- \* Wide range detection type, solid state auto switches (D-G5NBL type) are also available. Refer to page 1776 for details.

REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

D-□

-X□

Individual  
-X□

# Series 10-, 11-CQSX, CQ2X

## Clean Series Low Speed Cylinder Series 10-, 11-

The type which is applicable for using inside the clean room graded Class 100 by making an actuator's rod section a double seal construction and discharging by relief port directly to the outside of clean room. Since the external dimensions and applicable auto switches are the same as standard type, refer to the separate catalog of "Pneumatic Clean Series".

### Series 10-, 11-CQSX

#### How to Order

**Clean Series**

|    |             |
|----|-------------|
| 10 | Relief type |
| 11 | Vacuum type |

10 - C(D)QSX B 20 - 30 D - M9BW

With auto switch (Built-in magnet)

Low speed cylinder

Mounting style

|   |   |
|---|---|
| B | Through-hole/Both ends tapped common (Standard) |
|---|---|

Bore size

|    |       |
|----|-------|
| 12 | 12 mm |
| 16 | 16 mm |
| 20 | 20 mm |
| 25 | 25 mm |

Cylinder stroke (mm)

| Bore size (mm) | Standard stroke (mm)  |
|----------------|-----------------------|
| 12, 16         | 5, 10, 15, 20, 25, 30 |
| 20             | 5, 10, 15, 20, 25,    |
| 25             | 30, 35, 40, 45, 50    |

Number of auto switches

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

Auto switch

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

\* For the applicable auto switch model, refer to page 1129.  
\* Auto switches are shipped together, (but not assembled).

Rod end thread

|     |                                  |
|-----|----------------------------------|
| Nil | Standard (Rod end female thread) |
| M   | Rod end male thread              |

Action

|   |               |
|---|---------------|
| D | Double acting |
|---|---------------|

Manufacturing of Intermediate stroke  
Intermediate strokes by the 1 mm interval are available by using spacers with standard stroke cylinders. The overall length of cylinder will be the same as the standard stroke with a longer one.  
Example) 3 mm width spacer is installed in the standard cylinder 10-CQSXB25-50D to make 10-CQSXB25-47D.

#### Specifications

| Bore size (mm)                | 10- (Relief type)   |          |           |            |
|-------------------------------|---|----------|-----------|------------|
|                               | 12  | 16       | 20        | 25         |
| Fluid                         | Air   |          |           |            |
| Proof pressure                | 1.5 MPa   |          |           |            |
| Maximum operating pressure    | 1.0 MPa   |          |           |            |
| Minimum operating pressure    | 0.04 MPa  |          | 0.035 MPa |            |
| Ambient and fluid temperature | Without auto switch: -10 to 70°C<br>With auto switch: -10 to 60°C |          |           |            |
| Piston speed                  | 1 to 200 mm/s   |          |           |            |
| Piston rod size               | ø6  | ø8       | ø10       | ø12        |
| Rod end thread                | Female thread<br>M3 x 0.5   | M4 x 0.7 | M5 x 0.8  | M6 x 1.0   |
|                               | Male thread<br>M5 x 0.8   | M6 x 1.0 | M8 x 1.25 | M10 x 1.25 |
| Stroke tolerance              | $^{+1.0}_0$ mm  |          |           |            |
| Port size                     | M5 x 0.8  |          |           |            |
| Vacuum port, Relief port      | M5 x 0.8  |          |           |            |

| Bore size (mm)                | 11- (Vacuum type)   |          |           |            |
|-------------------------------|---|----------|-----------|------------|
|                               | 12  | 16       | 20        | 25         |
| Fluid                         | Air   |          |           |            |
| Proof pressure                | 1.5 MPa   |          |           |            |
| Maximum operating pressure    | 1.0 MPa   |          |           |            |
| Minimum operating pressure    | 0.03 MPa  |          | 0.025 MPa |            |
| Ambient and fluid temperature | Without auto switch: -10 to 70°C<br>With auto switch: -10 to 60°C |          |           |            |
| Piston speed                  | 1 to 200 mm/s   |          |           |            |
| Piston rod size               | ø6  | ø8       | ø10       | ø12        |
| Rod end thread                | Female thread<br>M3 x 0.5   | M4 x 0.7 | M5 x 0.8  | M6 x 1.0   |
|                               | Male thread<br>M5 x 0.8   | M6 x 1.0 | M8 x 1.25 | M10 x 1.25 |
| Stroke tolerance              | $^{+1.0}_0$ mm  |          |           |            |
| Port size                     | M5 x 0.8  |          |           |            |
| Vacuum port, Relief port      | M5 x 0.8  |          |           |            |

### Series 10-, 11-CQ2X

#### How to Order

**Clean Series**

|    |             |
|----|-------------|
| 10 | Relief type |
| 11 | Vacuum type |

10 - C(D)Q2XB 40 - 30 D - J79W

With auto switch (Built-in magnet)

Low speed cylinder

Bore size

|    |       |
|----|-------|
| 32 | 32 mm |
| 40 | 40 mm |
| 50 | 50 mm |
| 63 | 63 mm |

Number of auto switches

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

Port thread type

|     |     |             |
|-----|-----|-------------|
| Nil | Rc  | ø32 to ø100 |
| TN  | NPT |             |
| TF  | G   |             |

\* Without auto switch, ø32, 5 strokes:  
M thread

Cylinder stroke (mm)

| Bore size (mm) | Standard stroke (mm)                           |
|----------------|--|
| 32, 40         | 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100 |
| 50, 63         | 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100    |

Action

|   |               |
|---|---------------|
| D | Double acting |
|---|---------------|

Auto switch

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

\* For the applicable auto switch model, refer to page 1136.  
\* Auto switches are shipped together, (but not assembled).

Rod end thread

|     |                                  |
|-----|----------------------------------|
| Nil | Standard (Rod end female thread) |
| M   | Rod end male thread              |

Manufacturing of Intermediate stroke  
Intermediate strokes by the 1 mm interval are available by using spacers with standard stroke cylinders. But, as for ø40 with damper, please consult SMC separately.  
Example) 18 mm width spacer is installed in the standard cylinder 10-CQ2XB40-75D to make 10-CQ2XB40-57D.

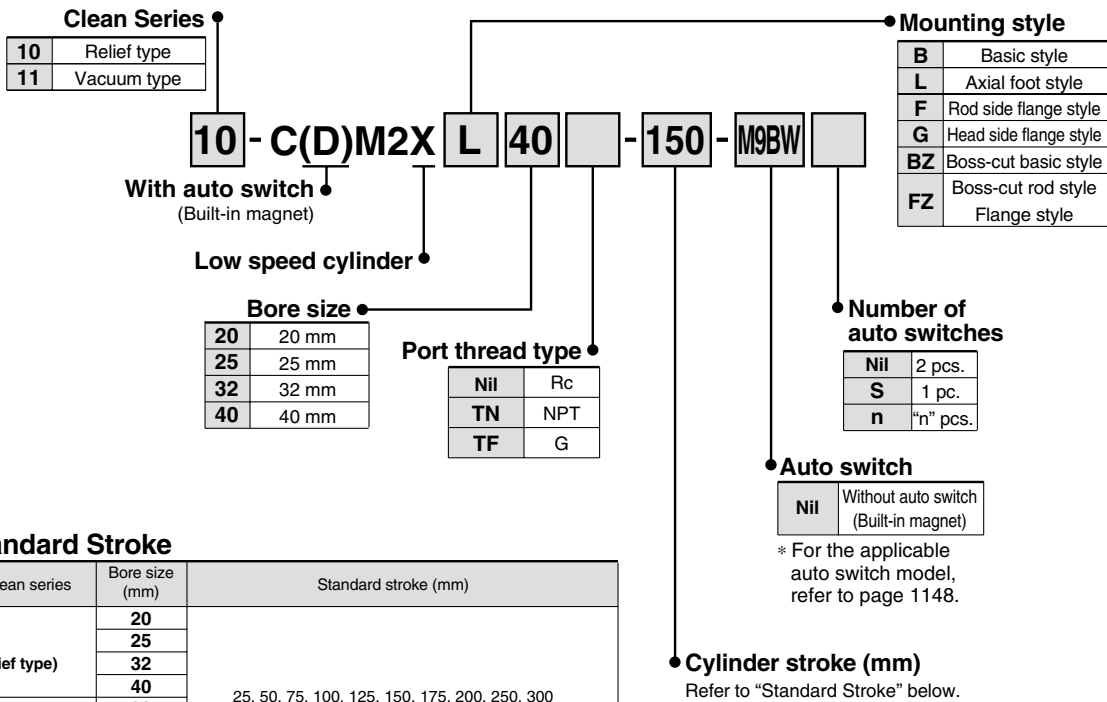
#### Specifications

| Bore size (mm)                | 10- (Relief type)   |          |           |    | 11- (Vacuum type)                |          |           |    |
|-------------------------------|---|----------|-----------|----|----------------------------------|----------|-----------|----|
|                               | 32  | 40       | 50        | 63 | 32                               | 40       | 50        | 63 |
| Fluid                         | Air   |          |           |    |                                  |          |           |    |
| Proof pressure                | 1.5 MPa   |          |           |    |                                  |          |           |    |
| Maximum operating pressure    | 1.0 MPa   |          |           |    |                                  |          |           |    |
| Minimum operating pressure    | 0.035 MPa   | 0.03 MPa | 0.025 MPa |    | 0.025 MPa                        | 0.02 MPa |           |    |
| Ambient and fluid temperature | Without auto switch: -10 to 70°C<br>With auto switch: -10 to 60°C |          |           |    |                                  |          |           |    |
| Piston speed                  | 1 to 200 mm/s   |          |           |    | 0.5 to 200 mm/s                  |          |           |    |
| Piston rod size               | ø16   |          | ø20       |    | ø16                              |          | ø20       |    |
| Rod end thread                | Female thread<br>M8 x 1.25  |          | M10 x 1.5 |    | M8 x 1.25                        |          | M10 x 1.5 |    |
|                               | Male thread<br>M14 x 1.5  |          | M18 x 1.5 |    | M14 x 1.5                        |          | M18 x 1.5 |    |
| Stroke tolerance              | $^{+1.0}_0$ mm  |          |           |    |                                  |          |           |    |
| Port size                     | M5 x 0.8, 1/8 <sup>Note 1)</sup>                                  |          | 1/4       |    | M5 x 0.8, 1/8 <sup>Note 1)</sup> |          | 1/4       |    |
| Vacuum port, Relief port      | M5 x 0.8  |          |           |    |                                  |          |           |    |

Note 1) Only 5 stroke comes with M5 x 0.8 in the case of no auto switch on ø32.

**10-, 11- CM2X Series**

**How to Order**



**Standard Stroke**

| Clean series      | Bore size (mm) | Standard stroke (mm)                          |
|-------------------|----------------|---|
| 10- (Relief type) | 20             | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300 |
|                   | 25             |   |
|                   | 32             |   |
|                   | 40             |   |
| 11- (Vacuum type) | 20             |   |
|                   | 25             |   |
|                   | 32             |   |
|                   | 40             |   |

\* Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

**Specifications**

| Bore size (mm)                | 10- (Relief type)   |            |           |           | 11- (Vacuum type) |           |     |     |
|-------------------------------|---|------------|-----------|-----------|-------------------|-----------|-----|-----|
|                               | 20  | 25         | 32        | 40        | 20                | 25        | 32  | 40  |
| Fluid                         | Air   |            |           |           |                   |           |     |     |
| Proof pressure                | 1.5 MPa   |            |           |           |                   |           |     |     |
| Maximum operating pressure    | 1.0 MPa   |            |           |           |                   |           |     |     |
| Minimum operating pressure    | 0.035 MPa   |            |           |           | 0.025 MPa         |           |     |     |
| Ambient and fluid temperature | Without auto switch: -10 to 70°C<br>With auto switch: -10 to 60°C |            |           |           |                   |           |     |     |
| Cushion                       | Rubber bumper   |            |           |           |                   |           |     |     |
| Piston speed                  | 1 to 200 mm/s   |            |           |           | 0.5 to 200 mm/s   |           |     |     |
| Piston rod size               | ø8  | ø10        | ø12       | ø14       | ø8                | ø10       | ø12 | ø14 |
| Rod end thread                | M8 x 1.25   | M10 x 1.25 | M14 x 1.5 | M8 x 1.25 | M10 x 1.25        | M14 x 1.5 |     |     |
| Stroke tolerance              | <sup>+1.4</sup> mm  |            |           |           |                   |           |     |     |
| Port size                     | 1/8   |            |           | 1/4       | 1/8               |           |     | 1/4 |
| Vacuum port, Relief port      | M5 x 0.8  |            |           |           |                   |           |     |     |

**⚠ Precautions**

Be sure to read before handling.  
Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.  
Refer to the Clean Series catalog separately for the precautions in clean environments.

**Operating Precautions**

**⚠ Warning**

- Do not rotate the cover.
  - When installing a cylinder or screwing a pipe fitting into the port, the coupling portion of the cover could break if the cover rotated.

**⚠ Caution**

- Be careful of the snap ring to pop out.
  - When replacing the rod seal, take care that the snap ring does not spring out while you are removing it.

**Maintenance**

**⚠ Caution**

- Grease pack
  - When maintenance requires only grease, use the following part number to order.  
Grease pack part no.: GR-X-005 (5 g)

- REA
- REB
- REC
- C□Y
- C□X
- MQ
- RHC
- RZQ

- D-□
- X□
- Individual -X□

# Related Products: Made to Order Specifications: -XB13: Low Speed Cylinder 5 to 50 mm/s (CY1/CY3: 7 to 50 mm/s)



|                           |                               |
|---------------------------|-------------------------------|
| <b>Low Speed Cylinder</b> | <b>Symbol</b><br><b>-XB13</b> |
|---------------------------|-------------------------------|

|            |                    |                      |                                     |                      |        |
|------------|--------------------|----------------------|-------------------------------------|----------------------|--------|
| <b>CG1</b> | Standard model no. | — XB13               | <b>CY1</b>                          | Standard model no.   | — XB13 |
| <b>MB</b>  | Standard model no. | — XB13               | <b>CY3</b>                          | Standard model no.   | — XB13 |
|            |                    | Low speed cylinder ● | <b>MGP<sup>M</sup><sub>L</sub></b>  | Standard model no.   | — XB13 |
|            |                    |                      | <b>MGGM</b>                         | Standard model no.   | — XB13 |
|            |                    |                      | <b>MGCM</b>                         | Standard model no.   | — XB13 |
|            |                    |                      | <b>CX2</b>                          | Standard model no.   | — XB13 |
|            |                    |                      | <b>CXW<sup>M</sup><sub>L</sub></b>  | Standard model no.   | — XB13 |
|            |                    |                      | <b>CXS<sup>M</sup><sub>L</sub></b>  | Standard model no.   | — XB13 |
|            |                    |                      | <b>MXH</b>                          | Standard model no.   | — XB13 |
|            |                    |                      | <b>MXU</b>                          | Standard model no.   | — XB13 |
|            |                    |                      | <b>CXT<sup>M</sup><sub>L</sub></b>  | Standard model no.   | — XB13 |
|            |                    |                      | <b>CXSJ<sup>M</sup><sub>L</sub></b> | Standard model no.   | — XB13 |
|            |                    |                      |                                     | Low speed cylinder ● |        |

Note) Operate without lubrication from a pneumatic system lubricator.

## Specifications

| Applicable cylinder       | Air cylinder Standard   |                                   | Magnetically coupled rodless cylinder                                  | Compact guide cylinder                        | Guide cylinder                      |                              | Slide unit    | Dual rod cylinder             |                           | Compact slide             |                 | Platform cylinder |                               |
|---------------------------|---|-----------------------------------|--|---|-------------------------------------|------------------------------|---------------|-------------------------------|---------------------------|---------------------------|-----------------|-------------------|-------------------------------|
|                           | Series  | CG1                               |  |   | MB                                  | CY <sup>1</sup> <sub>3</sub> |               | MGP <sup>M</sup> <sub>L</sub> | MGGM                      | MGCM                      | CX2             |                   | CXW <sup>M</sup> <sub>L</sub> |
| Action                    | Double acting, Single rod   |                                   | Double acting  |   |                                     |                              |               |                               |                           |                           |                 |                   |                               |
| Bore size (mm)            | 20, 25, 32<br>40, 50, 63<br>80, 100   | 32, 40<br>50, 63<br>80, 100       | CY3B: 6, 10,<br>15, 20, 25, 32<br>40, 50, 63<br>CY1S,<br>CY1L: 6 to 40 | 12, 16, 20<br>25, 32, 40<br>50, 63, 80<br>100 | 20, 25, 32<br>40, 50, 63<br>80, 100 | 20, 25<br>32, 40<br>50       | 10, 15<br>25  | 10, 16<br>20, 25<br>32        | 6, 10<br>15, 20<br>25, 32 | 6, 10<br>15, 20<br>25, 32 | 6, 10<br>16, 20 | 6, 10<br>16       | 12, 16<br>20, 25<br>32, 40    |
| Piston speed              | 5 to 50 mm/s  |                                   | 7 to 50 mm/s   | 5 to 50 mm/s                                  | 5 to 50 mm/s                        |                              |               |                               |                           |                           |                 |                   |                               |
| Cushion                   | Rubber bumper   | Air cushion on both ends          | Rubber bumper  | Rubber bumper (Basic cylinder)                | Shock absorber (CX2: Option)        |                              | Rubber bumper |                               |                           |                           |                 |                   |                               |
| Auto switch               | Mountable   |                                   |  |   |                                     |                              |               |                               |                           |                           |                 |                   |                               |
| Mounting                  | Basic Foot Flange Trunnion Clevis   | Basic Foot Flange Clevis Trunnion | Basic Slider   | Basic   | Basic Front mounting Flange         |                              | Basic         |                               |                           |                           |                 |                   |                               |
| Dimensions                | Dimensions and specifications are the same as standard products of double acting. |                                   |  |   |                                     |                              |               |                               |                           |                           |                 |                   |                               |
| Additional specifications |   |                                   |  |   |                                     |                              |               |                               |                           |                           |                 |                   |                               |

\* No shock absorber is available for the Series MGGM.

# Related Products: Speed Controller for Low Speed Operation

The effective area of controlled flow is approximately 1/10 of the standard type.  
These controllers are suitable for controlling the speed of microspeed cylinders.  
The dual type speed controller is especially suitable for cylinders with a small bore size.

## Elbow/Universal Type



### Air Flow/Effective Area

| Model           |                                   | AS12□1FM-M5<br>AS13□1FM-M5     | AS22□1FM-□01<br>AS23□1FM-□01 | AS22□1FM-□02<br>AS23□1FM-□02 |     |                                      |     |
|-----------------|-----------------------------------|--------------------------------|------------------------------|------------------------------|-----|--------------------------------------|-----|
| Tubing O.D.     | Metric size                       | ø3.2, ø4, ø6                   | ø3.2, ø4                     | ø6, ø8                       |     | ø8, ø10                              |     |
|                 | Inch size                         | ø1/8", ø5/32", ø3/16"<br>ø1/4" | ø1/8", ø5/32"                | ø3/16", ø1/4"<br>ø5/16"      |     | ø5/32" ø3/16" ø1/4", ø5/16"<br>ø3/8" |     |
| Controlled flow | Air flow (l/min (ANR))            | 7                              | 12                           |                              | 38  |                                      |     |
|                 | Effective area (mm <sup>2</sup> ) | 0.1                            | 0.2                          |                              | 0.6 |                                      |     |
| Free flow       | Flow rate (l/min (ANR))           | 100                            | 180                          | 230                          | 260 | 390                                  | 460 |
|                 | Effective area (mm <sup>2</sup> ) | 1.5                            | 2.7                          | 3.5                          | 4   | 6                                    | 7   |

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

## In-line Type



### Air Flow/Effective Area

| Model           |                                   | AS1001FM                       | AS2001FM |               | AS2051FM |               |
|-----------------|-----------------------------------|--------------------------------|----------|---------------|----------|---------------|
| Tubing O.D.     | Metric size                       | ø3.2, ø4, ø6                   | ø4       | ø6            | ø6       | ø8            |
|                 | Inch size                         | ø1/8", ø5/32", ø3/16"<br>ø1/4" | ø5/32"   | ø3/16", ø1/4" | ø3/16"   | ø1/4", ø5/16" |
| Controlled flow | Air flow (l/min (ANR))            | 7                              | 12       |               | 38       |               |
|                 | Effective area (mm <sup>2</sup> ) | 0.1                            | 0.2      |               | 0.6      |               |
| Free flow       | Flow rate (l/min (ANR))           | 100                            | 130      | 230           | 290      | 460           |
|                 | Effective area (mm <sup>2</sup> ) | 1.5                            | 2        | 3.5           | 4.5      | 7             |

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

## Elbow Type (Metal body)



### Air Flow/Effective Area

| Model           |                                   | AS12□0M  |           | AS22□0M-□01 |         | AS22□0M-□02 |         |
|-----------------|-----------------------------------|----------|-----------|-------------|---------|-------------|---------|
| Port size       | Cylinder side                     | M5 x 0.8 | 10-32 UNF | R 1/8       | NPT 1/8 | R 1/4       | NPT 1/4 |
|                 | Tube side                         |          |           | Rc 1/8      |         | Rc 1/4      |         |
| Controlled flow | Air flow (l/min (ANR))            | 7        |           | 12          |         | 38          |         |
|                 | Effective area (mm <sup>2</sup> ) | 0.1      |           | 0.2         |         | 0.6         |         |
| Free flow       | Flow rate (l/min (ANR))           | 105      |           | 280         |         | 420         |         |
|                 | Effective area (mm <sup>2</sup> ) | 1.6      |           | 4.3         |         | 6.5         |         |

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

## Dual Type



### Air Flow/Effective Area

| Model                          |                                   | ASD230FM-M5                    | ASD330FM-□01  | ASD430FM-□02 |                        |
|--------------------------------|-----------------------------------|--------------------------------|---------------|--------------|------------------------|
| Tubing O.D.                    | Metric size                       | ø4, ø6                         | ø6, ø8        | ø6           | ø8, ø10                |
|                                | Inch size                         | ø1/8", ø5/32"<br>ø3/16", ø1/4" | ø3/16", ø1/4" | —            | ø1/4", ø5/16"<br>ø3/8" |
| Controlled flow<br>(Free flow) | Air flow (l/min (ANR))            | 7                              | 12            | 38           |                        |
|                                | Effective area (mm <sup>2</sup> ) | 0.1                            | 0.2           | 0.6          |                        |

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

D-□

-X□

Individual  
-X□



# Low Speed Cylinder Specific Product Precautions

Be sure to read before handling.

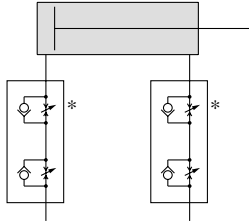
Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

## Recommended Pneumatic Circuit

### Warning

#### Horizontal Operation

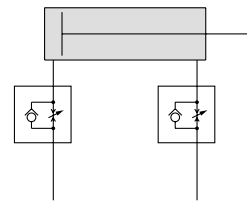
I



#### 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.

II

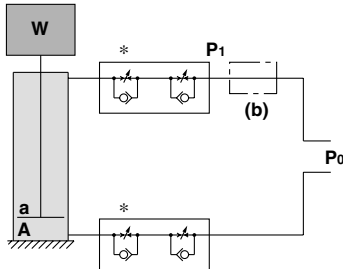


#### Meter-in speed controller

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

#### Vertical Operation

I



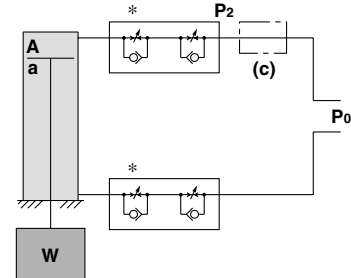
- (1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.\*
- (2) Depending on the size of the load, installing a regulator with check valve at position (b) can deduce lurching during descent and operation delay during ascent.

As a guide,

$$\text{when } W + P_0a > P_0A,$$

$$\text{adjust } P_1 \text{ to make } W + P_1a = P_0A.$$

II



- (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,

$$\text{adjust } P_2 \text{ to make } W + P_2A = P_0a.$$

W: Load (N) P<sub>0</sub>: Operating pressure (MPa) P<sub>1</sub>, P<sub>2</sub>: Reduced pressure (MPa) a: Rod side piston area (mm<sup>2</sup>) A: Head side piston area (mm<sup>2</sup>)

### Warning

Since C□J2X, C□UX10 are subject to internal leakage due to their construction, the speed may not be fully controlled with the meter-out controller (\*) during low speed operation.

#### Selection

#### Pneumatic Circuit

### Caution

- 1. Operate within the standard strokes.**  
Operating with the stroke exceeding the standard stroke may cause malfunction.
- 2. Provide a construction that does not apply a lateral load to the cylinder.**  
Applying a lateral load to the cylinder may cause malfunction.
- 3. Do not use the product at a high frequency.**  
Use it at 30 cpm or less as a guideline.
- 4. Do not wipe out the grease in the sliding part of the air cylinder.**  
Doing so forcefully may cause malfunction.

### Caution

- 1. The piping length between the speed controller and the cylinder port must be kept as short as possible.**  
If the speed controller and the cylinder port are far apart, speed adjustment may be unstable.
- 2. Use a low speed controller to easily adjust for low speed operation or a dual speed controller (Series ASD) to prevent cylinders from popping out.**  
(When the low speed controller is used, the maximum speed may be limited.)



# Smooth Cylinder

# Series CM2Y

ø20, ø25, ø32, ø40

## How to Order

**CM2Y L 40 [ ] - 150 - [ ]**

**With auto switch CDM2Y L 40 [ ] - 150 - M9BW [ ] [ ]**

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

**Mounting style**

|    |                                  |
|----|----------------------------------|
| B  | Basic style                      |
| L  | Axial foot style                 |
| F  | Rod side flange style            |
| G  | Head side flange style           |
| C  | Single clevis style              |
| D  | Double clevis style              |
| U  | Rod side trunnion style          |
| T  | Head side trunnion style         |
| E  | Integral clevis style            |
| BZ | Boss-cut basic style             |
| FZ | Boss-cut rod side flange style   |
| UZ | Boss-cut rod side trunnion style |

**Bore size**

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

**Thread type**

|     |     |
|-----|-----|
| Nil | Rc  |
| TN  | NPT |
| TF  | G   |

**Cylinder stroke (mm)**  
Refer to "Standard Stroke" on page 1070.

**Number of auto switches**

|     |        |
|-----|--------|
| Nil | 2 pcs. |
| S   | 1 pc.  |
| n   | n pcs. |

**Auto switch**

|     |                     |
|-----|---------------------|
| Nil | Without auto switch |
|-----|---------------------|

**Made to Order**  
For details, refer to page 1070.

**Built-in Magnet Cylinder Model**  
If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch. (Example) CDM2YB20-100

### Applicable Auto Switch/Refer to pages 1719 to 1827 for further information on auto switches.

| Type                            | Special function                | Electrical entry                 | Indicator/light | Wiring (Output)     | Load voltage |           | Auto switch model | Lead wire (m) |               |       |       |          | Pre-wired connector | Applicable load |     |   |            |   |   |
|---------------------------------|---------------------------------|----------------------------------|-----------------|---------------------|--------------|-----------|-------------------|---------------|---------------|-------|-------|----------|---------------------|-----------------|-----|---|------------|---|---|
|                                 |                                 |                                  |                 |                     | DC           | AC        |                   | 0.5 (Nil)     | 1 (M)         | 3 (L) | 5 (Z) | None (N) |                     | Relay, PLC      | PLC |   |            |   |   |
| Solid state switch              | —                               | Grommet                          | No              | 3-wire (NPN)        | 24 V         | 5 V, 12 V | —                 | M9N           | ●             | ●     | ●     | ○        | —                   |                 |     | ○ | IC circuit | — |   |
|                                 |                                 |                                  |                 | 3-wire (PNP)        |              |           |                   | M9P           | ●             | ●     | ●     | ○        | —                   | ○               |     |   |            |   |   |
|                                 |                                 | Connector                        | Yes             | 2-wire              | 12 V         | —         | M9B               | ●             | ●             | ●     | ○     | —        | ○                   | —               |     |   |            |   |   |
|                                 |                                 | Terminal conduit                 |                 | 3-wire (NPN)        | 5 V, 12 V    | —         | H7C               | ●             | —             | ●     | ●     | ●        | —                   | —               |     |   |            |   |   |
|                                 | Diagnostic indication (2-color) | Grommet                          | No              | 2-wire              | 24 V         | 12 V      | —                 | G39A          | —             | —     | —     | —        | ●                   | —               | —   | — |            |   |   |
|                                 |                                 |                                  |                 | 3-wire (NPN)        |              |           |                   | 5 V, 12 V     | —             | K39A  | —     | —        | —                   | —               | ●   | — | —          | — |   |
|                                 |                                 | With diagnostic output (2-color) | Grommet         | Yes                 | 3-wire (PNP) | 24 V      | 12 V              | —             | M9NW          | ●     | ●     | ●        | ○                   | —               | ○   | — | —          |   |   |
|                                 |                                 |                                  |                 |                     | 3-wire (NPN) |           |                   |               | 5 V, 12 V     | —     | M9PW  | ●        | ●                   | ●               | ○   | — | ○          | — | — |
|                                 |                                 |                                  |                 |                     | 2-wire       |           |                   |               | 12 V          | —     | M9BW  | ●        | ●                   | ●               | ○   | — | ○          | — | — |
|                                 |                                 |                                  |                 |                     | 4-wire (NPN) |           |                   |               | 5 V, 12 V     | —     | H7NF  | ●        | —                   | ●               | ○   | — | ○          | — | — |
| Reed switch                     | —                               | Grommet                          | Yes             | 3-wire (Equiv. NPN) | 24 V         | 12 V      | —                 | A96           | ●             | —     | ●     | —        | —                   | —               | —   | — |            |   |   |
|                                 |                                 |                                  |                 | No                  |              |           |                   | 2-wire        | 100 V         | A93   | ●     | —        | ●                   | —               | —   | — | —          | — |   |
|                                 |                                 |                                  |                 |                     |              |           |                   |               | 100 V or less | A90   | ●     | —        | ●                   | —               | —   | — | —          | — |   |
|                                 |                                 |                                  |                 |                     |              |           |                   |               | 100 V, 200 V  | B54   | ●     | —        | ●                   | ●               | —   | — | —          | — |   |
|                                 |                                 |                                  |                 |                     |              |           |                   |               | 200 V or less | B64   | ●     | —        | ●                   | —               | —   | — | —          | — |   |
|                                 |                                 | Connector                        | No              | 2-wire              | 24 V         | 12 V      | —                 | —             | C73C          | ●     | —     | ●        | ●                   | ●               | —   | — | —          |   |   |
|                                 |                                 |                                  |                 |                     |              |           |                   |               | 24 V or less  | C80C  | ●     | —        | ●                   | ●               | ●   | — | —          | — |   |
|                                 |                                 |                                  |                 |                     |              |           |                   |               | —             | A33A  | —     | —        | —                   | —               | ●   | — | —          | — |   |
|                                 |                                 |                                  |                 |                     |              |           |                   |               | 100 V, 200 V  | A34A  | —     | —        | —                   | —               | ●   | — | —          | — |   |
|                                 |                                 |                                  |                 |                     |              |           |                   |               | —             | A44A  | —     | —        | —                   | —               | ●   | — | —          | — |   |
| Diagnostic indication (2-color) | Grommet                         | Yes                              | —               | —                   | —            | —         | B59W              | ●             | —             | ●     | —     | —        | —                   | —               |     |   |            |   |   |

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW \* O: Manufactured upon receipt of order.  
 1 m ..... M (Example) M9NWM \* D-A9□V□/M9□V□/M9□WV□/M9□A(V)L types cannot be mounted.  
 3 m ..... L (Example) M9NWL \* Do not add the suffix (N) indicating "no lead wire" to the part numbers of models D-A3□A,  
 5 m ..... Z (Example) M9NWZ A44A, G39A and K39A.  
 None ..... N (Example) H7CN

\* In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 1082.  
 \* Refer to pages 1784 and 1785 for details of auto switches with a pre-wired connector.  
 \* D-A9□/M9□/□M9□W auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)  
 \* D-C7□□/C80□/H7□□ auto switches are assembled at the time of shipment.

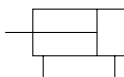
- REA
- REB
- REC
- C□Y
- C□X
- MQ
- RHC
- RZQ
- D-□
- X□
- Individual -X□

# Series CM2Y



## JIS Symbol

Double acting: Single rod



## Integral clevis



## Made to Order

(For details, refer to pages 1836, 1851 to 1954.)

| Symbol | Specifications  |
|--------|---|
| —XA□   | Change of rod end shape                               |
| —XC3   | Special port location                                 |
| —XC6   | Made of stainless steel                               |
| —XC9   | Adjustable stroke cylinder/adjustable retraction type |
| —XC13  | Auto switch rail mounting style                       |
| —XC20  | Head cover axial port                                 |

## ⚠ Precautions

**Be sure to read before handling.**  
**Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.**

### Handling Precautions

## ⚠ Warning

### 1. Do not rotate the cover

- When installing a cylinder or screwing a fitting into the port, the coupling portion of the cover may be damaged if the cover rotates.

## ⚠ Caution

### 1. Be careful of the retaining ring to pop out.

- When replacing the rod seal, be careful of the retaining ring not to pop out while removing it.

## Replacement Part: Rod Seal

| Bore size (mm) | Part no. |
|----------------|----------|
| 20             | PDU-8Z   |
| 25             | PDU-10Z  |
| 32             | PDU-12LZ |
| 40             | PDU-14LZ |

## Grease Pack for Maintenance

When only grease for maintenance is necessary, please order by the following part numbers.

**Grease pack part no.:** GR-L-005 (5 g)  
 GR-L-010 (10 g)  
 GR-L-150 (150 g)

1070

## Specifications

| Bore size (mm)                | 20  | 25 | 32 | 40 |
|-------------------------------|---|----|----|----|
| Action                        | Double acting, Single rod   |    |    |    |
| Piston speed                  | 5 to 500 mm/s   |    |    |    |
| Fluid                         | Air   |    |    |    |
| Proof pressure                | 1.05 MPa  |    |    |    |
| Maximum operating pressure    | 0.7 MPa   |    |    |    |
| Ambient and fluid temperature | Without auto switch -10 to 70°C (with no freezing)<br>With auto switch -10 to 60°C (with no freezing) |    |    |    |
| Lubrication                   | Non-lube  |    |    |    |
| Stroke length tolerance       | $^{+1.4}_0$ mm  |    |    |    |
| Cushion                       | Rubber bumper   |    |    |    |
| Allowable leakage rate        | 0.5 ℓ/min (ANR) or less   |    |    |    |

## Minimum Operating Pressure

| Bore size (mm)             | 20   | 25 | 32 | 40 |
|----------------------------|------|----|----|----|
| Minimum operating pressure | 0.02 |    |    |    |

Unit: MPa

## Mounting Bracket Part No.

| Mounting bracket                 | Minimum order | Bore size (mm) |          |          |    | Description (when ordering a minimum number)                               |
|----------------------------------|---------------|----------------|----------|----------|----|--|
|                                  |               | 20             | 25       | 32       | 40 |  |
| Axial foot*                      | 2             | CM-L020B       | CM-L032B | CM-L040B |    | Foot 2 pcs., Mounting nut 1 pc.  |
| Flange                           | 1             | CM-F020B       | CM-F032B | CM-F040B |    | Flange 1 pc., Mounting nut 1 pc.   |
| Single clevis**                  | 1             | CM-C020B       | CM-C032B | CM-C040B |    | Single clevis 1 pc., Liner 3 pcs.  |
| Double clevis (with pin) **, *** | 1             | CM-D020B       | CM-D032B | CM-D040B |    | Double clevis 1 pc., Liner 3 pcs., Clevis pin 1 pc., Retaining ring 2 pcs. |
| Trunnion (with nut)              | 1             | CM-T020B       | CM-T032B | CM-T040B |    | Trunnion 1 pc., Trunnion nut 1 pc.   |

\* When ordering foot brackets, order 2 pieces per cylinder unit.

\*\* Three liners are included in the clevis bracket for adjusting an angle when mounting it.

\*\*\* Clevis pins and retaining rings (cotter pins for ø40) are included.

## Mounting Bracket and Accessory

| Accessory                   | Standard      |             |            | Option               |                              |                        |
|-----------------------------|---------------|-------------|------------|----------------------|------------------------------|------------------------|
|                             | Mounting nut  | Rod end nut | Clevis pin | Single knuckle joint | Note 3) Double knuckle joint | Note 4) Clevis bracket |
| Basic style                 | ● (1 pc.)     | ●           | —          | ●                    | ●                            | —                      |
| Axial foot style            | ● (2)         | ●           | —          | ●                    | ●                            | —                      |
| Rod side flange style       | ● (1)         | ●           | —          | ●                    | ●                            | —                      |
| Head side flange style      | ● (1)         | ●           | —          | ●                    | ●                            | —                      |
| Integral clevis style       | — Note 1)     | ●           | —          | ●                    | ●                            | ●                      |
| Single clevis style         | — Note 1)     | ●           | —          | ●                    | ●                            | —                      |
| Double clevis style Note 3) | — Note 1)     | ●           | ● Note 5)  | ●                    | ●                            | —                      |
| Rod side trunnion style     | ● (1) Note 2) | ●           | —          | ●                    | ●                            | —                      |
| Head side trunnion style    | ● (1) Note 2) | ●           | —          | ●                    | ●                            | —                      |
| Boss-cut basic style        | ● (1)         | ●           | —          | ●                    | ●                            | —                      |
| Boss-cut flange style       | ● (1)         | ●           | —          | ●                    | ●                            | —                      |
| Boss-cut trunnion style     | ● (1)         | ●           | —          | ●                    | ●                            | —                      |



Note 1) Mounting nuts are not attached to the integral clevis, single clevis and double clevis types.

Note 2) Trunnion nuts are mounted on the rod side trunnion style and head side trunnion style.

Note 3) Pins and retaining rings (cotter pins in case of ø40) are packed with the double clevis and double knuckle joint styles.

Note 4) Pins and retaining rings are packed with clevis brackets.

Note 5) Retaining rings (cotter pins for ø40) are included in clevis pins.

## Standard Stroke

| Bore size (mm) | Standard stroke (mm)                     |
|----------------|--|
| 20, 25, 32, 40 | 25, 50, 75, 100, 125, 150, 200, 250, 300 |



Note 1) Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Note 2) As the stroke increases, more sliding resistance may result due to the deflection of the piston rod and other factors. Take measures such as the installation of a guide.



## Mass

(kg)

| Bore size (mm)                           |                                 | 20   | 25   | 32   | 40   |
|--|---------------------------------|------|------|------|------|
| Basic mass                               | Basic style                     | 0.14 | 0.21 | 0.28 | 0.56 |
|  | Axial foot style                | 0.29 | 0.37 | 0.44 | 0.83 |
|  | Flange style                    | 0.20 | 0.30 | 0.37 | 0.68 |
|  | Clevis integrated style         | 0.12 | 0.19 | 0.27 | 0.52 |
|  | Single clevis style             | 0.18 | 0.25 | 0.32 | 0.65 |
|  | Double clevis style             | 0.19 | 0.27 | 0.33 | 0.69 |
|  | Trunnion style                  | 0.18 | 0.28 | 0.34 | 0.66 |
|  | Boss-cut basic style            | 0.13 | 0.19 | 0.26 | 0.53 |
|  | Boss-cut flange style           | 0.19 | 0.28 | 0.35 | 0.65 |
| Boss-cut trunnion style                  | 0.17                            | 0.26 | 0.32 | 0.63 |      |
| Additional mass per each 50 mm of stroke |                                 | 0.04 | 0.06 | 0.08 | 0.13 |
| Option bracket                           | Clevis bracket (With pin)       | 0.07 | 0.07 | 0.14 | 0.14 |
|  | Single knuckle joint            | 0.06 | 0.06 | 0.06 | 0.23 |
|  | Double knuckle joint (With pin) | 0.07 | 0.07 | 0.07 | 0.20 |

Calculation: (Example) **CM2YL32-100**

- Basic mass.....0.44 (Foot style, ø32)
- Additional mass.....0.08/50 stroke
- Cylinder stroke.....100 stroke  
0.44 + 0.08 x 100/50 = 0.60 kg

## Low Friction Cylinder Mounting

CM2Y   -  - X1854

Same mounting specification as CM2Q

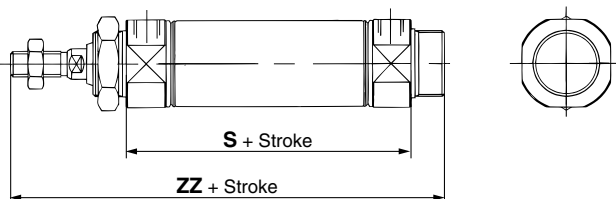
In order to adjust the mounting dimensions of the low friction cylinder (CM2Q), extend the longitudinal dimension (S, ZZ) by 3 mm.

## Specifications

| Cylinder bore size (mm)           | 20                        | 25 | 32 | 40 |
|-----------------------------------|---------------------------|----|----|----|
| <b>Action</b>                     | Double acting, Single rod |    |    |    |
| <b>Direction of low friction</b>  | Dual directions           |    |    |    |
| <b>Fluid</b>                      | Air                       |    |    |    |
| <b>Proof pressure</b>             | 1.05 MPa                  |    |    |    |
| <b>Maximum operating pressure</b> | 0.7 MPa                   |    |    |    |

\* Low friction operates in dual directions.

## Dimensions



| Bore size (mm) | S  | ZZ  |
|----------------|----|-----|
| 20             | 65 | 119 |
| 25             | 65 | 123 |
| 32             | 67 | 125 |
| 40             | 91 | 157 |

\* Add 3 mm to S and ZZ dimensions of the double acting, single rod type on pages 1072 to 1076 for the dimensions for each mounting bracket other than the basic style.

REA

REB

REC

Y

X

MQ

RHC

RZQ

D-

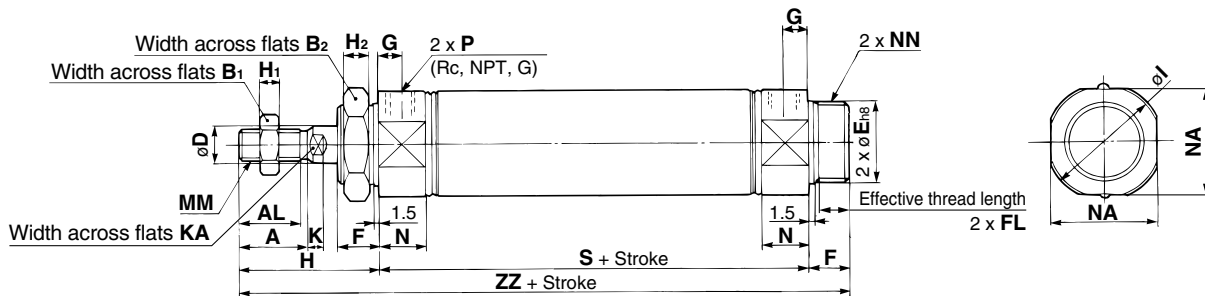
-X

Individual  
-X

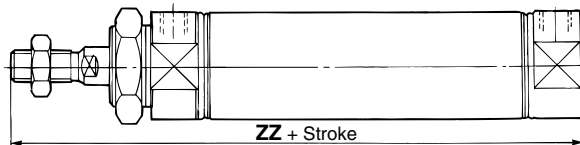
# Series CM2Y

## Basic Style (B)

CM2YB  —



## Boss-cut



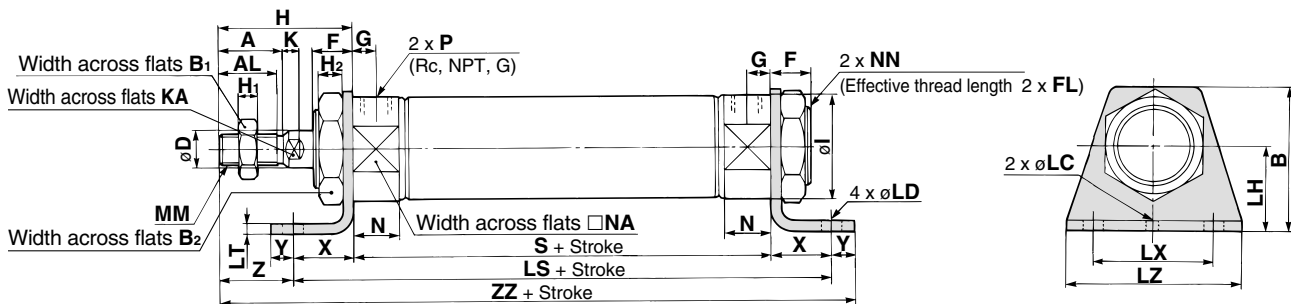
| Bore size (mm) | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   | S  | ZZ  |
|----------------|----|------|----------------|----------------|----|-----------------------------------|----|------|----|----|----------------|----------------|------|-----|----|------------|------|------|-----------|-----|----|-----|
| 20             | 18 | 15.5 | 13             | 26             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 116 |
| 25             | 22 | 19.5 | 17             | 32             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 120 |
| 32             | 22 | 19.5 | 17             | 32             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 122 |
| 40             | 24 | 21   | 22             | 41             | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 154 |

## Boss-cut (mm)

| Bore size (mm) | ZZ  |
|----------------|-----|
| 20             | 103 |
| 25             | 107 |
| 32             | 109 |
| 40             | 138 |

## Axial Foot Style (L)

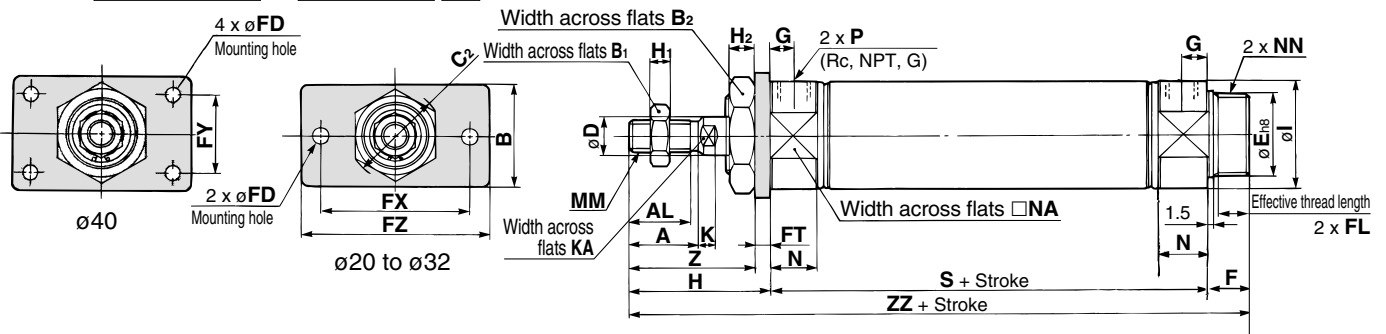
CM2YL  —



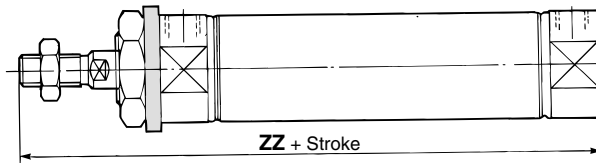
| Bore size (mm) | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | D  | F  | FL   | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | LC | LD  | LH | LS  | LT  | LX | LZ | MM         | N    | NA   | NN        | P   | S  | X  | Y  | Z  | ZZ  |
|----------------|----|------|----|----------------|----------------|----|----|------|----|----|----------------|----------------|------|-----|----|----|-----|----|-----|-----|----|----|------------|------|------|-----------|-----|----|----|----|----|-----|
| 20             | 18 | 15.5 | 40 | 13             | 26             | 8  | 13 | 10.5 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | 4  | 6.8 | 25 | 102 | 3.2 | 40 | 55 | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 20 | 8  | 21 | 131 |
| 25             | 22 | 19.5 | 47 | 17             | 32             | 10 | 13 | 10.5 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | 4  | 6.8 | 28 | 102 | 3.2 | 40 | 55 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 20 | 8  | 25 | 135 |
| 32             | 22 | 19.5 | 47 | 17             | 32             | 12 | 13 | 10.5 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | 4  | 6.8 | 28 | 104 | 3.2 | 40 | 55 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 20 | 8  | 25 | 137 |
| 40             | 24 | 21   | 54 | 22             | 41             | 14 | 16 | 13.5 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | 4  | 7   | 30 | 134 | 3.2 | 55 | 75 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 23 | 10 | 27 | 171 |

## Rod Side Flange Style (F)

CM2YF Bore size — Stroke



## Boss-cut style



| Bore size (mm) | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | C <sub>2</sub> | D  | E                                 | F  | FL   | FD | FT | FX | FY | FZ | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   | S  | Z  | ZZ  |
|----------------|----|------|----|----------------|----------------|----------------|----|-----------------------------------|----|------|----|----|----|----|----|----|----|----------------|----------------|------|-----|----|------------|------|------|-----------|-----|----|----|-----|
| 20             | 18 | 15.5 | 34 | 13             | 26             | 30             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 41 | 5              | 8              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 37 | 116 |
| 25             | 22 | 19.5 | 40 | 17             | 32             | 37             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 41 | 120 |
| 32             | 22 | 19.5 | 40 | 17             | 32             | 37             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 41 | 122 |
| 40             | 24 | 21   | 52 | 22             | 41             | 47.3           | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 7  | 5  | 66 | 36 | 82 | 11 | 50 | 8              | 10             | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 45 | 154 |

## Boss-cut Style (mm)

| Bore size (mm) | ZZ  |
|----------------|-----|
| 20             | 103 |
| 25             | 107 |
| 32             | 109 |
| 40             | 138 |

REA

REB

REC

Y

X

MQ

RHC

RZQ

D-

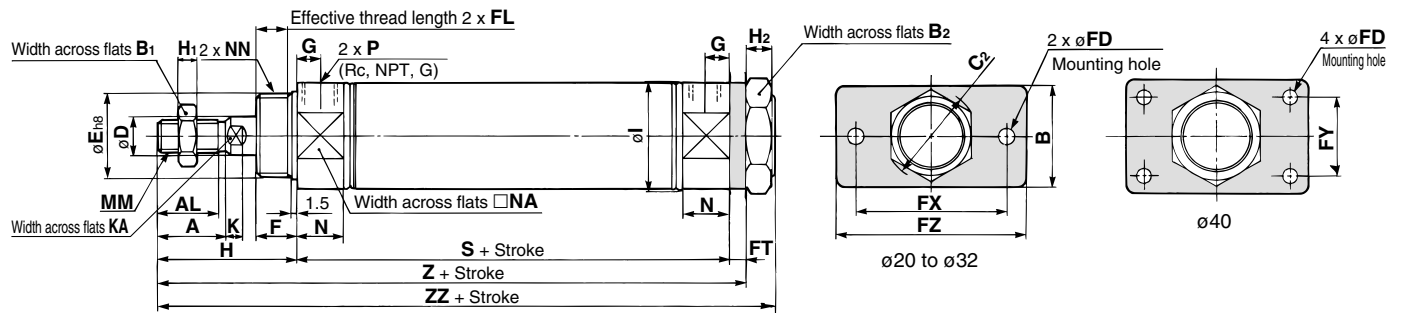
-X

Individual  
-X

# Series CM2Y

## Head Side Flange Style (G)

CM2YG Bore size — Stroke

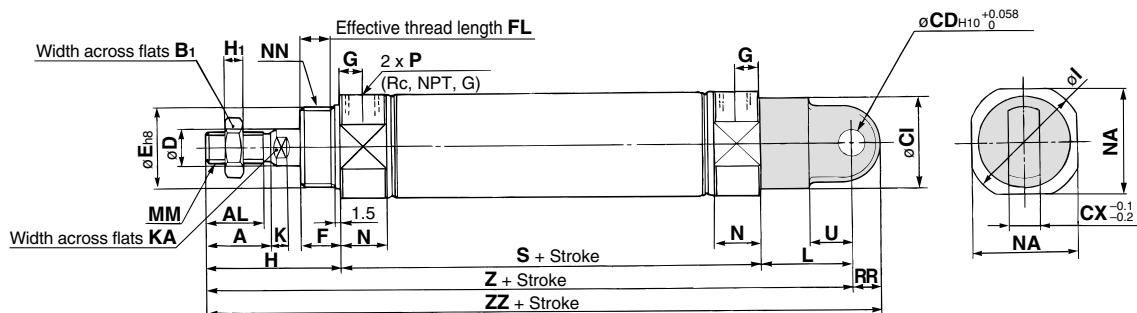


| Bore size (mm) | A  | AL   | B  | B <sub>1</sub> | B <sub>2</sub> | C <sub>2</sub> | D  | E                                 | F  | FL   | FD | FT | FX | FY | FZ | G  | H  | H <sub>1</sub> | H <sub>2</sub> | I    |
|----------------|----|------|----|----------------|----------------|----------------|----|-----------------------------------|----|------|----|----|----|----|----|----|----|----------------|----------------|------|
| 20             | 18 | 15.5 | 34 | 13             | 26             | 30             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 41 | 5              | 8              | 28   |
| 25             | 22 | 19.5 | 40 | 17             | 32             | 37             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 33.5 |
| 32             | 22 | 19.5 | 40 | 17             | 32             | 37             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 7  | 4  | 60 | —  | 75 | 8  | 45 | 6              | 8              | 37.5 |
| 40             | 24 | 21   | 52 | 22             | 41             | 47.3           | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 7  | 5  | 66 | 36 | 82 | 11 | 50 | 8              | 10             | 46.5 |

| Bore size (mm) | K   | KA | MM         | N    | NA   | NN        | P   | S  | Z   | ZZ  |
|----------------|-----|----|------------|------|------|-----------|-----|----|-----|-----|
| 20             | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 62 | 107 | 116 |
| 25             | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 62 | 111 | 120 |
| 32             | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 64 | 113 | 122 |
| 40             | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 88 | 143 | 154 |

## Single Clevis Style (C)

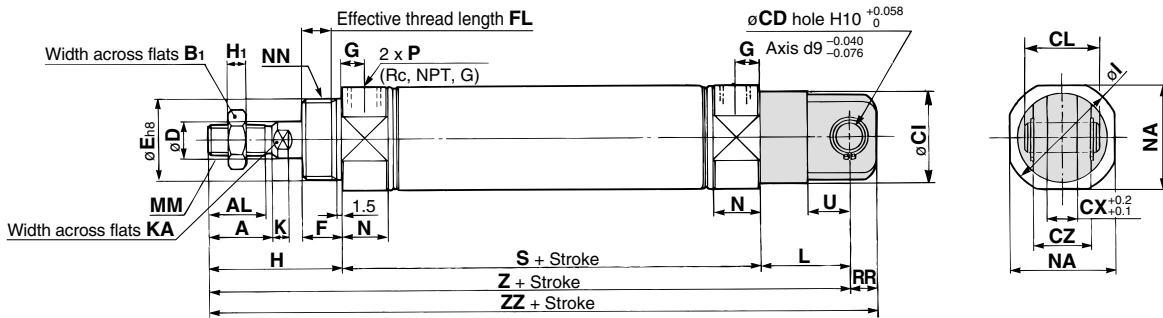
CM2YC Bore size — Stroke



| Bore size (mm) | A  | AL   | B <sub>1</sub> | CI | CD | CX | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | L  | MM         | N    | NA   | NN        | P   | RR | S  | U  | Z   | ZZ  |
|----------------|----|------|----------------|----|----|----|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|----|------------|------|------|-----------|-----|----|----|----|-----|-----|
| 20             | 18 | 15.5 | 13             | 24 | 9  | 10 | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | 30 | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 9  | 62 | 14 | 133 | 142 |
| 25             | 22 | 19.5 | 17             | 30 | 9  | 10 | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | 30 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 9  | 62 | 14 | 137 | 146 |
| 32             | 22 | 19.5 | 17             | 30 | 9  | 10 | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | 30 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 9  | 64 | 14 | 139 | 148 |
| 40             | 24 | 21   | 22             | 38 | 10 | 15 | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | 39 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 11 | 88 | 18 | 177 | 188 |

## Double Clevis Style (D)

CM2YD Bore size — Stroke

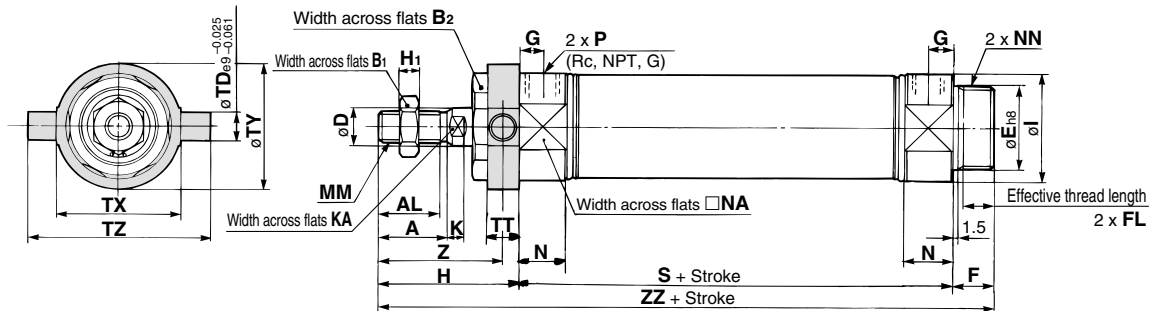


| Bore size (mm) | A  | AL   | B <sub>1</sub> | CD | CI | CL   | CX | CZ | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | L  | MM         | N    | NA   | NN        | P   | RR | S  | U  | Z   | ZZ  |
|----------------|----|------|----------------|----|----|------|----|----|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|----|------------|------|------|-----------|-----|----|----|----|-----|-----|
| 20             | 18 | 15.5 | 13             | 9  | 24 | 25   | 10 | 19 | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | 30 | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 | 9  | 62 | 14 | 133 | 142 |
| 25             | 22 | 19.5 | 17             | 9  | 30 | 25   | 10 | 19 | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | 30 | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 | 9  | 62 | 14 | 137 | 146 |
| 32             | 22 | 19.5 | 17             | 9  | 30 | 25   | 10 | 19 | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | 30 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 | 9  | 64 | 14 | 139 | 148 |
| 40             | 24 | 21   | 22             | 10 | 38 | 41.2 | 15 | 30 | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | 39 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 | 11 | 88 | 18 | 177 | 188 |

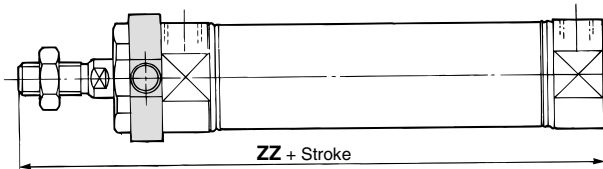
\* Clevis pin and snap ring (cotter pin for bore size ø40) are shipped together.

## Rod Side Trunnion Style (U)

CM2YU Bore size — Stroke



## Boss-cut style



| Bore size (mm) | A  | AL   | B <sub>1</sub> | B <sub>2</sub> | D  | E                                 | F  | FL   | G  | H  | H <sub>1</sub> | I    | K   | KA | MM         | N    | NA   | NN        | P   |
|----------------|----|------|----------------|----------------|----|-----------------------------------|----|------|----|----|----------------|------|-----|----|------------|------|------|-----------|-----|
| 20             | 18 | 15.5 | 13             | 26             | 8  | 20 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 41 | 5              | 28   | 5   | 6  | M8 x 1.25  | 15   | 24   | M20 x 1.5 | 1/8 |
| 25             | 22 | 19.5 | 17             | 32             | 10 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 33.5 | 5.5 | 8  | M10 x 1.25 | 15   | 30   | M26 x 1.5 | 1/8 |
| 32             | 22 | 19.5 | 17             | 32             | 12 | 26 <sup>0</sup> <sub>-0.033</sub> | 13 | 10.5 | 8  | 45 | 6              | 37.5 | 5.5 | 10 | M10 x 1.25 | 15   | 34.5 | M26 x 1.5 | 1/8 |
| 40             | 24 | 21   | 22             | 41             | 14 | 32 <sup>0</sup> <sub>-0.039</sub> | 16 | 13.5 | 11 | 50 | 8              | 46.5 | 7   | 12 | M14 x 1.5  | 21.5 | 42.5 | M32 x 2   | 1/4 |

| Bore size (mm) | S  | TD | TT | TX | TY | TZ | Z    | ZZ  |
|----------------|----|----|----|----|----|----|------|-----|
| 20             | 62 | 8  | 10 | 32 | 32 | 52 | 36   | 116 |
| 25             | 62 | 9  | 10 | 40 | 40 | 60 | 40   | 120 |
| 32             | 64 | 9  | 10 | 40 | 40 | 60 | 40   | 122 |
| 40             | 88 | 10 | 11 | 53 | 53 | 77 | 44.5 | 154 |

### Boss-cut Style (mm)

| Bore size (mm) | ZZ  |
|----------------|-----|
| 20             | 103 |
| 25             | 107 |
| 32             | 109 |
| 40             | 138 |

REA

REB

REC

Y

X

MQ

RHC

RZQ

D-

-X

Individual  
-X



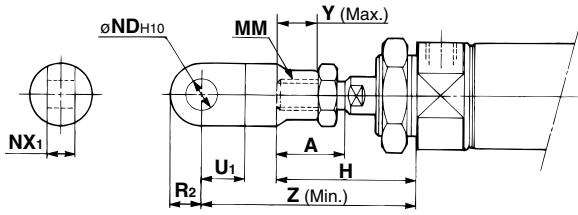


# Series CM2Y

# Accessory Bracket Dimensions

## Single Knuckle Joint

(mm)

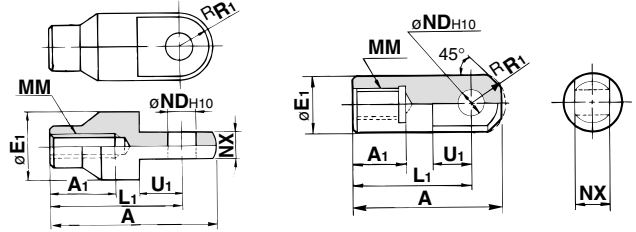


| Bore size | A  | H  | MM         | NDH10                               | NX1                                  | U1 | R2 | Y  | Z  |
|-----------|----|----|------------|-------------------------------------|--------------------------------------|----|----|----|----|
| 20        | 18 | 41 | M8 x 1.25  | 9 <sup>+0.058</sup> / <sub>0</sub>  | 9 <sup>-0.1</sup> / <sub>-0.2</sub>  | 14 | 10 | 11 | 66 |
| 25, 32    | 22 | 45 | M10 x 1.25 | 9 <sup>+0.058</sup> / <sub>0</sub>  | 9 <sup>-0.1</sup> / <sub>-0.2</sub>  | 14 | 10 | 14 | 69 |
| 40        | 24 | 50 | M14 x 1.5  | 12 <sup>+0.070</sup> / <sub>0</sub> | 16 <sup>-0.1</sup> / <sub>-0.3</sub> | 20 | 14 | 13 | 92 |

## Single Knuckle Joint

(mm)

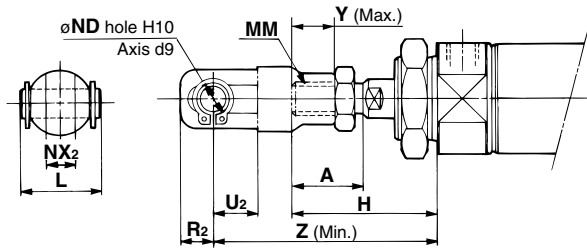
I-020B, 032B Material: Rolled steel I-040B Material: Free cutting sulfur steel



| Part no. | Applicable bore size (mm) | A  | A1 | E1 | L1 | MM         | NDH10                               | NX                                   | R1   | U1 |
|----------|---------------------------|----|----|----|----|------------|-------------------------------------|--------------------------------------|------|----|
| I-020B   | 20                        | 46 | 16 | 20 | 36 | M8 x 1.25  | 9 <sup>+0.058</sup> / <sub>0</sub>  | 9 <sup>-0.1</sup> / <sub>-0.2</sub>  | 10   | 14 |
| I-032B   | 25, 32                    | 48 | 18 | 20 | 38 | M10 x 1.25 | 9 <sup>+0.058</sup> / <sub>0</sub>  | 9 <sup>-0.1</sup> / <sub>-0.2</sub>  | 10   | 14 |
| I-040B   | 40                        | 69 | 22 | 24 | 55 | M14 x 1.5  | 12 <sup>+0.070</sup> / <sub>0</sub> | 16 <sup>-0.1</sup> / <sub>-0.3</sub> | 15.5 | 20 |

## Double Knuckle Joint

(mm)

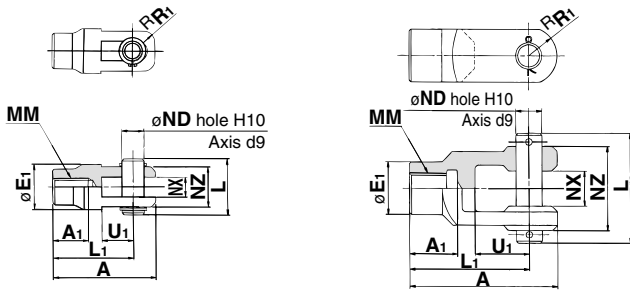


| Bore size | A  | H  | L    | MM         | ND | NX2                                  | R2 | U2 | Y  | Z  |
|-----------|----|----|------|------------|----|--------------------------------------|----|----|----|----|
| 20        | 18 | 41 | 25   | M8 x 1.25  | 9  | 9 <sup>+0.2</sup> / <sub>+0.1</sub>  | 10 | 14 | 11 | 66 |
| 25, 32    | 22 | 45 | 25   | M10 x 1.25 | 9  | 9 <sup>+0.2</sup> / <sub>+0.1</sub>  | 10 | 14 | 14 | 69 |
| 40        | 24 | 50 | 49.7 | M14 x 1.5  | 12 | 16 <sup>+0.3</sup> / <sub>+0.1</sub> | 13 | 25 | 13 | 92 |

## Double Knuckle Joint

(mm)

Y-020B, Y-032B Material: Rolled steel Y-040B Material: Cast iron



| Part no. | Applicable bore size | A  | A1 | E1 | L    | L1 | MM         | ND | NX                                   | NZ | R1 | U1 | Applicable pin part number | Retaining ring size |
|----------|----------------------|----|----|----|------|----|------------|----|--------------------------------------|----|----|----|----------------------------|---------------------|
| Y-020B   | 20                   | 46 | 16 | 20 | 25   | 36 | M8 x 1.25  | 9  | 9 <sup>+0.2</sup> / <sub>+0.1</sub>  | 18 | 5  | 14 | CDP-1                      | Type C9 for axis    |
| Y-032B   | 25, 32               | 48 | 18 | 20 | 25   | 38 | M10 x 1.25 | 9  | 9 <sup>+0.2</sup> / <sub>+0.1</sub>  | 18 | 5  | 14 | CDP-1                      | Type C9 for axis    |
| Y-040B   | 40                   | 68 | 22 | 24 | 49.7 | 55 | M14 x 1.5  | 12 | 16 <sup>+0.3</sup> / <sub>+0.1</sub> | 38 | 13 | 25 | CDP-3                      | ø3 x 18ℓ            |

\* Clevis pin and retaining ring (cotter pin for ø40) are attached.

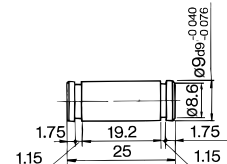
## Double Clevis Pin

Material: Carbon steel

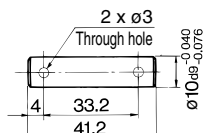
(mm)

Bore size: ø20, ø25, ø32  
CDP-1

Bore size: ø40  
CDP-2



Retaining ring: Type C9 for axis



Cotter pin ø3 x 18ℓ

\* Retaining rings (cotter pins for ø40) are included.

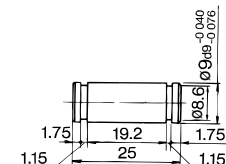
## Double Knuckle Pin

Material: Carbon steel

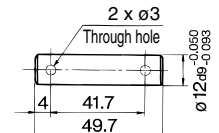
(mm)

Bore size: ø20, ø25, ø32  
CDP-1

Bore size: ø40  
CDP-3



Retaining ring: Type C9 for axis



Cotter pin ø3 x 18ℓ

\* Retaining rings (cotter pins for ø40) are included.

REA

REB

REC

Y

X

MQ

RHC

RZQ

D

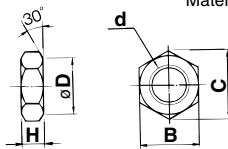
-X

Individual  
 -X

# Series CM2Y

## Rod End Nut (mm)

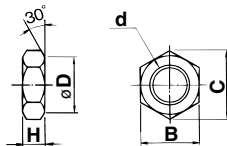
Material: Carbon steel



| Part no. | Applicable bore size (mm) | B  | C    | D    | d          | H |
|----------|---------------------------|----|------|------|------------|---|
| NT-02    | 20                        | 13 | 15.0 | 12.5 | M8 x 1.25  | 5 |
| NT-03    | 25, 32                    | 17 | 19.6 | 16.5 | M10 x 1.25 | 6 |
| NT-04    | 40                        | 22 | 25.4 | 21.0 | M14 x 1.5  | 8 |

## Mounting Nut (mm)

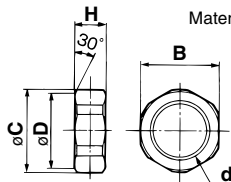
Material: Carbon steel



| Part no. | Applicable bore size (mm) | B  | C    | D    | d         | H  |
|----------|---------------------------|----|------|------|-----------|----|
| SN-020B  | 20                        | 26 | 30   | 25.5 | M20 x 1.5 | 8  |
| SN-032B  | 25, 32                    | 32 | 37   | 31.5 | M26 x 1.5 | 8  |
| SN-040B  | 40                        | 41 | 47.3 | 40.5 | M32 x 2.0 | 10 |

## Trunnion Nut (mm)

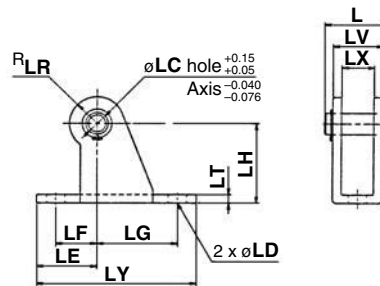
Material: Carbon steel



| Part no. | Applicable bore size (mm) | B  | C  | D    | d         | H  |
|----------|---------------------------|----|----|------|-----------|----|
| TN-020B  | 20                        | 26 | 28 | 25.5 | M20 x 1.5 | 10 |
| TN-032B  | 25, 32                    | 32 | 34 | 31.5 | M26 x 1.5 | 10 |
| TN-040B  | 40                        | 41 | 45 | 40.5 | M32 x 2   | 10 |

## Clevis Pivot Bracket (For CM2E) (mm)

Material: Rolled steel plate



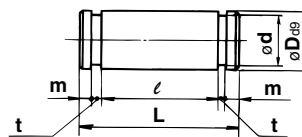
| Part no. | Applicable bore size (mm) | L    | LC | LD  | LE | LF | LG | LH | LR | LT  | LX | LY | LV   | Applicable pin part no. |
|----------|---------------------------|------|----|-----|----|----|----|----|----|-----|----|----|------|-------------------------|
| CM-E020B | 20, 25                    | 24.5 | 8  | 6.8 | 22 | 15 | 30 | 30 | 10 | 3.2 | 12 | 59 | 18.4 | CD-S02                  |
| CM-E032B | 32, 40                    | 34   | 10 | 9   | 25 | 15 | 40 | 40 | 13 | 4   | 20 | 75 | 28   | CD-S03                  |

Note 1) Clevis bracket pins and retaining rings are included.

Note 2) It cannot be used for single clevis style (CM2C) and double clevis style (CM2D).

## Clevis Pin (For CM2E) (mm)

Material: Carbon steel



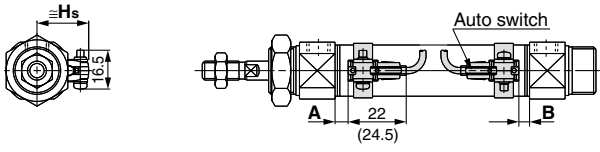
| Part no. | Applicable bore size (mm) | Dd9                                    | d   | L    | l    | m    | t    | Applicable retaining ring part no. |
|----------|---------------------------|--|-----|------|------|------|------|------------------------------------|
| CD-S02   | 20, 25                    | 8 <sup>+0.040</sup> <sub>-0.076</sub>  | 7.6 | 24.5 | 19.5 | 1.6  | 0.9  | Type C 8 for axis                  |
| CD-S03   | 32, 40                    | 10 <sup>+0.040</sup> <sub>-0.076</sub> | 9.6 | 34   | 29   | 1.35 | 1.15 | Type C 10 for axis                 |

Note) Retaining rings are included.

**Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height**

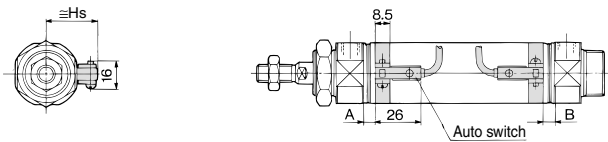
**Reed auto switch**

**D-A9□**

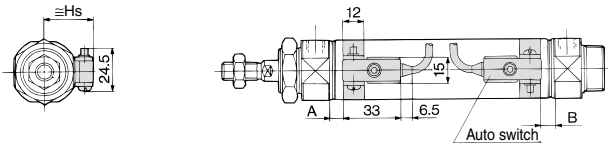


( ) : For D-A93 type

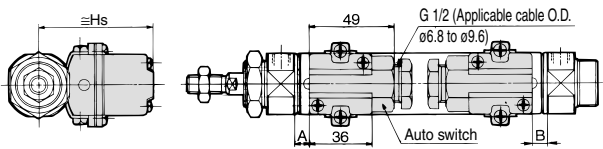
**D-C7/C8**



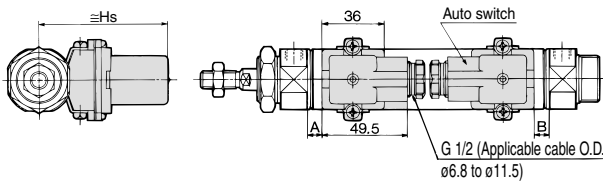
**D-B5/B6/B59W**



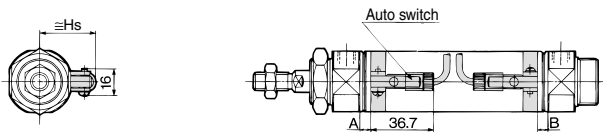
**D-A33A/A34A**



**D-A44A**



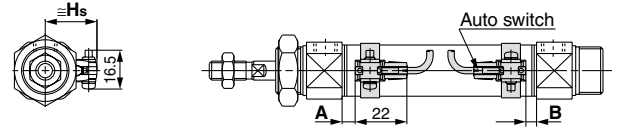
**D-C73C/C80C**



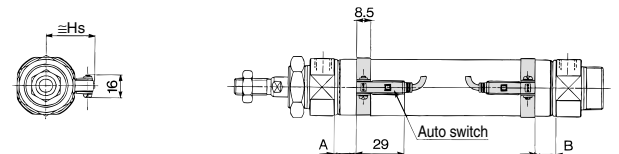
**Solid state auto switch**

**D-M9□**

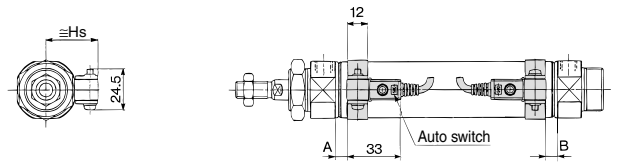
**D-M9□W**



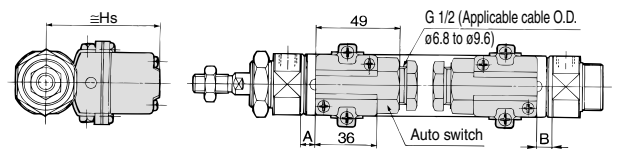
**D-H7□/H7□W/H7NF**



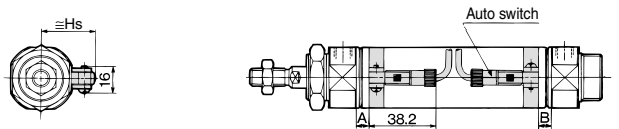
**D-G5NTL**



**D-G39A/K39A**



**D-H7C**



- REA**
- REB**
- REC**
- C□Y**
- C□X**
- MQ**
- RHC**
- RZQ**
- D-□**
- X□**
- Individual -X□**

# Series CM2Y

## Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

### Auto Switch Proper Mounting Position

(mm)

| Auto switch model<br>Bore size (mm) | D-A9□ |      | D-M9□<br>D-M9□W |      | D-B5□<br>D-B64 |   | D-C7□<br>D-C80<br>D-C73C<br>D-C80C |    | D-B59W |   | D-A3□A<br>D-G39A<br>D-K39A<br>D-A44A |     | D-H7□<br>D-H7C<br>D-H7□W<br>D-H7NF |    | D-G5NTL |     |
|-------------------------------------|-------|------|-----------------|------|----------------|---|------------------------------------|----|--------|---|--------------------------------------|-----|------------------------------------|----|---------|-----|
|                                     | A     | B    | A               | B    | A              | B | A                                  | B  | A      | B | A                                    | B   | A                                  | B  | A       | B   |
| 20                                  | 6.5   | 5.5  | 10.5            | 9.5  | 1              | 0 | 7                                  | 6  | 4      | 3 | 0.5                                  | 0   | 6                                  | 5  | 2.5     | 1.5 |
| 25                                  | 6.5   | 5.5  | 10.5            | 9.5  | 1              | 0 | 7                                  | 6  | 4      | 3 | 0.5                                  | 0   | 6                                  | 5  | 2.5     | 1.5 |
| 32                                  | 7.5   | 6.5  | 11.5            | 10.5 | 2              | 1 | 8                                  | 7  | 5      | 4 | 1.5                                  | 0.5 | 7                                  | 6  | 3.5     | 2.5 |
| 40                                  | 13.5  | 11.5 | 17.5            | 15.5 | 7              | 6 | 13                                 | 12 | 10     | 9 | 6.5                                  | 5.5 | 12                                 | 11 | 8.5     | 7.5 |

Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

### Auto Switch Mounting Height

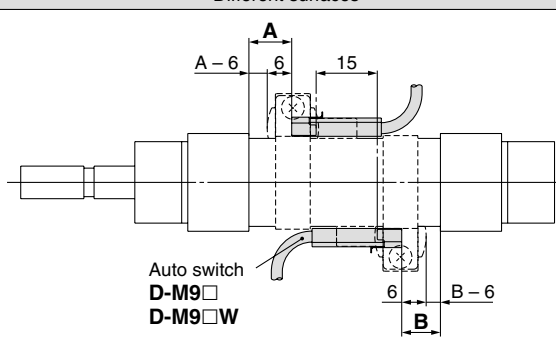
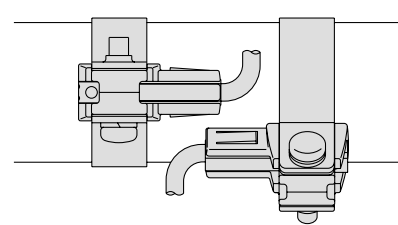
(mm)

| Auto switch model<br>Bore size (mm) | D-A9□<br>D-M9□<br>D-M9□W | D-B5□<br>D-B64<br>D-B59W<br>D-G5NTL<br>D-H7C | D-C7□<br>D-C80<br>D-H7□<br>D-H7□W<br>D-H7NF | D-C73C<br>D-C80C | D-A3□A<br>D-G39A<br>D-K39A | D-A44A |
|-------------------------------------|--------------------------|--|---|------------------|----------------------------|--------|
|                                     | Hs                       | Hs   | Hs  | Hs               | Hs                         | Hs     |
| 20                                  | 22                       | 25.5   | 22.5  | 25               | 60                         | 69.5   |
| 25                                  | 24.5                     | 28   | 25  | 27.5             | 62.5                       | 72     |
| 32                                  | 28                       | 31.5   | 28.5  | 31               | 66                         | 75.5   |
| 40                                  | 32                       | 35.5   | 32.5  | 35               | 70                         | 79.5   |

## Minimum Auto Switch Mounting Stroke

| Auto switch model          | n: No. of auto switch (mm) |                         |                         |   |                 |
|----------------------------|----------------------------|-------------------------|-------------------------|---|-----------------|
|                            | No. of auto switch mounted |                         |                         |   |                 |
|                            | 1 pc.                      | 2 pcs.                  |                         | n pcs.  |                 |
|                            |                            | Different surfaces      | Same surface            | Different surfaces                            | Same surface    |
| D-A9□<br>D-M9□<br>D-M9□W   | 10                         | 15 <small>Note)</small> | 45 <small>Note)</small> | $15 + 45 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 45 + 45 (n-2)   |
| D-C7□<br>D-C80             | 10                         | 15                      | 50                      | $15 + 45 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 50 + 45 (n-2)   |
| D-H7□<br>D-H7□W<br>D-H7NF  | 10                         | 15                      | 60                      | $15 + 45 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 60 + 45 (n-2)   |
| D-C73C<br>D-C80C<br>D-H7C  | 10                         | 15                      | 65                      | $15 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 65 + 50 (n-2)   |
| D-B5□/B64<br>D-G5NTL       | 10                         | 15                      | 75                      | $15 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 75 + 55 (n-2)   |
| D-B59W                     | 15                         | 20                      | 75                      | $20 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6...) | 75 + 55(n-2)    |
| D-A3□A/G39A<br>D-K39A/A44A | 10                         | 35                      | 100                     | 35 + 30(n-2)                                  | 100 + 100 (n-2) |

Note) When 2 D-A93/M9□/M9□W auto switches are included.

| Auto switch model   | With 2 auto switches   |                      |
|---|--|----------------------|
|   | Different surfaces   | Same surface         |
|  <p style="text-align: center;">Auto switch<br/>D-M9□<br/>D-M9□W</p> <p style="text-align: center;">The proper auto switch mounting position is 6 mm inward from the switch holder edge.</p> |  <p style="text-align: center;">The auto switch is mounted by slightly displacing it in a direction (cylinder tube circumferential exterior) so that the auto switch and lead wire do not interfere with each other.</p> |                      |
| D-A93   | —  | Less than 50 strokes |
| D-M9□<br>D-M9□W   | Less than 20 strokes   | Less than 55 strokes |

## Operating Range

| Auto switch model          | Bore size (mm) |     |     |    |
|----------------------------|----------------|-----|-----|----|
|                            | 20             | 25  | 32  | 40 |
| D-A9□                      | 6              | 6   | 6   | 6  |
| D-M9□<br>D-M9□W            | 3.5            | 3   | 3.5 | 3  |
| D-C7□/C80<br>D-C73C/C80C   | 7              | 8   | 8   | 8  |
| D-B5□/B64<br>D-A3□A/A44A   | 8              | 8   | 9   | 9  |
| D-B59W                     | 12             | 12  | 13  | 13 |
| D-H7□/H7□W<br>D-G5NTL/H7NF | 4              | 4   | 4.5 | 5  |
| D-H7C                      | 7              | 8.5 | 9   | 10 |
| D-G39A/K39A                | 8              | 9   | 9   | 9  |

\* 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.

REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

D-□

-X□

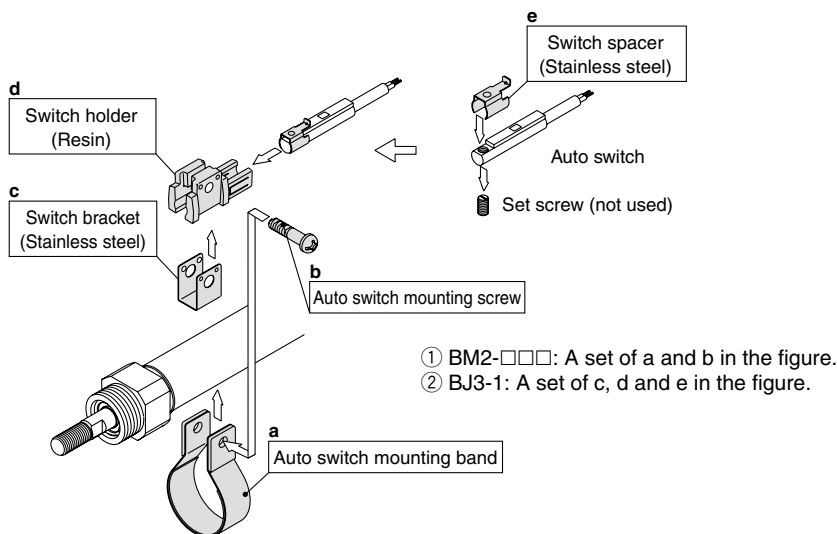
Individual  
-X□

# Series CM2Y

## Auto Switch Mounting Bracket Part No.

| Auto switch model                                     | Bore size (mm)              |                             |                             |                             |
|---|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|   | 20                          | 25                          | 32                          | 40                          |
| D-A9□<br>D-M9□<br>D-M9□W                              | Note)<br>①BM2-020<br>②BJ3-1 | Note)<br>①BM2-025<br>②BJ3-1 | Note)<br>①BM2-032<br>②BJ3-1 | Note)<br>①BM2-040<br>②BJ3-1 |
| D-C7□/C80<br>D-C73C/C80C<br>D-H7□<br>D-H7□W<br>D-H7NF | BM2-020                     | BM2-025                     | BM2-032                     | BM2-040                     |
| D-B5□/B64<br>D-B59W<br>D-G5NTL                        | BA2-020                     | BA2-025                     | BA2-032                     | BA2-040                     |
| D-A3□A/A44A<br>D-G39A/K39A                            | BM3-020                     | BM3-025                     | BM3-032                     | BM3-040                     |

Note) Two kinds of auto switch mounting brackets are used as a set.



Other than the applicable auto switches listed in “How to Order”, the following auto switches can be mounted. For detailed specifications, refer to pages 1719 to 1827.

| Auto switch type | Model              | Electrical entry (Direction) | Features                                   |
|------------------|--------------------|------------------------------|--|
| Reed             | D-B53, C73, C76    | Grommet (In-line)            | —  |
|                  | D-C80              |                              | Without indicator light                    |
| Solid state      | D-H7A1, H7A2, H7B  |                              | —  |
|                  | D-H7NW, H7PW, H7BW |                              | Diagnostic indication (2-color indication) |
|                  | D-G5NTL            |                              | With timer                                 |

\* With pre-wired connector is available for solid state auto switches. For details, refer to pages 1784 and 1785.

\* Normally closed (NC = b contact), solid state auto switches (D-F9G, F9H type) are also available. For details, refer to page 1746.

\* Wide range detection type, solid state auto switches (D-G5NBL type) are also available. Refer to page 1776 for details.



# Smooth Cylinder Specific Product Precautions 1

Be sure to read before handling.

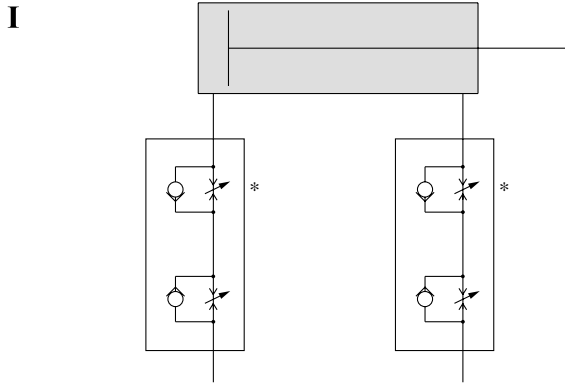
Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

## Recommended Pneumatic Circuit

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

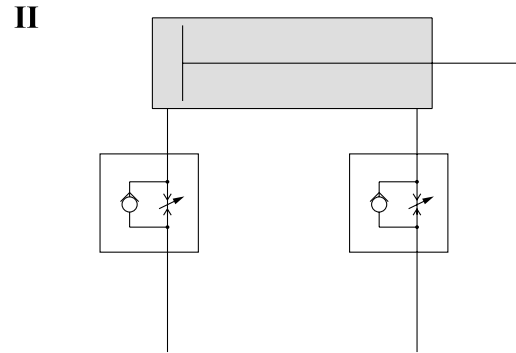
### Warning

#### Horizontal operation (Speed control)



**Dual speed controller**

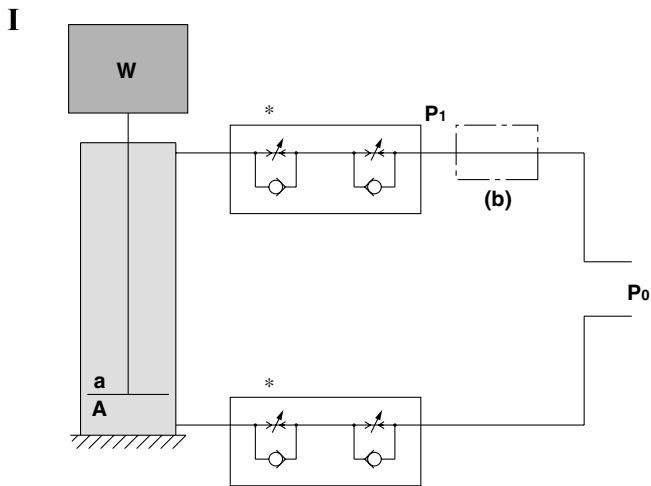
Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip. More stable low speed operation can be achieved than meter-in circuit alone.



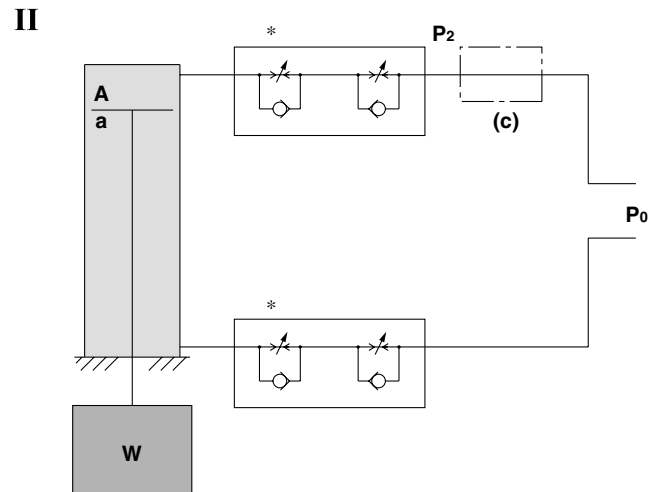
**Meter-in speed controller**

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<sub>0</sub>: Operating pressure (MPa) P<sub>1</sub>, P<sub>2</sub>: Reduced pressure (MPa) a: Rod side piston area (mm<sup>2</sup>) A: Head side piston area (mm<sup>2</sup>)

REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

D-□

-X□

Individual  
-X□



# Smooth Cylinder Specific Product Precautions 2

Be sure to read before handling.

Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 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.

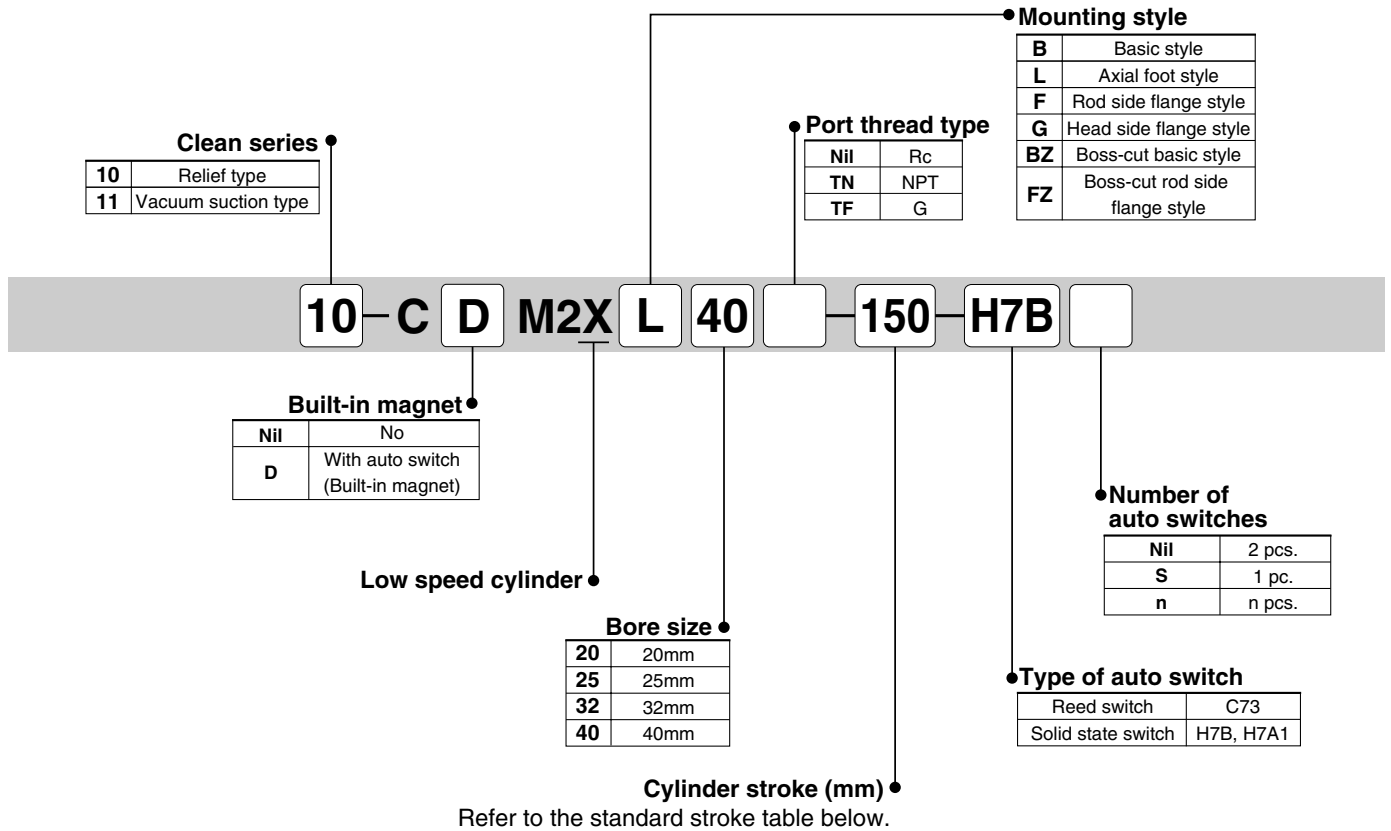
Pressure fluctuations may cause malfunction.



# Series 10-11-CM2X Low speed cylinder

Double acting single rod /  $\phi 20$ ,  $\phi 25$ ,  $\phi 32$ ,  $\phi 40$

## How to Order




## Model

| Relief type         | Model      | Bore size (mm) | Port size | Lubrication | Action                   | Standard stroke (mm)                       | Auto switch mounting | Cushion |     |
|---------------------|------------|----------------|-----------|-------------|--------------------------|--|----------------------|---------|-----|
|                     |            |                |           |             |                          |  |                      | Rubber  | Air |
| Relief type         | 10-CM2X□20 | 20             | 1/8       | Non-lube    | Double acting single rod | 25, 50, 75, 100, 125<br>150, 200, 250, 300 | ○                    | ○       | —   |
|                     | 10-CM2X□25 | 25             |           |             |                          |  |                      |         |     |
|                     | 10-CM2X□32 | 32             |           |             |                          |  |                      |         |     |
|                     | 10-CM2X□40 | 40             |           |             |                          |  |                      |         |     |
| Vacuum suction type | 11-CM2X□20 | 20             | 1/8       | Non-lube    | Double acting single rod | 25, 50, 75, 100, 125<br>150, 200, 250, 300 | ○                    | ○       | —   |
|                     | 11-CM2X□25 | 25             |           |             |                          |  |                      |         |     |
|                     | 11-CM2X□32 | 32             |           |             |                          |  |                      |         |     |
|                     | 11-CM2X□40 | 40             |           |             |                          |  |                      |         |     |

## Specifications

| Bore size<br>(mm)                    | 10- (Relief type)   |            |     |           | 11- (Vacuum suction type) |            |     |           |
|--------------------------------------|---|------------|-----|-----------|---------------------------|------------|-----|-----------|
|                                      | 20  | 25         | 32  | 40        | 20                        | 25         | 32  | 40        |
| Fluid                                | Air   |            |     |           |                           |            |     |           |
| Proof pressure                       | 1.5 MPa   |            |     |           |                           |            |     |           |
| Max. operating pressure              | 1.0 MPa   |            |     |           |                           |            |     |           |
| Min. operating pressure              | 0.035 MPa   |            |     |           | 0.025 MPa                 |            |     |           |
| Ambient and fluid temperature        | Without auto switch : -10°C to 70°C (With no freezing)<br>With auto switch : -10 to 60°C (With no freezing) |            |     |           |                           |            |     |           |
| Cushion                              | Rubber bumper   |            |     |           |                           |            |     |           |
| Piston speed                         | 1 to 200 mm/s   |            |     |           | 0.5 to 200 mm/s           |            |     |           |
| Piston rod diameter                  | ø8  | ø10        | ø12 | ø14       | ø8                        | ø10        | ø12 | ø14       |
| Rod end thread                       | M8 x 1.25   | M10 x 1.25 |     | M14 x 1.5 | M8 x 1.25                 | M10 x 1.25 |     | M14 x 1.5 |
| Rod end thread tolerance             | JIS Class 2   |            |     |           |                           |            |     |           |
| Stroke tolerance                     | +1.4<br>0 mm  |            |     |           |                           |            |     |           |
| Port size                            | 1/8   |            |     | 1/4       | 1/8                       |            |     | 1/4       |
| Vacuum suction port, Relief port     | M5 x 0.8  |            |     |           |                           |            |     |           |
| Grease                               | Fluorine grease   |            |     |           |                           |            |     |           |
| Particle generation grade            | Grade 2   |            |     |           | Grade 1                   |            |     |           |
| Suction flow rate (Reference values) | —   |            |     |           | 2 l/min (ANR)             |            |     |           |

 External dimensions and applicable auto switches are the same as 10-/11-CM2. Please refer to pages 15 to 20.



## Specific Product Precautions

Be sure to read before handling.

### Precautions

#### Warning

**1. Do not rotate the cover.**

When installing a cylinder or screwing a pipe fitting into the port, the coupling portion of the cover could break if the cover is rotated.

#### Caution

**1. Be careful of the snap ring to pop out.**

When replacing the rod seal, take care that the snap ring does not spring out while you are removing it.

### Maintenance

#### Caution

**1. Grease pack**

Use the following part number to order grease for maintenance.  
Grease pack  
GR-X-005 (5g)



# Actuator / Common Precautions 1

Be sure to read before handling. Refer to the main text for precautions for each series.

## Precaution on designing

### Warning

1. **There is a possibility of dangerous sudden action by air cylinders if sliding parts of machinery are twisted due to external forces, etc.**

In such cases, personal injury by catching hands or feet in the machinery, or damage to the machinery itself may occur. Therefore, the machine should be adjusted to operate smoothly and designed to avoid such dangers.

2. **A protective cover is recommended to minimize the risk of personal injury.**

If a driven object and moving parts of a cylinder are in close proximity, personal injury may occur. 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.**

Particularly when a cylinder operates at a high frequency or is installed in a place 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 circuit pressure due to a power outage, etc.**

When a cylinder is used in a clamping mechanism, there is a danger of workpiece 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 personal 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 avoid personal injury and equipment damage in the event that there is a loss of power to equipment controlled by pneumatics, electricity, or hydraulics.

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

When a cylinder is driven by an exhaust center type directional control valve or when it is started up after residual pressure is exhausted from the circuit, etc., the piston and its driven object will lurch when the cylinder is operated at high speed if pressure is applied to one side of the cylinder, due to the absence of air pressure inside the cylinder. Therefore, equipment should be selected and circuits should be designed to prevent this sudden lurching, because there is a danger of personal injury and/or damage to equipment when this occurs.

8. **Consider emergency stops.**

Design the machinery so that personal injury and/or damage to machinery and equipment will not occur when the 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 personal injury or equipment damage will not occur upon restart of operation.

When the cylinder has to be reset at the start position, install safety manual control equipment.

## Selection

### Warning

1. **Confirm the specifications.**

The products featured in this catalog are designed for use in industrial compressed air systems. If the products are used in conditions where pressure and/or temperature are outside the range of specifications, damage and/or malfunctions may occur. Do not use in these conditions. (Refer to the specifications).

Please consult with SMC if you use a fluid other than compressed air.

2. **Intermediate Stops**

With a 3-position closed center type valve, it is difficult to accurately and precisely stop a piston at the required position in the same way as can be done 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. Please contact with SMC when it is necessary to hold a stopped position for an extended period of time.

### Caution

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

Operation that exceeds the maximum stroke may damage a piston rod. Refer to the air cylinder model selection procedures for the maximum feasible strokes.

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

Operate a cylinder within a range so that a piston having inertial force will not be damaged when it collides against the cover at the stroke end. Refer to the air cylinder model selection procedures for the maximum feasible strokes.

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

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

An intermediate support should be provided in order to prevent damage to a long stroke cylinder, due to problems such as sagging of the rod, deflection of the cylinder tube, vibration and external load.



# Actuator / Common Precautions 2

Be sure to read before handling. Refer to the main text for precautions for each series.

## Mounting

### Caution

- 1. Be certain to match the rod shaft center with the load and direction of movement when connecting.**  
When not properly matched, problems may arise with the rod and tube, and damage may be caused due to friction on areas such as the inner tube surface, bushings, rod surface, and seals.
- 2. When using an external guide, 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 portion of the cylinder tube or the piston rod by striking it with an object, or squeezing it.**  
The tube bore is manufactured under precise tolerances. Thus, even a slight deformation could lead to a malfunction. Moreover, scratches or gouges, etc. in the piston rod may lead to damaged seals and cause air leakage.
- 4. Do not use until you verify that the equipment can operate properly.**  
After mounting, repairs, or modification, etc., connect the air supply and electric power, and then confirm proper mounting by means of appropriate function and leak tests.
- 5. Instruction manual**  
Install the products and operate them only after reading the instruction manual carefully and understanding its contents. Also keep the manual where it can be referred to as necessary.

## Cushion

### Caution

- 1. Readjust with a cushion needle.**  
Cushions are adjusted at the time of shipment; however, the cushion needle on the cover should be readjusted, when the product is put into service based on 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 the actuator with the cushion needle fully closed.**  
This could damage the seals.

## Air Supply

### Warning

- 1. Use clean air.**  
Do not use compressed air which contains chemicals, synthetic oil containing organic solvents, salts or corrosive gases, etc. as this may cause damage or malfunction.

### Caution

- 1. Install air filters.**  
Install air filters close to valves at their upstream side. A filtration degree of 5 $\mu$ m or less should be selected.
- 2. Install an aftercooler, air dryer, or water separator (Drain Catch).**  
Compressed air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an air dryer, aftercooler or water separator (drain catch), etc.
- 3. Use the product within the specified range of fluid and ambient temperature.**  
Take measures to prevent freezing at temperature below 5°C, since moisture in circuits may freeze and cause damage to seals and lead to malfunctions.



# Actuator / Common Precautions 3

Be sure to read before handling. Refer to the main text for precautions for each series.

## Operating Environment

### Warning

1. Do not use in atmospheres or locations where corrosion hazards exist.  
Refer to the construction drawings regarding cylinder materials.
2. In locations where ultrapure water or cleaning solvent, etc. splashes on the equipment, take suitable measures to protect the rod.

## Maintenance

### Warning

1. Perform maintenance procedures as shown in the instruction manual.  
Improper handling may result in malfunction and damage of machinery or equipment.
2. 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 release the compressed air in the system.  
When machinery is restarted, proceed with caution after confirming that appropriate measures are in place to prevent cylinders from sudden movement.

### Caution

1. Drain flushing  
Remove drainage from air filters regularly.



# Auto switch / Common Precautions 1

Be sure to read before handling. Refer to the main text for precautions for each series.

## 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 specifications of current voltage, temperature or impact.

#### 2. Use caution when multiple cylinders are used in close proximity to each other.

When two or more auto switch cylinders are lined up in close proximity to each other, magnetic field interference may cause the switches to malfunction. Maintain a minimum cylinder separation of 40mm. (When the allowable interval is specified for each cylinder series, use the indicated value.)

#### 3. Use caution to the ON time of a switch at the intermediate position of stroke.

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 fast, the operating time will be shortened and the load may not operate properly. The maximum detectable piston speed is :

$$V \text{ (mm/s)} = \frac{\text{Auto switch operation range (mm)}}{\text{Load operating time (ms)}} \times 1000$$

In cases of high piston speed, the use of an auto switch (D-F5NT, F7NT, G5NT and M5□T) with a built-in OFF delay timer (approx. 200ms) makes it possible to extend the load operating time.

#### 4. Wiring should be kept as short as possible.

<Reed switch>

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) For an auto switch without a contact protection circuit, use a contact protection box when the wire length is 5m or longer.
- 2) Even if an auto switch has a built-in contact protection circuit, when the wiring is more than 30m 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 contact SMC in this case.

<Solid state switch>

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

#### 5. Use caution to internal voltage drop of a switch.

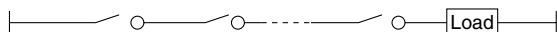
<Reed switch>

1. Switches with an indicator light (except D-A56/A76H/ A96/A96 V/C76/E76A/Z76)

• If auto switches are connected in series as shown below, please note that there will be a large voltage drop because of internal resistance in the light emitting diodes. (Refer to internal voltage drop in the auto switch specifications.)

• [The voltage drop will be "n" times larger when "n" auto switches are connected.]

The load may be ineffective even though the auto switch function is normal.



- Similarly, when operating below a specified voltage, it is possible that the load may be ineffective even though the auto switch function is normal. Therefore, the formula below should be satisfied after confirming the minimum operating voltage of the load.

Power voltage – Internal voltage drop of switch > Minimum operating voltage of load

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

<Solid state switch>

- 3) Generally, the internal voltage drop will be greater with a 2-wire solid state auto switch than with a reed switch. Take the same precautions as in 1).

Also please note that a 12VDC relay is not applicable.

#### 6. Use caution to the leakage current.

<Solid state switch>

With a 2-wire solid state auto switch, current (leakage current) flows to the load to operate the internal circuit even when in the OFF state.

Current to operate load (OFF condition) > Leakage current  
If the condition given in the above formula is not met, it will not reset correctly (stays ON). Use a 3-wire switch if this specification cannot be satisfied.

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

#### 7. Do not use a load that generates surge voltage.

<Reed switch>

When driving a load such as a relay that generates a surge voltage, use a switch with a built-in contact protection circuit or a contact protection box.

<Solid state switch>

Although a zener diode for surge protection is connected to the output side of a solid state auto switch, damage may still occur if the surge is applied repeatedly. When a load, such as a relay or solenoid, which generates surge is directly driven, use a type of switch with a built-in surge absorbing element.

#### 8. 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 inspections and confirm proper operation.

#### 9. Ensure sufficient space for maintenance activities.

When designing an application, be sure to allow sufficient space for maintenance and inspection.



# Auto switch / Common Precautions 2

Be sure to read before handling. Refer to the main text for precautions for each series.

## Mounting/Adjustment

### Warning

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

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

#### 2. 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 switch to be damaged by the stress.

#### 3. Mount switches using the proper tightening torque.

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

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

#### 4. Mount a switch at the center of the operating range.

Adjust the mounting position of an auto switch so that the piston stops at the center of the operating range (the range in which a switch is ON). (The mounting positions shown in the catalog indicate the optimum position at the stroke end.) If mounted at the end of the operating range (around the borderline of ON and OFF), the operation will be unstable.

<D-M9□>

If this auto switch replaces the conventional model, it may not function depending on the application (shown below) because its operation range is shorter.

• **Applications where at the end, the stopping position shifting range is larger than the operation range**

e.g. **Workpiece pushing, pressing into a hole, or clamping**

• **Applications where an auto switch is used to detect intermediate stopping positions (Detecting time is shortened).**

**As indicated above, mount a switch at the center of the operating range.**

## Wiring

### Warning

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

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

#### 2. Be sure 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 switch will be instantly damaged because of excess current.

#### 3. 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.

#### 4. 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, including auto switches, may malfunction due to

## Wiring

### Warning

#### 5. Do not allow short circuiting of loads.

<Reed switch>

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

<Solid state switch>

Models M-F9□(V), F9□W(V), J51, G5NB and all models of PNP output switches do not have built-in short circuit prevention circuits. If loads are short circuited, the switches will be instantly damaged.

Use caution to avoid reverse wiring with the brown power supply line and the black output line on 3-wire type switches.

#### 6. Avoid incorrect wiring.

<Reed switch>

A 24VDC 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 (-).

[In the case of model D-97, the side without indicator is (+) and the blue line side is (-).]

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

Also please note that a current greater than the maximum specified one will damage a light emitting diode and make it inoperable.

Applicable models

D-A73, A73H, A73C, C73, C73C, E73A, Z73, R73

D-97, 93A, A93, A93V

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

D-A53, A54, B53, B54

2) However, when using a 2 color indication auto switch (D-A79W, A59W, B59W), be aware that the switch will constantly remain ON if the connections are reversed.

<Solid state switch>

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

<D-M9□>

D-M9□ does not have built-in short-circuit prevention circuits. Reverse connection of power supply line (+) and (-) may damage the switch.



# Auto switch / Common Precautions 3

Be sure to read before handling. Refer to the main text for precautions for each series.

## Environment

### Warning

#### 1. Never use in the presence of explosive gases.

Our auto switches are not explosion proof. Never use them in the presence of explosive gas, as this may cause a serious explosion.

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

Auto switches will malfunction or magnets inside cylinders will become demagnetized. (Please consult with SMC regarding the availability of a magnetic field resistant auto switch.)

#### 3. Do not use in environments where the auto switches will be constantly exposed to water.

Although switches except D-A3□/A44□/G39□/K39□ satisfy the IEC standard IP67 structure (JIS C 0920: anti-immersion structure), do not use switches in applications where continually exposed to water splash or spray. Poor insulation or swelling of the potting resin inside switches may cause malfunction.

#### 4. Do not use in environments with oil or chemicals.

Please consult with SMC if auto switches will be used in an environment with coolants, cleaning solvents, 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, a malfunction due to swelling of the potting resin, or hardening of the lead wires.

#### 5. Do not use in environments with temperature cycles.

Please consult with SMC if switches are to be used where there are temperature cycles other than normal temperature changes, as they may be adversely affected internally.

#### 6. Do not use in environments where there is excessive impact shock.

##### <Reed switch>

When excessive impact (300 m/s<sup>2</sup> or more) is applied to a reed switch during operation, the contact point may malfunction and generate or cut off a signal momentarily (1ms or less). Please consult with SMC regarding the need to use a solid state switch depending on the environment.

#### 7. Do not use in locations where surges are generated.

##### <Solid state switch>

When there are units (solenoid type lifters, high frequency induction furnaces, motors, etc.) which generate a large amount of surge in the area around cylinders with solid state auto switches, this may cause deterioration or damage to the switches. Avoid sources of surge generation and crossed lines.

#### 8. Avoid close contact with magnetic substances.

When a magnetic substance (substance attracted by a magnet) is brought into close proximity with an auto switch cylinder, it may cause the auto switches to malfunction due to a loss of the magnetic force inside the cylinder.

## Maintenance

### Warning

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

##### 1) Securely tighten switch mounting screws.

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

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

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

##### 3) Confirm that the green light on the 2-color indicator type switch lights up.

Confirm that the green LED is ON when stopped at the set position. If the red LED is ON when stopped at the set position, the mounting position is not appropriate. Readjust the mounting position until the green LED lights up.

## Other

### Warning

#### 1. Please consult with SMC concerning water resistance, elasticity of lead wires, etc.

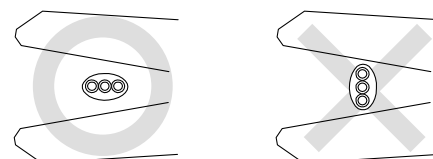
##### \*Lead wire color changes

Lead wire colors of SMC auto switches have been changed in order to meet NECA (Nippon Electric Control Equipment Industries Association) Standard 0402 for production beginning September, 1996 and thereafter. Special care should be taken regarding wire polarity during the time that both old and new colors exist.

| 2-wire system                      |        |        | 3-wire system                                 |        |        |
|------------------------------------|--------|--------|---|--------|--------|
|                                    | Old    | New    |   | Old    | New    |
| Output (+)                         | Red    | Brown  | Power supply +                                | Red    | Brown  |
| Output (-)                         | Black  | Blue   | Power supply GND                              | Black  | Blue   |
|                                    |        |        | Output  | White  | Black  |
| Solid state with diagnostic output |        |        | Solid state with latch type diagnostic output |        |        |
|                                    | Old    | New    |   | Old    | New    |
| Power supply +                     | Red    | Brown  | Power supply +                                | Red    | Brown  |
| Power supply GND                   | Black  | Blue   | Power supply GND                              | Black  | Blue   |
| Output                             | White  | Black  | Output  | White  | Black  |
| Diagnostic output                  | Yellow | Orange | Latch type diagnostic output                  | Yellow | Orange |

### Caution

#### 1. When stripping the cable clad, take care with the orientation of the cable being stripped. The insulator may accidentally be torn or damaged depending on the orientation.(D-M9□ only)



Recommended tools are shown below.

| Manufacturer | Model name    | Model no. |
|--------------|---------------|-----------|
| VESSEL       | Wire stripper | No 3000G  |
| TOKYO IDEAL  | Strip master  | 45-089    |

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



# Cylinder


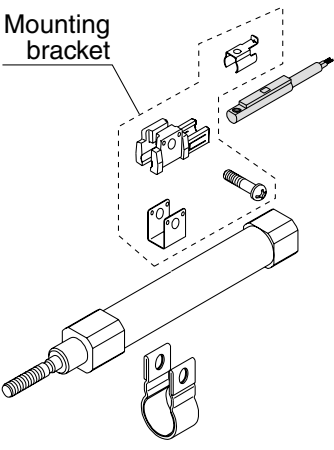

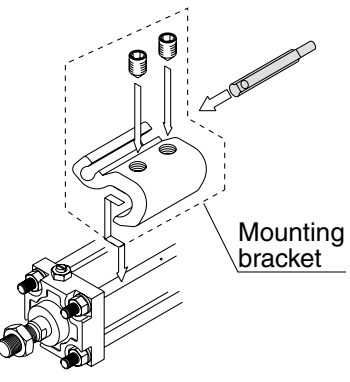

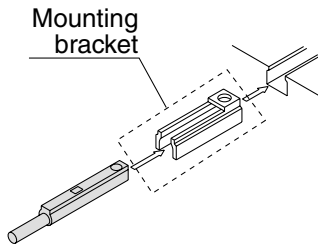
## Applicable auto switch list

| Cylinder series    |                  | CDJ2    | CDM2    | CDBM2      | CDG1       | CDA2       | CUJ      | CDU        | CDQS      | CDQ2      | REC        | CXSJ        | CXS        | MGP    | MGF       | MXP        | MXQ          | MXS       | CYP       | CDQSX     | CDQ2X   | CDM2X      |            |            |   |   |
|--------------------|------------------|---------|---------|------------|------------|------------|----------|------------|-----------|-----------|------------|-------------|------------|--------|-----------|------------|--------------|-----------|-----------|-----------|---------|------------|------------|------------|---|---|
| Bore size          |                  | ø6      | ø10/ø16 | ø20 to ø40 | ø20 to ø40 | ø20 to ø63 | ø80/ø100 | ø40 to ø63 | ø6 to ø10 | ø6 to ø25 | ø12 to ø25 | ø32 to ø100 | ø20 to ø40 | ø6-ø10 | ø6 to ø32 | ø12 to ø63 | ø40/ø63/ø100 | ø6 to ø16 | ø6 to ø25 | ø6 to ø25 | ø15/ø32 | ø12 to ø25 | ø32 to ø63 | ø20 to ø40 |   |   |
|                    | Reed switch      | D-C7/C8 |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-C73C/C80C        |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-B5/B6            |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-B59W             |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-A3/A4            |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-A3□A/A44A        |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-A3□C/A44C        |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-A7/A8            |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-A7□H/A80H        |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-A73C/A80C        |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-A79W             |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-A5/A6            |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-A59W             |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-A9               |                  | *       | *       | *          | *          | *          | *        | *          | *         |           |            |             |            | *      |           | *          |              |           |           |           |         |            |            |            | * |   |
| D-A9□V             |                  |         |         |            |            |            |          |            | *         |           |            |             |            |        |           | *          |              |           |           |           |         |            |            |            |   |   |
| D-Z7/Z8            |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| Solid state switch |                  | D-H7    |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-H7C            |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-H7BAL          |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-H7□F           |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-H7□W           |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-G5/K5          |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-G5BAL          |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-G59F           |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-G5NTL          |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-G5□W/K59W      |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-G39/K39        |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-G39A/K39A      |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-F7/J7          |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-J79C           |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-F7□F           |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-F7BAL          |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-F7BAVL         |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-F7□V           |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-F7NTL          |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-F7□W (V)       |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-F5/J5          |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-F5BAL          |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-F5□W/J59W      |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-F5□F           |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-F5NTL          |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-G39C/K39C      |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-M9             | *       | *       | *          | *          | *          | *        | *          | *         |           |            |             | *          |        | *         |            | *            |           | *         |           | *       |            | *          |            | * |   |
|                    | D-M9□V           |         |         |            |            |            |          |            | *         |           |            |             |            |        |           | *          |              |           |           |           |         |            |            |            |   | * |
|                    | D-F9□W           | *       | *       | *          | *          | *          | *        | *          | *         |           |            |             | *          |        | *         |            | *            |           | *         |           | *       |            | *          |            | * |   |
|                    | D-F9□WV          |         |         |            |            |            |          | *          | *         |           |            |             |            |        | *         |            | *            |           | *         |           | *       |            | *          |            | * |   |
|                    | D-F9BAL          |         |         |            |            |            |          | *          | *         |           |            |             |            |        | *         |            | *            |           | *         |           | *       |            | *          |            | * |   |
|                    | D-Y59A/Y7P/Y59B  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-Y69A/Y7PV/Y69B |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
|                    | D-Y7□W           |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-Y7□WV            |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-Y7BAL            |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-P5□WL            |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-F9G/H            | *                | *       | *       | *          | *          | *          | *        | *          |           |           |            | *           |            | *      |           | *          |              | *         |           | *         |         | *          |            | *          |   |   |
| D-Y7G/H            |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-G5NBL            |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |
| D-F8□              |                  |         |         |            |            |            |          |            |           |           |            |             |            |        |           |            |              |           |           |           |         |            |            |            |   |   |

Please refer to the next page for applicable auto switches and cylinders in the fields marked with asterisks (\*).

## Compact auto switch mounting bracket

Mounting brackets used for installing the compact auto switches D-A9/M9/F9 onto band mounting / tie-rod mounting / groove mounting style cylinders are available.


|   |   |  |
|---|---|--|
| <p><b>Band mounting</b></p>  <p>Applicable cylinder<br/> <b>10-/11-/21-/22-CDJ2 Series</b><br/> <b>10-/11-/21-/22-CDM2 Series</b><br/> <b>10-/11-/21-/22-CDG1 Series</b><br/> <b>10-/11-REC Series</b><br/> <b>10-/11-CDM2X Series</b></p> |  <p>Mounting bracket</p>   | <p><b>Applicable auto switch</b></p> <p>Solid state switch<br/> <b>D-M9</b><br/> <b>D-F9□W (2-color indication)</b></p> <p>Reed switch<br/> <b>D-A9</b></p> <p>Perpendicular entry is unavailable.</p>                   |
| <p><b>Tie-rod mounting</b></p>  <p>Applicable cylinder<br/> <b>10-/11-/21-/22-CDA2 Series</b></p>   |  <p>Mounting bracket</p>  | <p><b>Applicable auto switch</b></p> <p>Solid state switch<br/> <b>D-M9/M9□V</b><br/> <b>D-F9□W/F9□WV (2-color indication)</b><br/> <b>D-F9BAL (water resistant type)</b></p> <p>Reed switch<br/> <b>D-A9/D-A9□V</b></p> |
| <p><b>Groove mounting</b></p>  <p>Applicable cylinder<br/> <b>12-/13-/21-/22-MGP Series</b></p>  |  <p>Mounting bracket</p> | <p>Reed switch<br/> <b>D-A9/D-A9□V</b></p>   |





# 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), Japan Industrial Standards (JIS)\*1) and other safety regulations\*2).

- \* 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 10218-1992: Manipulating industrial robots -Safety.  
JIS B 8370: General rules for pneumatic equipment.  
JIS B 8361: General rules for hydraulic equipment.  
JIS B 9960-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)  
JIS B 8433-1993: Manipulating industrial robots - Safety.  
etc.
- \* 2) Labor Safety and Sanitation Law, etc.

 **Caution:** Operator error could result in injury or equipment damage.

 **Warning:** Operator error could result in serious injury or loss of life.

 **Danger :** In extreme conditions, there is a possibility of serious injury or loss of life.

## Warning

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

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

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

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

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

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.

2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.

3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

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

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.

3. An application which could have negative effects on people, property, or animals requiring special safety analysis.

4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.



# Safety Instructions

## 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

**1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.\*3)**

**Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.**

**2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.**

**This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.**

**3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.**

**\* 3) 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

**When the product is exported, strictly follow the laws required by the Ministry of Economy, Trade and Industry (Foreign Exchange and Foreign Trade Control Law).**



# Clean series: Common Precautions 1

Be sure to read before handling.

Refer to the main text for detailed precautions on every series.

## Air Supply

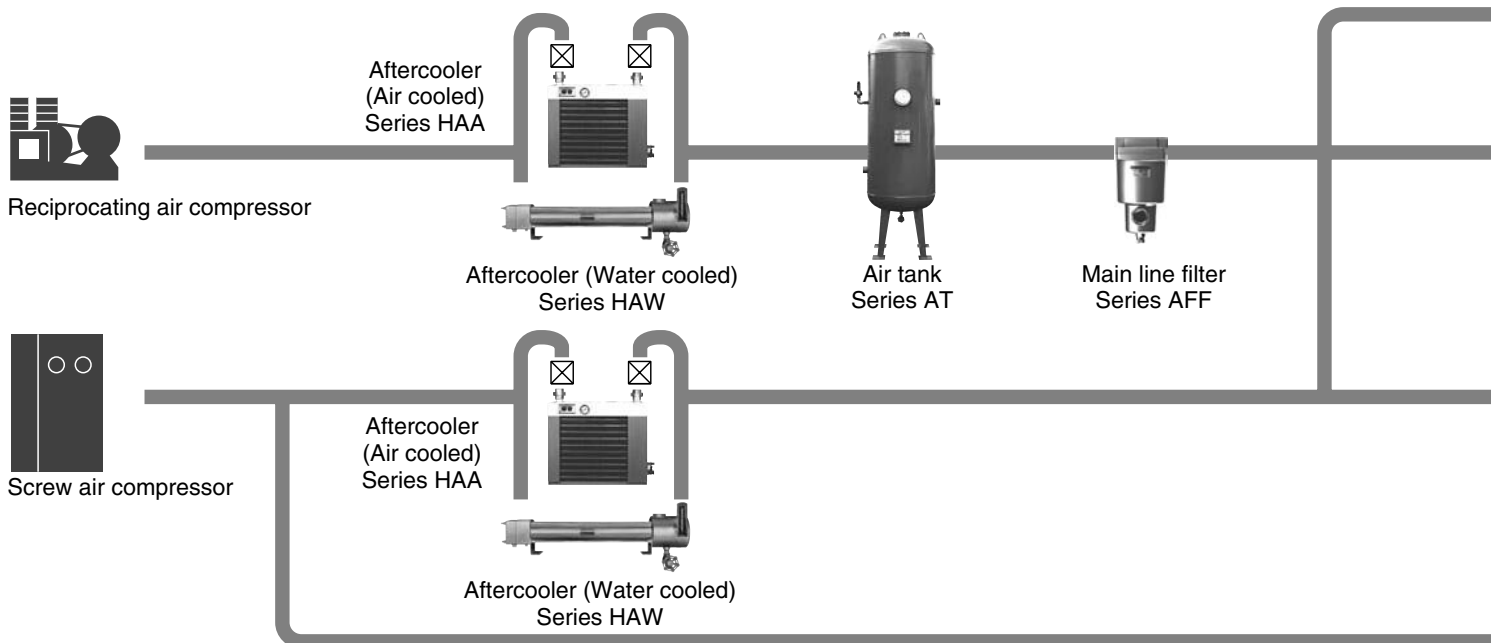
### ⚠ Caution

#### System Configuration

Refer to the "Air Preparation System" below for the quality of compressed air before configuring the system.

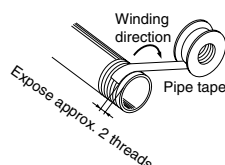
#### Main line

#### Sub-line



#### Piping

1. Provide an inclination of 1cm per meter in the direction of the air flow to the main piping.
2. If there is a line branching from the main piping, provide an outlet of compressed air on top using a tee so that drainage accumulated in the piping will not flow out.
3. Provide a drainage mechanism at every recessed point or dead end to prevent drain accumulation.
4. For future piping extensions, plug the end of the piping with a tee.
5. Before piping  
Before piping, the piping should be thoroughly blown out with air (flushed) or washed to remove chips, cutting oil and other debris from inside the pipe.
6. Wrapping of pipe tape  
When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not get inside the valve. Also, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



7. If air with a low dew point ( $-40^{\circ}\text{C}$  or less) is required, do not use nylon tube or resin fitting (except for fluorine resin) for the outlet side of the membrane air dryer or heatless air dryer. Nylon tubing could be affected by the ambient air and it thus might not be possible to achieve the prescribed low dew point at the end of the tube. Therefore, for low dew point air, use stainless steel or fluorine tube.

#### Maintenance

1. If the heatless air dryer Series ID is left unused for a long period, the absorbent may be moistened. Prior to use, close the valve on the outlet side of the dryer for regeneration and drying.

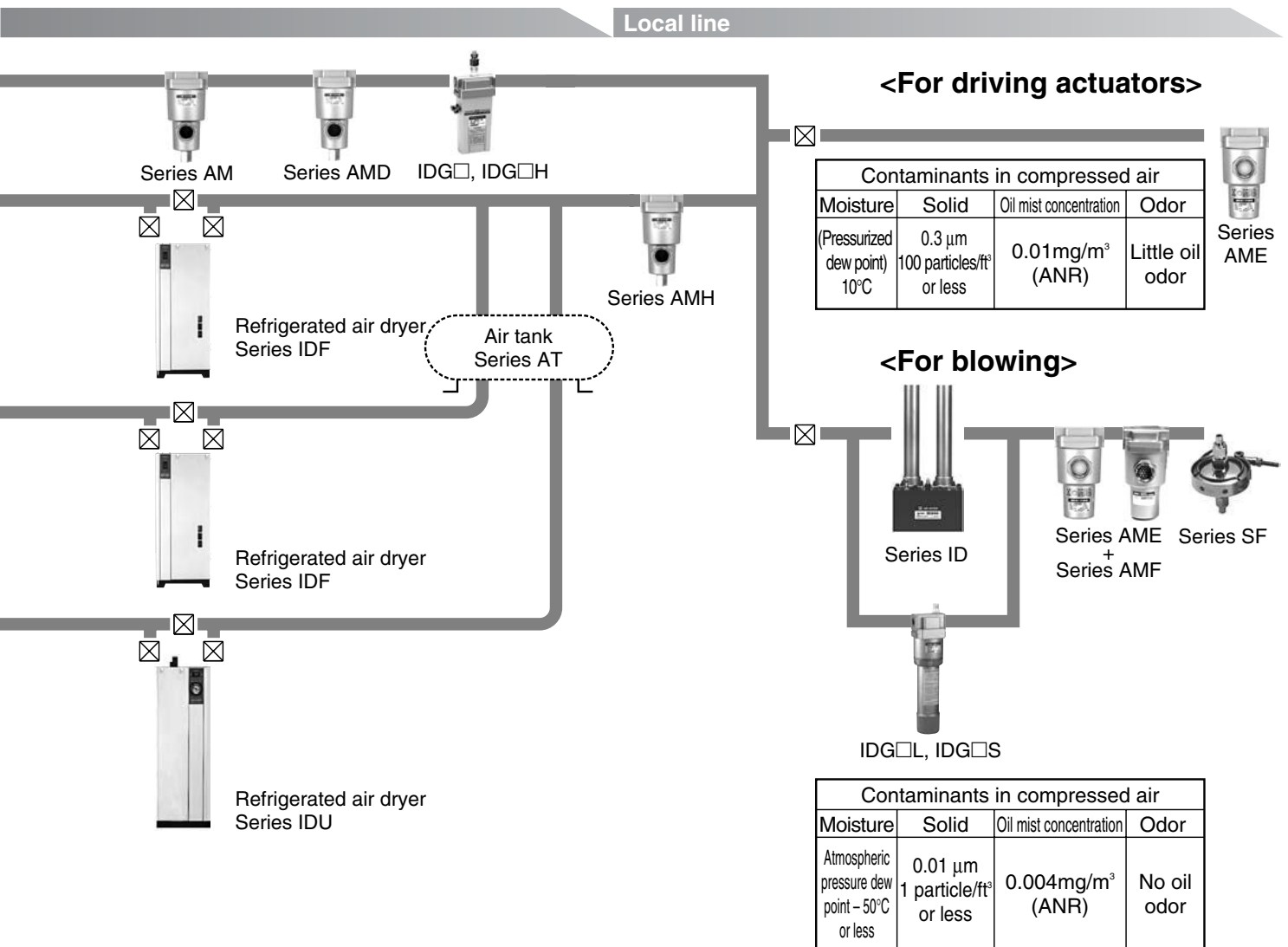
#### Caution on Design

Employ a safe design, so that the following unexpected conditions will not occur.

### ⚠ Warning

1. Provide a design that prevents high-temperature compressed air from flowing into the outlet side of the cooling equipment.  
If the flow of the coolant water in a water-cooled aftercooler is stopped or if the fan motor of an air cooled aftercooler is stopped, the high-temperature compressed air will flow to the outlet side of the cooling equipment, causing the equipment on the outlet side (such as the AFF, AM, AD, or IDF series) to be damaged or to malfunction.
2. Provide a design in which interruptions in the supply of compressed air are taken into consideration.

## Air Supply



There are cases in which compressed air cannot flow due to the freezing of the refrigerated air dryer or a malfunction (heatless dryer) in the switching valve.

### **⚠ Caution**

**3. Design a layout in which the leakage of the coolant water and the dripping of condensation are taken into consideration.**

A water-cooled aftercooler that uses coolant water could lead to water leakage due to freezing. Depending on the operating conditions, the refrigerated air dryer and its downstream pipes could create a dripping of water droplets due to condensation formed by supercooling.

**4. Provide a design that prevents back pressure and backflow.**

The generation of back pressure and backflow could lead to

equipment damage.

Take appropriate safety measures, including the proper installation methods.

**5. Depending on the model and operating conditions, the life span of air cylinders may be shortened when they are used in an environment of super dry air (atmospheric pressure dew point: -50°C) or high-purity nitrogen gas or when such super dry air or high-purity nitrogen gas is used as the fluid.**

Please contact with SMC for further details on applicable series, models, operating conditions and life spans.

**6. Blowing system**

Even a small amount of dust can be a problem for blowing systems.

Install Clean Gas Filter Series SF to the end of the blowing line.



# Clean series: Common Precautions 2

Be sure to read before handling.

Refer to the main text for detailed precautions on every series.

## Piping: Inside of Clean Room

### ⚠ Caution

1. Do not make the piping for the air cylinder relief port and regulator breathing vent piping common with solenoid valve exhaust piping.

This can cause malfunctions in the air cylinder or regulator pressure change.

2. Arrange the piping so that the exhaust air of the solenoid valves is exhausted outside of the clean room.

3. Air filter drain piping

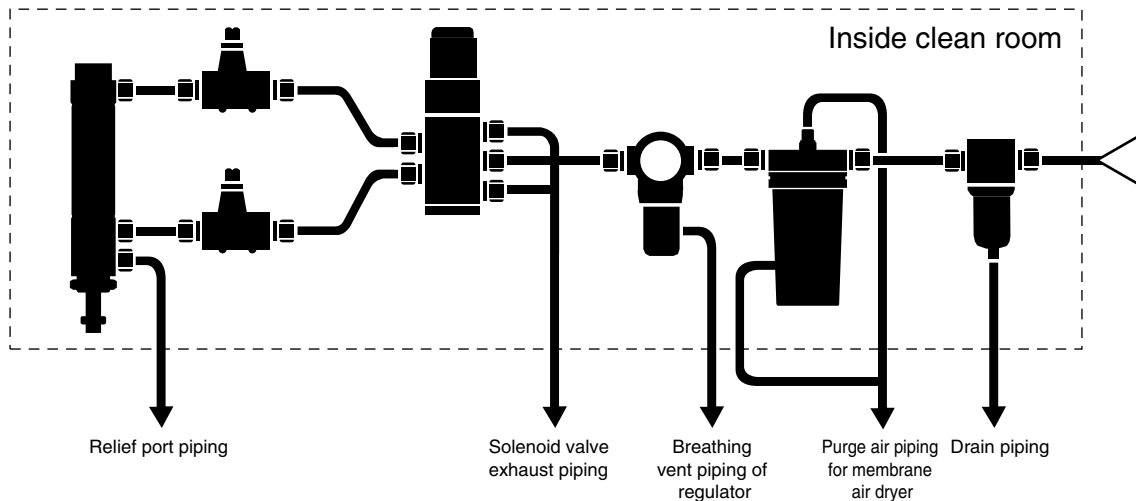
Exhaust drainage outside the clean room through piping from the drain guide of the air filter.

4. Arrange the membrane dryer air purge piping using a standard size tubing so that air is exhausted outside the clean room.

5. Take precautions so that the threaded portion of the piping connection or the tubing connection will not be loosened.

Take sufficient precautions against the piping shaking along with the vibration of the equipment.

6. Use polyurethane tubing containing no plasticizer.



## Handling

### ⚠ Caution

1. The inner bag of a double-packed clean series package should be opened in a clean room or clean environment.
2. When standard pneumatic equipment is brought into a clean room, spray high-purity air upon it and remove dust thoroughly by wiping the external surfaces of the cylinder tube, solenoid valves and air line equipment with alcohol.
3. To replace parts or disassemble the product in a clean room, first exhaust the compressed air inside the piping to the outside of the clean room before the work.
4. Do not use rotation type mounting brackets such as clevises, trunnions, etc.. They will generate a considerable amount of particulate matter due to the sliding friction between the metal parts.

## Lubrication / In the Case of Actuator

### ⚠ Warning

Be sure to wash your hands after handling fluoro-resin grease. The grease itself is not hazardous but it can produce a hazardous gas at temperatures exceeding 260°C.

### ⚠ Caution

1. Do not use any greases but those specified by SMC. Use of greases not specified will cause malfunctions or particle generation.
2. Do not lubricate the products since they are of a nonlubricant type. As the clean series actuators are lubricated at the factory with fluoro-resin grease, the product specifications may not be satisfied if turbine oil or other such lubricants are applied.

## Piston speed

### ⚠ Caution

The cylinder speed upper limit that retains the particle generation grade is 400 mm/s.



# Clean series: Common Precautions 3

Be sure to read before handling.

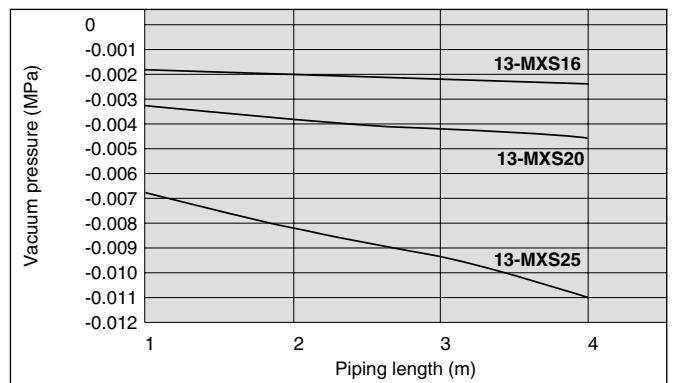
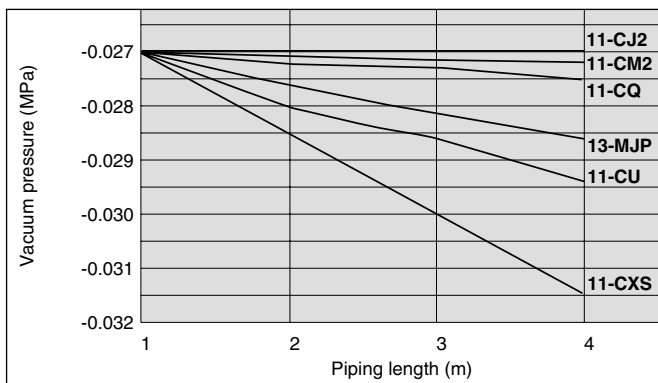
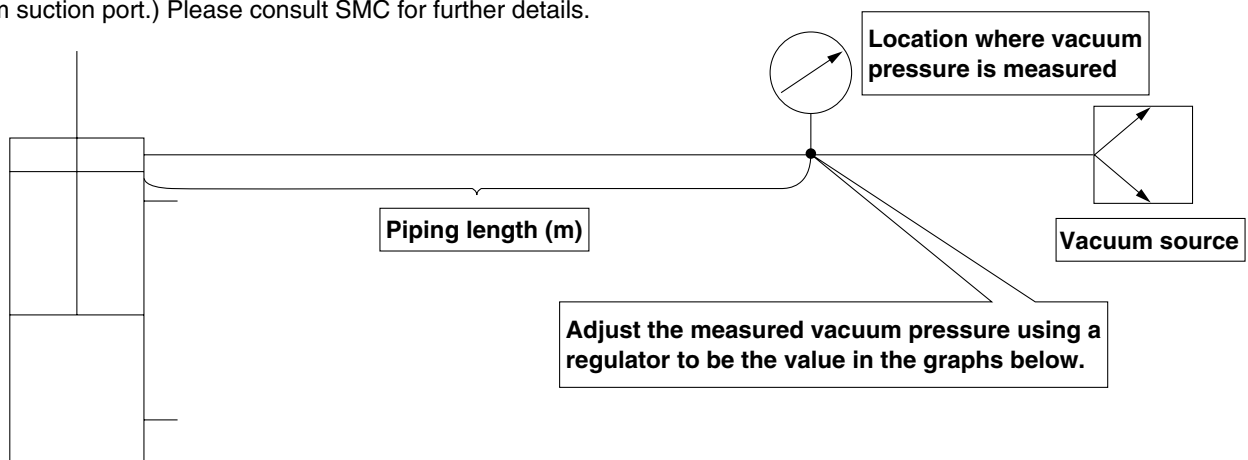
Refer to the main text for detailed precautions for every series.

## Suction flow rate of vacuum suction types

### ⚠ Caution

For the vacuum suction types (Series 11-/13-/22-), perform vacuum suction at the vacuum port to retain the particle generation grade.

The optimum suction flow rate varies depending on series and sizes. Refer to "Suction flow rate of vacuum suction type (Reference values)" for each series. (The vacuum pressure will be approximately -27 kPa at around 1 m from the vacuum suction port.) Please consult SMC for further details.







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