

# Air Cylinder

## MB Series

ø32, ø40, ø50, ø63, ø80, ø100, ø125

RoHS

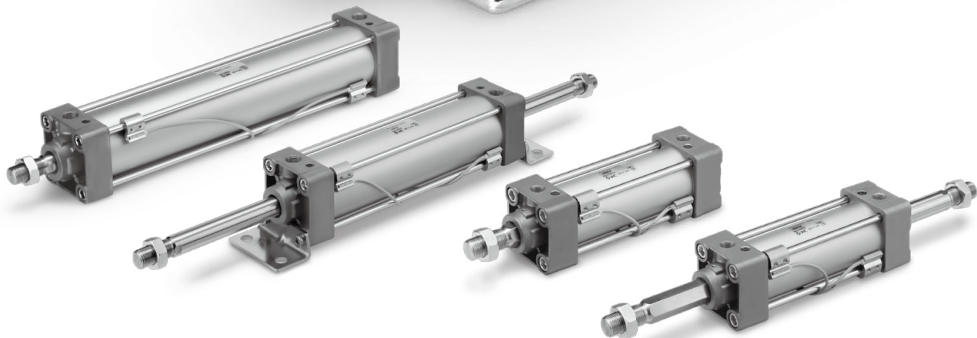
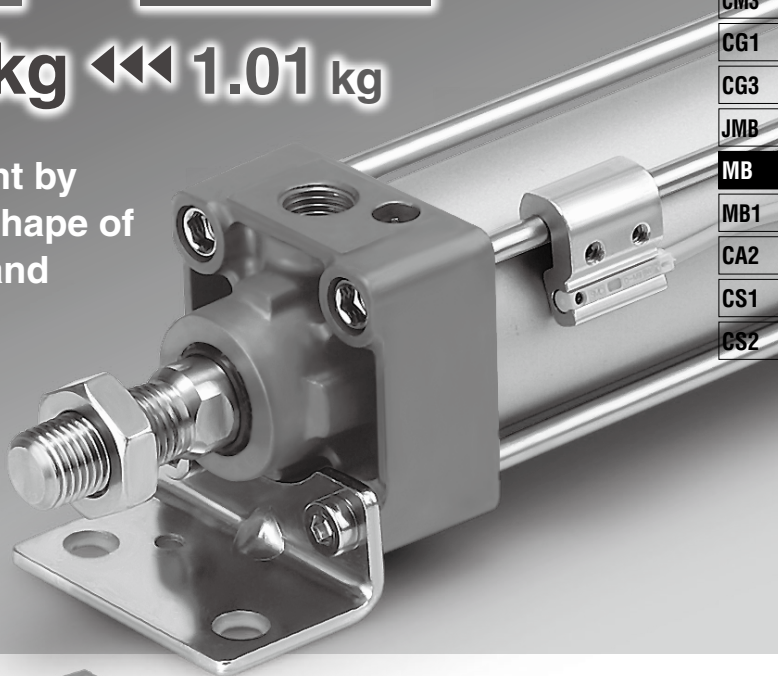
Weight **10% lighter** (ø40-100 stroke)

MB Series

Current model

**0.91 kg** <<< **1.01 kg**

Reduced weight by changing the shape of the rod cover and head cover.



CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB

**MB**

MB1

CA2

CS1

CS2

D-□

-X□

Technical Data

## Part numbers with rod end bracket and/or pivot bracket available

Not necessary to order a bracket for the applicable cylinder separately

Note) Mounting bracket is shipped together with the product, but not assembled.

Example) **MDB****D**-40-100Z-**N V**-M9BW

● Mounting type

### Pivot bracket

|            |  |
|------------|--|
| <b>Nil</b> | No bracket   |
| <b>N</b>   | Pivot bracket is shipped together with the product, but not assembled. |

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

### Double clevis



### Center trunnion



### Rod end bracket

|            |                      |
|------------|----------------------|
| <b>Nil</b> | No bracket           |
| <b>V</b>   | Single knuckle joint |
| <b>W</b>   | Double knuckle joint |

### With rod end bracket

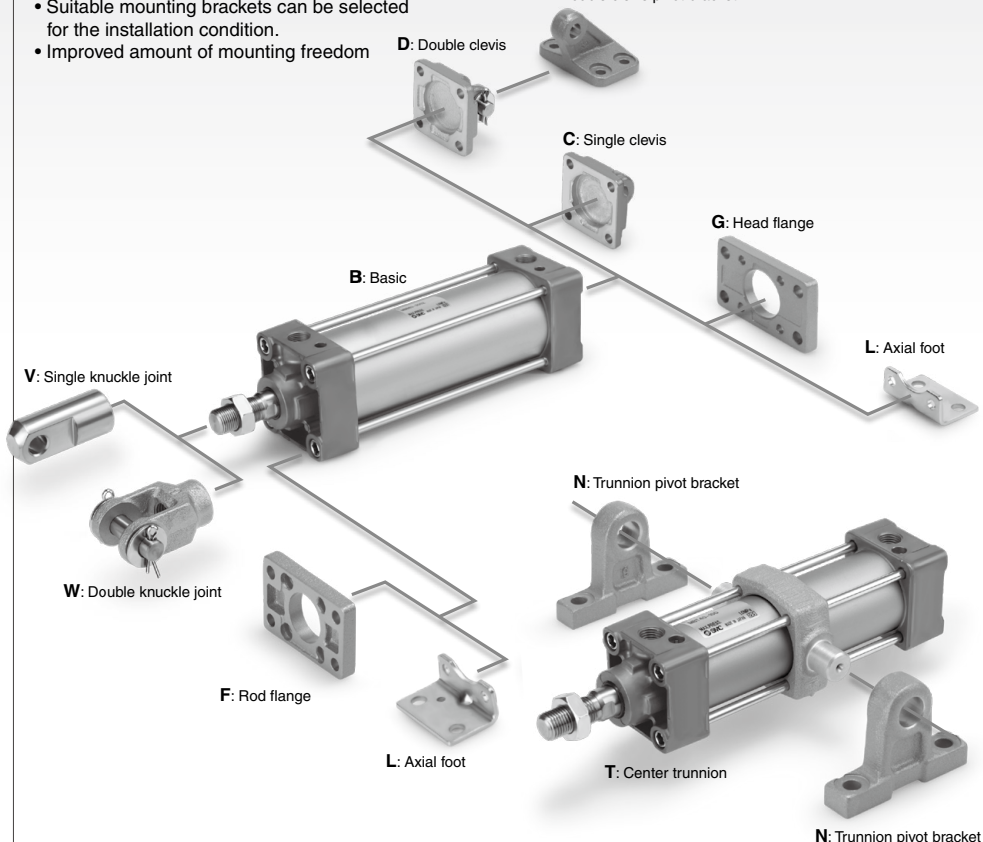
**V:** Single knuckle joint **W:** Double knuckle joint



## Various mounting bracket options

- Suitable mounting brackets can be selected for the installation condition.
- Improved amount of mounting freedom

**N:** Double clevis pivot bracket



## Lightweight

Reduced weight by changing the shape of the rod cover and head cover.

| Bore size [mm] | MB   | Reduction rate [%] | Current model [kg] |
|----------------|------|--------------------|--------------------|
| 32             | 0.66 | 8                  | 0.72               |
| 40             | 0.91 | 10                 | 1.01               |
| 50             | 1.56 | 9                  | 1.71               |
| 63             | 1.83 | 9                  | 2.01               |
| 80             | 3.25 | 9                  | 3.57               |
| 100            | 4.48 | 7                  | 4.82               |
| 125            | 6.90 | 0                  | 6.90               |

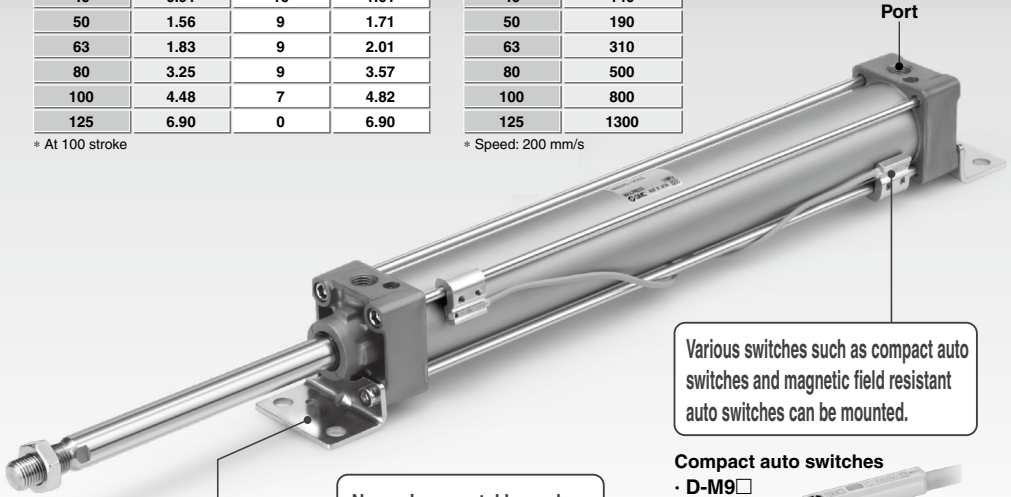
\* At 100 stroke

## Applicable speed/load

- Piston speed: Max. **1000** mm/s (ø32 to ø125)
- Load yield: See table below.

| Bore size [mm] | Maximum load mass [kg] |
|----------------|------------------------|
| 32             | 80                     |
| 40             | 140                    |
| 50             | 190                    |
| 63             | 310                    |
| 80             | 500                    |
| 100            | 800                    |
| 125            | 1300                   |

\* Speed: 200 mm/s



Mounting dimensions are the same as the current product.

No environmental hazardous substances used  
Lead free bushing is used as sliding material. Compliant with EU RoHS directive.

Various switches such as compact auto switches and magnetic field resistant auto switches can be mounted.

### Compact auto switches

- D-M9
- D-A9



### Magnetic field resistant auto switches

- D-P3DWA
- D-P4DW



## Series Variations

| Series                             | Type                      | Cushion | Bore size [mm] |    |    |    |    |     |     | Built-in magnet | With rod boot           | Page |
|------------------------------------|---------------------------|---------|----------------|----|----|----|----|-----|-----|-----------------|-------------------------|------|
|                                    |                           |         | 32             | 40 | 50 | 63 | 80 | 100 | 125 |                 |                         |      |
| Standard Single rod MB-Z           | Double acting, Single rod | Rubber  | ●              | ●  | ●  | ●  | ●  | ●   | ●   | ●               | 392                     |      |
|                                    |                           | Air     | ●              | ●  | ●  | ●  | ●  | ●   | ●   | ●               |                         |      |
| Standard Double rod MBW-Z          | Double acting, Double rod | Rubber  | ●              | ●  | ●  | ●  | ●  | ●   | ●   | ●               | 402                     |      |
|                                    |                           | Air     | ●              | ●  | ●  | ●  | ●  | ●   | ●   | ●               |                         |      |
| Non-rotating rod Single rod MBK-Z  | Double acting, Single rod | Rubber  | ●              | ●  | ●  | ●  | ●  | ●   | ●   | ●               | 408                     |      |
|                                    |                           | Air     | ●              | ●  | ●  | ●  | ●  | ●   | ●   | ●               |                         |      |
| Non-rotating rod Double rod MBKW-Z | Double acting, Double rod | Rubber  | ●              | ●  | ●  | ●  | ●  | ●   | ●   | ●               | 412                     |      |
|                                    |                           | Air     | ●              | ●  | ●  | ●  | ●  | ●   | ●   | ●               |                         |      |
| With end lock MBB                  | Double acting, Single rod | Rubber  | ●              | ●  | ●  | ●  | ●  | ●   | ●   | ●               | 416                     |      |
|                                    |                           | Air     | ●              | ●  | ●  | ●  | ●  | ●   | ●   | ●               |                         |      |
| Smooth Cylinder MBY-Z              | Double acting, Single rod | Rubber  | ●              | ●  | ●  | ●  | ●  | ●   | ●   | ●               | Best Pneumatics No. 2-3 |      |

CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB

MB

MB1

CA2

CS1

CS2

D-

-X

Technical Data

# Combinations of Standard and Made to Order Specifications

## MB Series

- : Standard
- ⊙ : Made to Order
- : Special product (Please contact SMC for details.)
- : Not available

| Series       | MB-Z  |                      |                          |                         |                          |                         |                         |                         |                         |                         |
|--------------|---|----------------------|--------------------------|-------------------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|              | (Standard type)   |                      |                          |                         |                          |                         |                         |                         |                         |                         |
|              | Double acting   |                      |                          |                         | Double acting            |                         |                         |                         |                         |                         |
|              | Single rod  |                      | Double rod               |                         | Single rod               |                         | Double rod              |                         |                         |                         |
| Action/Type  | Air   |                      | Rubber                   |                         | Air                      |                         | Rubber                  |                         |                         |                         |
| Cushion Page | 392   |                      |                          |                         | 402                      |                         |                         |                         |                         |                         |
| Symbol       | Specifications  | Applicable bore size | ø32 to ø100              | ø125                    | ø32 to ø100              | ø125                    | ø32 to ø100             | ø125                    | ø32 to ø100             | ø125                    |
| Standard     | Standard  | ø32 to ø125          | ●                        | ●                       | ●                        | ●                       | ●                       | ●                       | ●                       | ●                       |
| Long st      | Long stroke   |                      | ●                        | ●                       | ●                        | ●                       | ●                       | ●                       | ●                       | ●                       |
| D            | Built-in magnet   |                      | ●                        | ●                       | ●                        | ●                       | ●                       | ●                       | ●                       | ●                       |
| MB□-□k       | With rod boot   |                      | ●                        | ●                       | ●                        | ●                       | ●                       | ●                       | ●                       | ●                       |
| 25A          | Copper (Cu) and Zinc (Zn)-free <small>Note 1</small>  | ø32 to ø100          | ●                        | ○                       | ○                        | ○                       | ○                       | ○                       | ○                       | ○                       |
| MB□R         | Water resistant   | ø32 to ø125          | ●                        | ○                       | ●                        | ○                       | ●                       | ○                       | ●                       | ○                       |
| 10-          | Clean series <small>Note 6</small>  |                      | ○                        | ○                       | ○                        | ○                       | ○                       | ○                       | ○                       | ○                       |
| 20-          | Copper <small>Note 5</small> and Fluorine-free <small>Note 6</small>                                |                      | — <small>Note 9</small>  | — <small>Note 9</small> | — <small>Note 9</small>  | — <small>Note 9</small> | — <small>Note 9</small> | — <small>Note 9</small> | — <small>Note 9</small> | — <small>Note 9</small> |
| XA□          | Change of rod end shape   | ø32 to ø125          | ⊙                        | ⊙                       | ⊙                        | ⊙                       | ⊙                       | ⊙                       | ⊙                       | ⊙                       |
| XB5          | Oversized rod cylinder <small>Note 6</small>  |                      | ⊙                        | ○                       | ○                        | ○                       | ○                       | ○                       | ○                       | ○                       |
| XB6          | Heat resistant cylinder (-10 to 150°C)  |                      | ⊙                        | ⊙                       | ○                        | ○                       | ⊙                       | ○                       | ○                       | ○                       |
| XB13         | Low speed cylinder (5 to 50 mm/s)   |                      | ⊙ <small>Note 10</small> | ○                       | ⊙ <small>Note 10</small> | ○                       | ○                       | ○                       | ○                       | ○                       |
| XC3          | Special port location <small>Note 6</small> <small>Note 7</small>                                   |                      | ⊙                        | ○                       | ⊙                        | ○                       | ⊙                       | ○                       | ⊙                       | ○                       |
| XC4          | With heavy duty scraper   |                      | ⊙                        | ○                       | ⊙                        | ○                       | ⊙                       | ○                       | ⊙                       | ○                       |
| XC5          | Heat resistant cylinder (-10 to 110°C)  |                      | ⊙                        | ⊙                       | ○                        | ○                       | ⊙                       | ○                       | ○                       | ○                       |
| XC6          | Made of stainless steel   |                      | —                        | ⊙                       | —                        | ⊙                       | —                       | ⊙                       | —                       | ⊙                       |
| XC7          | Tie-rod, cushion valve, tie-rod nut, etc. 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   |                      | ⊙                        | ○                       | ⊙                        | ○                       | ○                       | ○                       | ○                       | ○                       |
| XC14         | Change of trunnion bracket mounting position  |                      | ⊙                        | ⊙                       | ⊙                        | ⊙                       | ⊙                       | ⊙                       | ⊙                       | ⊙                       |
| XC22         | Fluororubber seal   |                      | ⊙                        | ⊙                       | ○                        | ○                       | ⊙                       | ○                       | ○                       | ○                       |
| XC26         | With split pins for double clevis pin/double knuckle joint pin and flat washers                     |                      | ø125                     | —                       | ⊙                        | —                       | —                       | —                       | —                       | —                       |
| XC27         | Double clevis and double knuckle joint pins made of stainless steel                                 | ø32 to ø125          | ⊙                        | ⊙                       | ⊙                        | ⊙                       | —                       | —                       | —                       | —                       |
| XC29         | Double knuckle joint with spring pin  |                      | ⊙                        | ○                       | ⊙                        | ○                       | ○                       | ○                       | ○                       | ○                       |
| XC30         | Rod trunnion  |                      | ⊙                        | ○                       | ⊙                        | ○                       | ⊙                       | ○                       | ⊙                       | ○                       |
| XC35         | With coil scraper   |                      | ⊙                        | ○                       | ⊙                        | ○                       | ⊙                       | ○                       | ⊙                       | ○                       |
| XC65         | Made of stainless steel (Combination of XC7 and XC68)   |                      | ⊙                        | ○                       | ⊙                        | ○                       | ○                       | ○                       | ⊙                       | ○                       |
| XC68         | Made of stainless steel (with hard chrome plated piston rod)  |                      | ⊙                        | ○                       | ⊙                        | ○                       | ⊙                       | ○                       | ⊙                       | ○                       |
| XC88         | Spatter resistant coil scraper, Lube-retainer, Grease for welding (Piston rod: Stainless steel 304) |                      | ⊙                        | ○                       | ⊙                        | ○                       | ⊙                       | ○                       | ⊙                       | ○                       |
| XC89         | Spatter resistant coil scraper, Lube-retainer, Grease for welding (Piston rod: S45C)                |                      | ⊙                        | ○                       | ⊙                        | ○                       | ⊙                       | ○                       | ⊙                       | ○                       |
| XC91         | Spatter resistant coil scraper, Grease for welding (Piston rod: S45C)                               |                      | ⊙                        | ○                       | ⊙                        | ○                       | ⊙                       | ○                       | ⊙                       | ○                       |
| X1184        | Cylinder with heat resistant reed auto switch (-10 to 120°C)  |                      | ⊙                        | ○                       | ○                        | ○                       | ○                       | ○                       | ○                       | ○                       |

Note 1) For details, refer to the Web Catalog.

Note 2) For details about the smooth cylinder, refer to the Best Pneumatics No. ②-3.

Note 3) Simple specials except XC14A and XC14B.

Note 4) XC10 specification for the MBK-Z series is the non-rotating type on both sides. For only one side, submit a special order request form.

Note 5) Copper-free for the externally exposed part. For details, refer to the Web Catalog.

| MBK-Z<br>(Non-rotating rod type) |                        |            |        | MBB <sup>Note 6)</sup><br>(With end lock) |   | MBY-Z <sup>Note 2)</sup><br>(Smooth Cylinder) |                                 |
|----------------------------------|------------------------|------------|--------|---|---|---|---------------------------------|
| Double acting                    |                        |            |        |   |   |   |                                 |
| Single rod                       |                        | Double rod |        | Single rod                                |   | Single rod                                    |                                 |
| Air                              | Rubber                 | Air        | Rubber | Air                                       |   | ___ <sup>Note 9)</sup>                        |                                 |
| 408                              |                        | 412        |        | 416                                       |   | Best Pneumatics No. ②-3                       |                                 |
| ø32 to ø100                      |                        |            |        |   |   |   |                                 |
|                                  |                        |            |        |   |   |   | Symbol                          |
| ●                                | ●                      | ●          | ●      | ●   | ● | ●   | Standard                        |
| ○                                | ○                      | ○          | ○      | ○   | ○ | ○   | Long st                         |
| ●                                | ●                      | ●          | ●      | ●   | ● | ●   | D                               |
| ●                                | ●                      | ●          | ●      | ●   | ● | ○   | MB□-□ <sup>d</sup> <sub>k</sub> |
| —                                | —                      | —          | —      | ○   | — | —   | 25A                             |
| —                                | —                      | —          | —      | ○   | — | —   | MB□ <sup>h</sup> <sub>v</sub>   |
| —                                | —                      | —          | —      | ○   | — | —   | 10-                             |
| —                                | —                      | —          | —      | ○   | — | —   | 20-                             |
| ◎                                | ◎                      | ○          | ○      | ◎   | ◎ | ◎   | XA□                             |
| ○                                | ○                      | ○          | ○      | ○   | ○ | ○   | XB5                             |
| ○                                | ○                      | ○          | ○      | ○   | ○ | —   | XB6                             |
| ○                                | ○                      | ○          | ○      | ○   | ○ | —   | XB13                            |
| ◎                                | ◎                      | ◎          | ◎      | ○   | ○ | ○   | XC3                             |
| —                                | —                      | —          | —      | ○   | — | —   | XC4                             |
| ○                                | ○                      | ○          | ○      | ○   | ○ | —   | XC5                             |
| ___ <sup>Note 8)</sup>           | ___ <sup>Note 8)</sup> | —          | —      | ○   | — | —   | XC6                             |
| ◎                                | ◎                      | ◎          | ◎      | ○   | ◎ | ◎   | XC7                             |
| ◎                                | ◎                      | —          | —      | ○   | ○ | ○   | XC8                             |
| ◎                                | ◎                      | —          | —      | ○   | ○ | ○   | XC9                             |
| ◎ <sup>Note 4)</sup>             | ◎ <sup>Note 4)</sup>   | —          | —      | ◎   | ○ | ○   | XC10                            |
| ○                                | ○                      | —          | —      | ○   | ○ | ○   | XC11                            |
| ○                                | ○                      | ○          | ○      | ○   | ○ | —   | XC12                            |
| ◎                                | ◎                      | ○          | ○      | ◎ <sup>Note 3)</sup>                      | ◎ | ◎   | XC14                            |
| ○                                | ○                      | ○          | ○      | ○   | ○ | —   | XC22                            |
| —                                | —                      | —          | —      | —   | — | —   | XC26                            |
| ◎                                | ◎                      | ○          | ○      | ◎   | ◎ | ◎   | XC27                            |
| ○                                | ○                      | ○          | ○      | ◎   | ◎ | ◎   | XC29                            |
| ◎                                | ◎                      | ○          | ○      | ◎   | ◎ | ◎   | XC30                            |
| —                                | —                      | —          | —      | ○   | — | —   | XC35                            |
| —                                | —                      | —          | —      | ○   | ◎ | ◎   | XC65                            |
| —                                | —                      | —          | —      | —   | ◎ | ◎   | XC68                            |
| —                                | —                      | —          | —      | —   | — | —   | XC88                            |
| —                                | —                      | —          | —      | —   | — | —   | XC89                            |
| —                                | —                      | —          | —      | —   | — | —   | XC91                            |
| ○                                | ○                      | ○          | ○      | ○   | — | —   | X1184                           |

Note 6) The cover shape is the same as the current product.

Note 7) The XC3BB, XC3CC and XC3DD with trunion bracket are available with new models (part numbers with \*Z).

Note 8) The piston rod of the MBK-Z series is made of stainless steel. The rod end nut made of stainless steel is available with X1292.

Note 9) The copper and fluorine-free specification is available as a standard product.

Note 10) Use a smooth cylinder. For details, refer to the Best Pneumatics No. ②-3.

- CGJ1
- CGJ2
- CGJ2
- JCM
- CM2
- CM3
- CG1
- CG3
- JMB
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Technical Data

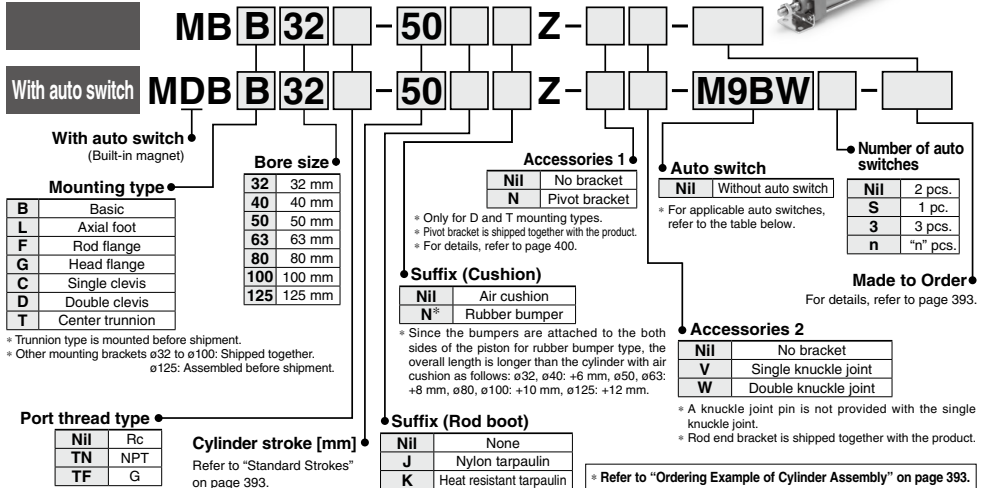
# Air Cylinder: Standard Type Double Acting, Single Rod

## MB Series

ø32, ø40, ø50, ø63, ø80, ø100, ø125



### How to Order



### Applicable Auto Switches/Refer to the pages 1575 to 1701 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) |   |                     |                 |            |            |            |
| Solid state auto switch                      | —   | Grommet                                    | No                 | 3-wire (NPN)            | 24 V         | 5 V, 12 V | —                 | M9N                  | ●      | ●     | ●     | ○ | ○                   | IC circuit      | Relay, PLC |            |            |
|  |   |  |                    | 3-wire (PNP)            |              |           |                   | M9P                  | ●      | ●     | ●     | ○ | ○                   |                 |            |            |            |
|  |   | Terminal conduit                           | Yes                | 2-wire                  | 5 V, 12 V    | 12 V      | —                 | M9B                  | ●      | ●     | ●     | ○ | ○                   | —               |            |            |            |
|  |   |  |                    | 3-wire (NPN)            |              |           |                   | —                    | G39    | —     | —     | — | —                   |                 |            | —          |            |
|  | Diagnostic indication (2-color indicator) | Grommet                                    | Yes                | 2-wire                  | 24 V         | 5 V, 12 V | —                 | M9NW                 | ●      | ●     | ●     | ○ | ○                   | IC circuit      |            |            |            |
|  |   |  |                    | 3-wire (PNP)            |              |           |                   | M9PW                 | ●      | ●     | ●     | ○ | ○                   |                 |            |            |            |
|  |   | Water resistant (2-color indicator)        | Grommet            | No                      | 2-wire       | 5 V, 12 V | 12 V              | —                    | M9B    | ●     | ●     | ● | ○                   | ○               |            | IC circuit |            |
|  |   |  |                    |                         | 3-wire (NPN) |           |                   |                      | M9NA*1 | —     | ○     | ○ | ●                   | ○               |            |            | ○          |
|  |   | With diagnostic output (2-color indicator) | Grommet            | No                      | 3-wire (PNP) | 5 V, 12 V | 12 V              | —                    | M9PA*1 | —     | ○     | ○ | ●                   | ○               |            | ○          | IC circuit |
|  |   |  |                    |                         | 2-wire       |           |                   |                      | M9BA*1 | —     | ○     | ○ | ●                   | ○               |            | ○          |            |
| Magnetic field resistant (2-color indicator) | Grommet                                   | No   | 4-wire (NPN)       | 5 V, 12 V               | 12 V         | —         | F59F              | —                    | ●      | —     | ●     | ○ | ○                   | IC circuit      |            |            |            |
|  |   |  | 2-wire (Non-polar) |                         |              |           | P3DWA             | —                    | ●      | —     | ●     | ○ | ○                   |                 |            |            |            |
| Reed auto switch                             | —   | Grommet                                    | Yes                | 3-wire (NPN equivalent) | 24 V         | 5 V       | —                 | A96                  | —      | ●     | —     | ● | —                   | IC circuit      | Relay, PLC |            |            |
|  |   |  |                    | 100 V                   |              |           |                   | A93                  | —      | ●     | —     | ● | —                   |                 |            |            |            |
|  |   |  |                    | 100 V or less           |              |           |                   | A90                  | —      | ●     | —     | ● | —                   |                 |            | IC circuit |            |
|  |   |  |                    | 100 V, 200 V            |              |           |                   | A54                  | —      | ●     | —     | ● | —                   |                 |            |            |            |
|  |   | Terminal conduit                           | Yes                | No                      | 2-wire       | 24 V      | 12 V              | —                    | A64    | —     | ●     | — | ●                   | —               |            | —          |            |
|  |   |  |                    |                         |              |           |                   |                      | —      | A33   | —     | — | —                   | —               |            |            | —          |
|  |   | DIN terminal                               | Grommet            | Yes                     | 2-wire       | 24 V      | 100 V, 200 V      | —                    | A34    | —     | —     | — | —                   | —               |            | PLC        |            |
|  |   |  |                    |                         |              |           |                   |                      | —      | A44   | —     | — | —                   | —               |            |            | —          |
| Diagnostic indication (2-color indicator)    | Grommet                                   | No   | 2-wire             | 24 V                    | —            | —         | A59W              | —                    | ●      | —     | ●     | — | —                   |                 |            |            |            |
|  |   |  |                    |                         |              |           | —                 | —                    | —      | —     | —     | — |                     | —               |            |            |            |

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

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

\* Lead wire length symbols: 0.5 m.....Nil (Example) M9NW 3 m.....L (Example) M9NWL  
1 m.....M (Example) M9NWM 5 m.....Z (Example) M9NZ

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

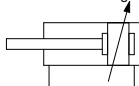
\* Since there are other applicable auto switches than listed above, refer to page 432 for details.

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



### Symbol

Double acting



Made to Order

**Made to Order: Individual Specifications (For details, refer to page 433.)**

| Symbol | Specifications   |
|--------|--|
| -X1184 | Cylinder with heat resistant reed auto switch (-10 to 120°C) |

### Made to Order

[Click here for details](#)

| Symbol | Specifications  |
|--------|---|
| -XA□   | Change of rod end shape   |
| -XB5   | Oversized rod cylinder*1 #2 #3  |
| -XB6   | Heat resistant cylinder (-10 to 150°C)  |
| -XC3   | Special port location*3   |
| -XC4   | With heavy duty scraper   |
| -XC5   | Heat resistant cylinder (-10 to 110°C)  |
| -XC6   | Made of stainless steel*4   |
| -XC7   | Tie-rod, cushion valve, tie-rod nut, etc. 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   |
| -XC14  | Change of trunnion bracket mounting position  |
| -XC22  | Fluororubber seal   |
| -XC26  | With split pins for double clevis pin/double knuckle joint pin and flat washers*4                   |
| -XC27  | Double clevis and double knuckle joint pins made of stainless steel                                 |
| -XC29  | Double knuckle joint with spring pin  |
| -XC30  | Rod trunnion  |
| -XC35  | With coil scraper   |
| -XC65  | Made of stainless steel (Combination of XC7 and XC68)*2   |
| -XC68  | Made of stainless steel (with hard chrome plated piston rod)*2                                      |
| -XC88  | Spatter resistant coil scraper, Lubo-retainer, Grease for welding (Piston rod: Stainless steel 304) |
| -XC89  | Spatter resistant coil scraper, Lubo-retainer, Grease for welding (Piston rod: S45C)                |
| -XC91  | Spatter resistant coil scraper, Grease for welding (Piston rod: S45C)                               |

\*1 Air cushion only

\*2 Except ø125

\*3 The cover shape is the same as the current product.

\*4 ø125 only

For special port location (-XC3), the mounting bracket and port location can be determined using the standard product corresponding to the operating conditions. Also, this is only applicable to -XC3BB, -XC3CC and -XC3DD with trunnion bracket.

For parts made of stainless steel (-XC6), use the same specification stainless steel with the surface treatment (with hard chrome plated piston rod) (-XC68).

## Specifications

| Bore size [mm]                | 32  | 40  | 50  | 63  | 80 | 100 | 125 |
|-------------------------------|---|-----|-----|-----|----|-----|-----|
| 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<br>With auto switch: -10 to 60°C (No freezing)                           |     |     |     |    |     |     |
| Lubricant                     | Not required (Non-lube)   |     |     |     |    |     |     |
| Piston speed                  | 50 to 1000 mm/s   |     |     |     |    |     |     |
| Stroke length tolerance       | Up to 250: $^{+1.0}_0$ , 251 to 1000: $^{+1.4}_0$ , 1001 to 1500: $^{+1.8}_0$ , 1501 to 2000: $^{+2.2}_0$ |     |     |     |    |     |     |
| Cushion                       | Air cushion or Rubber bumper  |     |     |     |    |     |     |
| Port size (Rc)                | 1/8   | 1/4 | 3/8 | 1/2 |    |     |     |
| Mounting                      | Basic, Axial foot, Rod flange, Head flange<br>Single clevis, Double clevis, Center trunnion               |     |     |     |    |     |     |

## Standard Strokes

| Bore size | Standard stroke   |                | Max. manufacturable stroke |
|-----------|---|----------------|----------------------------|
|           | Stroke range ①  | Stroke range ② |                            |
| 32        | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500                           | Up to 1000     | Up to 2700                 |
| 40        | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500                           | Up to 1800     |                            |
| 50        | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600                      |                |                            |
| 63        | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600                      |                |                            |
| 80        | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800            |                |                            |
| 100       | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800            | Up to 2000     |                            |
| 125       | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000 |                |                            |

Note 1) Manufacture of intermediate strokes is possible. (Spacers are not used.)

Note 2) Applicable strokes should be confirmed according to the usage. For details, refer to "Air Cylinders Model Selection" on front matter pages. In addition, the products that exceed the stroke range ① might not be able to fulfill the specifications due to the deflection etc.

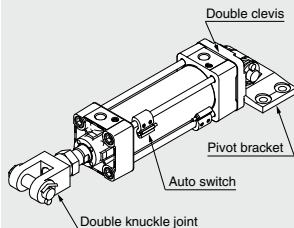
Note 3) Please consult with SMC for manufacturability and the part numbers when exceeding the stroke range ②.

Note 4) The stroke range with rod boot is up to 1000 mm. Please consult with SMC when exceeding 1000 mm strokes.

Note 5) Using a stroke of a length which is smaller than the effective cushion length may result in reduced air cushion performance. Refer to "Technical Data 1" on page 1901 for details on the effective cushion length.

## Ordering Example of Cylinder Assembly

Cylinder model: **MDBD32-50Z-NW-M9BW**



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

\* Pivot bracket, double knuckle joint and auto switch are shipped together with the product, but not assembled.

Refer to pages 425 to 432 for cylinders with auto switches.

- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Minimum stroke for auto switch mounting
- Auto switch mounting brackets/Part no.
- Operating range

CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB

MB

MB1

CA2

CS1

CS2

D-□

-X□

Technical Data

# MB Series

## Accessories

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

\* Refer to page 401 for dimensions and part numbers. (Refer to page 396 for rod boot.)

## Mounting Brackets/Part No.

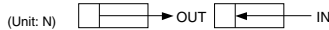
| Bore size [mm]     | 32     | 40     | 50     | 63     | 80     | 100    | 125    |
|--------------------|--------|--------|--------|--------|--------|--------|--------|
| Axial foot Note 1) | MB-L03 | MB-L04 | MB-L05 | MB-L06 | MB-L08 | MB-L10 | MB-L12 |
| Rod/Head flange    | MB-F03 | MB-F04 | MB-F05 | MB-F06 | MB-F08 | MB-F10 | MB-F12 |
| Single clevis      | MB-C03 | MB-C04 | MB-C05 | MB-C06 | MB-C08 | MB-C10 | MB-C12 |
| Double clevis      | MB-D03 | MB-D04 | MB-D05 | MB-D06 | MB-D08 | MB-D10 | MB-D12 |

Note 1) Order two feet per cylinder.

Note 2) Accessories for each mounting bracket are as follows.

Axial foot, Rod/Head flange, Single clevis/Body mounting bolt; Double clevis/Body mounting bolt, Clevis pin, Flat washers and Split pins. → Refer to page 401 for details.

## Theoretical Force



| Bore size [mm] | Rod diameter [mm] | Operating direction | Piston area [mm <sup>2</sup> ] | Operating pressure [MPa] |      |      |      |      |      |      |       |       |  |
|----------------|-------------------|---------------------|--------------------------------|--------------------------|------|------|------|------|------|------|-------|-------|--|
|                |                   |                     |                                | 0.2                      | 0.3  | 0.4  | 0.5  | 0.6  | 0.7  | 0.8  | 0.9   | 1.0   |  |
| 32             | 12                | OUT                 | 804                            | 161                      | 241  | 322  | 402  | 482  | 563  | 643  | 724   | 804   |  |
|                |                   | IN                  | 691                            | 138                      | 207  | 276  | 346  | 415  | 484  | 553  | 622   | 691   |  |
| 40             | 16                | OUT                 | 1257                           | 251                      | 377  | 503  | 629  | 754  | 880  | 1006 | 1131  | 1257  |  |
|                |                   | IN                  | 1056                           | 211                      | 317  | 422  | 528  | 634  | 739  | 845  | 950   | 1056  |  |
| 50             | 20                | OUT                 | 1963                           | 393                      | 589  | 785  | 982  | 1178 | 1374 | 1570 | 1767  | 1963  |  |
|                |                   | IN                  | 1649                           | 330                      | 495  | 660  | 825  | 989  | 1154 | 1319 | 1484  | 1649  |  |
| 63             | 20                | OUT                 | 3117                           | 623                      | 935  | 1247 | 1559 | 1870 | 2182 | 2494 | 2805  | 3117  |  |
|                |                   | IN                  | 2803                           | 561                      | 841  | 1121 | 1402 | 1682 | 1962 | 2242 | 2523  | 2803  |  |
| 80             | 25                | OUT                 | 5027                           | 1005                     | 1508 | 2011 | 2514 | 3016 | 3519 | 4022 | 4524  | 5027  |  |
|                |                   | IN                  | 4536                           | 907                      | 1361 | 1814 | 2268 | 2722 | 3175 | 3629 | 4082  | 4536  |  |
| 100            | 30                | OUT                 | 7854                           | 1571                     | 2356 | 3142 | 3927 | 4712 | 5498 | 6283 | 7069  | 7854  |  |
|                |                   | IN                  | 7147                           | 1429                     | 2144 | 2859 | 3574 | 4288 | 5003 | 5718 | 6432  | 7147  |  |
| 125            | 32                | OUT                 | 12272                          | 2454                     | 3682 | 4909 | 6136 | 7363 | 8590 | 9818 | 11045 | 12272 |  |
|                |                   | IN                  | 11468                          | 2294                     | 3440 | 4588 | 5734 | 6881 | 8028 | 9174 | 10321 | 11468 |  |

Note) Theoretical force [N] = Pressure [MPa] x Piston area [mm<sup>2</sup>]

## Weights

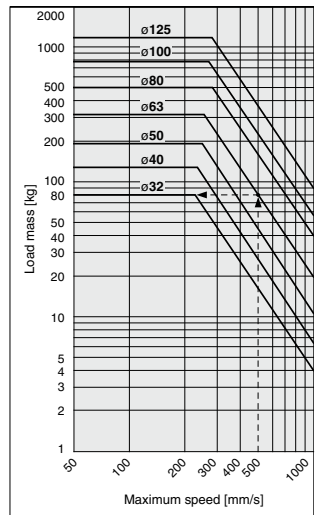
| Bore size [mm]                        |                                 | 32   | 40   | 50   | 63   | 80   | 100  | 125  |
|---------------------------------------|---------------------------------|------|------|------|------|------|------|------|
| Basic weight                          | Basic                           | 0.44 | 0.59 | 1.04 | 1.29 | 2.41 | 3.36 | 5.48 |
|                                       | Axial foot                      | 0.56 | 0.73 | 1.26 | 1.57 | 2.91 | 4.02 | 7.56 |
|                                       | Rod/Head flange                 | 0.73 | 0.96 | 1.49 | 2.08 | 3.86 | 5.19 | 9.64 |
|                                       | Single clevis                   | 0.69 | 0.82 | 1.38 | 1.92 | 3.52 | 4.94 | 8.05 |
|                                       | Double clevis                   | 0.7  | 0.86 | 1.47 | 2.08 | 3.81 | 5.21 | 8.25 |
|                                       | Center trunnion                 | 0.73 | 0.95 | 1.52 | 2.09 | 3.96 | 5.05 | 8.46 |
| Additional weight per 50 mm of stroke | All mounting brackets           | 0.11 | 0.16 | 0.26 | 0.27 | 0.42 | 0.56 | 0.71 |
| Accessories                           | Single knuckle joint            | 0.15 | 0.23 | 0.26 | 0.26 | 0.60 | 0.83 | 1.08 |
|                                       | Double knuckle joint (with pin) | 0.22 | 0.37 | 0.43 | 0.43 | 0.87 | 1.27 | 1.58 |

## Rod Boot Material

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

\* Max. ambient temperature for rod boot itself.

## Allowable Kinetic Energy



Example) Load limit at rod end when the air cylinder ø63 is actuated at 500 mm/s.

Extend upward from 500 mm/s on the horizontal axis of the graph to the intersection point with the line for a tube bore size of 63 mm, and then extend leftward from this point to find the load of 80 kg.

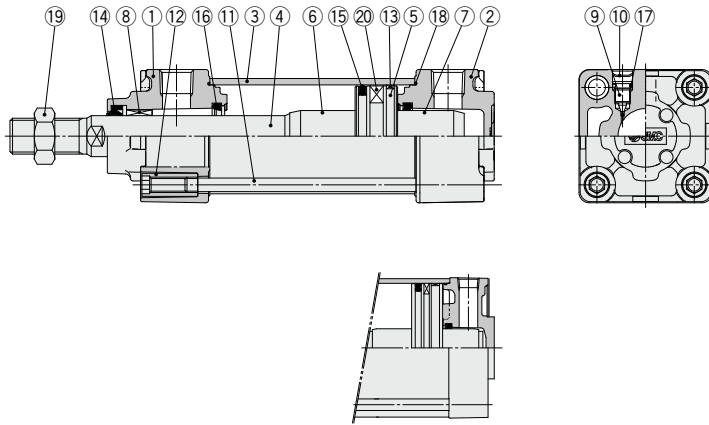
### Calculation

Example) **MBB32-100Z** (Basic, ø32, 100 stroke)

- Basic weight..... 0.44 (Basic, ø32)
  - Additional weight..... 0.11/50 stroke
  - Cylinder stroke..... 100 stroke
- 0.44 + 0.11 x 100/50 = **0.66 kg**



## Construction



MB125

### Component Parts

| No. | Description    | Material          | Q'ty | Note                     |
|-----|----------------|-------------------|------|--------------------------|
| 1   | Rod cover      | Aluminum die-cast | 1    | Trivalent chromated      |
| 2   | Head cover     | Aluminum die-cast | 1    | Trivalent chromated      |
| 3   | Cylinder tube  | Aluminum alloy    | 1    | Hard anodized            |
| 4   | Piston rod     | Carbon steel      | 1    | Hard chrome plating      |
| 5   | Piston         | Aluminum alloy    | 1    |                          |
| 6   | Cushion ring   | Aluminum alloy    | 1    | Anodized                 |
| 7   | Cushion ring B | Aluminum alloy    | 1    | Anodized                 |
| 8   | Bushing        | Bearing alloy     | 1    |                          |
| 9   | Cushion valve  | Steel wire        | 2    | Trivalent zinc chromated |
| 10  | Retaining ring | Steel for spring  | 2    | ø40 to ø125              |

| No. | Description          | Material     | Q'ty | Note                     |
|-----|----------------------|--------------|------|--------------------------|
| 11  | Tie-rod              | Carbon steel | 4    | Trivalent zinc chromated |
| 12  | Tie-rod nut          | Carbon steel | 8    | Trivalent zinc chromated |
| 13  | Wear ring            | Resin        | 1    |                          |
| 14  | Rod seal             | NBR          | 1    |                          |
| 15  | Piston seal          | NBR          | 1    |                          |
| 16  | Cushion seal         | Urethane     | 2    |                          |
| 17  | Cushion valve seal   | NBR          | 2    |                          |
| 18  | Cylinder tube gasket | NBR          | 2    |                          |
| 19  | Rod end nut          | Rolled steel | 1    | Trivalent zinc chromated |
| 20  | Magnet               | —            | (1)  |                          |

### Replacement Parts/Seal Kit

| Bore size [mm] | Kit no.     | Contents                          |
|----------------|-------------|-----------------------------------|
| 32             | MB32Z-PS    | Set of the nos.<br>14, 15, 16, 18 |
| 40             | CA2-40Z-PS  |                                   |
| 50             | CA2-50Z-PS  |                                   |
| 63             | CA2-63Z-PS  |                                   |
| 80             | CA2-80Z-PS  |                                   |
| 100            | CA2-100Z-PS |                                   |
| 125            | MB125-PS    |                                   |

\* Seal kits consist of items 14, 15, 16, 18, and can be ordered by using the seal kit number corresponding to each bore size.

\* Center trunnion type should not be disassembled. (Refer to page 434.)

\* The seal kit includes a grease pack (10 g for ø32 to ø50, 20 g for ø63 and ø80, 30 g for ø100 and ø125).

Order with the following part number when only the grease pack is needed.

**Grease pack part number: GR-S-010** (10 g), **GR-S-020** (20 g)

### Water Resistant Air Cylinder

Water resistant air cylinders are also available in the MB series, which are suitable for use on machine tools, where exposure to coolant is possible and applicable for food machinery and automobile washing equipment in an environment where water splashes. Please refer to page 1125 for more information.

CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB

**MB**

MB1

CA2

CS1

CS2

D-□

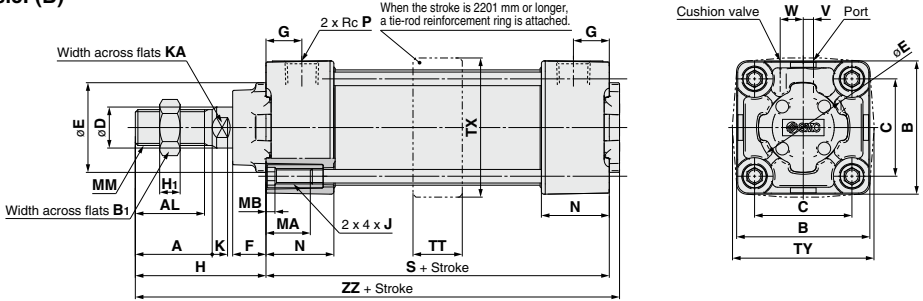
-X□

Technical  
Data

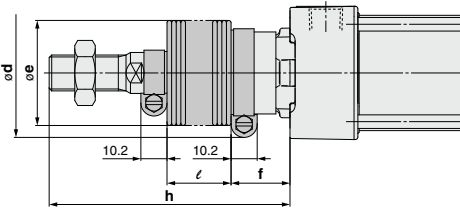
# MB Series

## Standard

### Basic: (B)



### With rod boot



| Bore size [mm] | A  | AL   | B   | B <sub>1</sub> | C    | D  | E  | F  | G    | H  | H <sub>1</sub> | J          | K  | KA | MA | MB | MM         | N    | P   | S   | TT | TX  | TY  | V    | W    | ZZ  |
|----------------|----|------|-----|----------------|------|----|----|----|------|----|----------------|------------|----|----|----|----|------------|------|-----|-----|----|-----|-----|------|------|-----|
| 32             | 22 | 19.5 | 46  | 17             | 32.5 | 12 | 30 | 13 | 13   | 47 | 6              | M6 x 1     | 6  | 10 | 16 | 4  | M10 x 1.25 | 27   | 1/8 | 84  | 17 | 48  | 49  | 4    | 6.5  | 135 |
| 40             | 30 | 27   | 52  | 22             | 38   | 16 | 35 | 13 | 14   | 51 | 8              | M6 x 1     | 6  | 14 | 16 | 4  | M14 x 1.5  | 27   | 1/4 | 84  | 22 | 55  | 58  | 4    | 9    | 139 |
| 50             | 35 | 32   | 65  | 27             | 46.5 | 20 | 40 | 14 | 15.5 | 58 | 11             | M8 x 1.25  | 7  | 18 | 16 | 5  | M18 x 1.5  | 31.5 | 1/4 | 94  | 22 | 68  | 71  | 5    | 10.5 | 156 |
| 63             | 35 | 32   | 75  | 27             | 56.5 | 20 | 45 | 14 | 16.5 | 58 | 11             | M8 x 1.25  | 7  | 18 | 16 | 5  | M18 x 1.5  | 31.5 | 3/8 | 94  | 28 | 81  | 81  | 9    | 12   | 156 |
| 80             | 40 | 37   | 95  | 32             | 72   | 25 | 45 | 20 | 19   | 72 | 13             | M10 x 1.5  | 10 | 22 | 16 | 5  | M22 x 1.5  | 38   | 3/8 | 114 | 34 | 102 | 102 | 11.5 | 14   | 190 |
| 100            | 40 | 37   | 114 | 41             | 89   | 30 | 55 | 20 | 19   | 72 | 16             | M10 x 1.5  | 10 | 26 | 16 | 5  | M26 x 1.5  | 38   | 1/2 | 114 | 40 | 124 | 124 | 17   | 15   | 190 |
| 125            | 54 | 50   | 136 | 41             | 110  | 32 | 60 | 27 | 19   | 97 | 16             | M12 x 1.75 | 13 | 27 | 20 | 6  | M27 x 2    | 38   | 1/2 | 120 | 50 | 148 | 148 | 17   | 15   | 223 |

### With Rod Boot

| Bore size [mm] | d  | e  | f  | $\ell$  |           |            |            |            |            |            |            |            |            |            |             |   |   |   |   |   |   |   |   |   |   |   |   |
|----------------|----|----|----|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|---|---|---|---|---|---|---|---|---|---|---|---|
|                |    |    |    | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 501 to 600 | 601 to 700 | 701 to 800 | 801 to 900 | 901 to 1000 |   |   |   |   |   |   |   |   |   |   |   |   |
| 32             | 54 | 36 | 23 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | —          | —          | —          | —          | —           | — | — | — | — | — | — | — | — | — | — | — |   |
| 40             | 56 | 41 | 23 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | —          | —          | —          | —          | —           | — | — | — | — | — | — | — | — | — | — | — |   |
| 50             | 64 | 51 | 25 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | —          | —          | —          | —           | — | — | — | — | — | — | — | — | — | — | — | — |
| 63             | 64 | 51 | 25 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | —          | —          | —          | —           | — | — | — | — | — | — | — | — | — | — | — | — |
| 80             | 68 | 56 | 29 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | —          | —           | — | — | — | — | — | — | — | — | — | — | — | — |
| 100            | 76 | 61 | 29 | 12.5    | 25        | 37.5       | 50         | 75         | 100        | 125        | 150        | 175        | 200        | —          | —           | — | — | — | — | — | — | — | — | — | — | — | — |
| 125            | 82 | 75 | 27 | 10      | 20        | 30         | 40         | 60         | 80         | 100        | 120        | 140        | 160        | 180        | 200         | — | — | — | — | — | — | — | — | — | — | — | — |

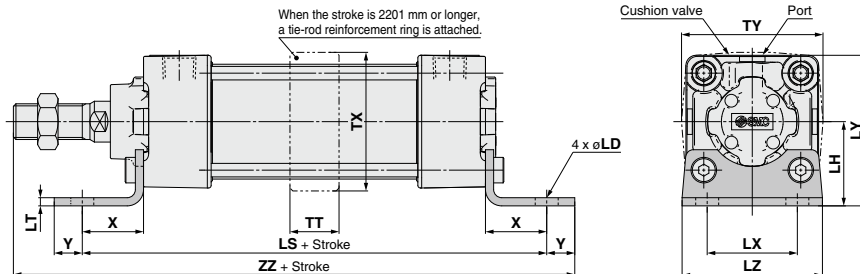
| Bore size [mm] | h       |           |            |            |            |            |            |            |            |            |            |             | Rubber Bumper  |     |     |
|----------------|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|----------------|-----|-----|
|                | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 501 to 600 | 601 to 700 | 701 to 800 | 801 to 900 | 901 to 1000 | Bore size [mm] | S   | ZZ  |
| 32             | 73      | 86        | 98         | 111        | 136        | 161        | 186        | —          | —          | —          | —          | —           | 32             | 90  | 141 |
| 40             | 81      | 94        | 106        | 119        | 144        | 169        | 194        | —          | —          | —          | —          | —           | 40             | 90  | 145 |
| 50             | 89      | 102       | 114        | 127        | 152        | 177        | 202        | 227        | —          | —          | —          | —           | 50             | 102 | 164 |
| 63             | 89      | 102       | 114        | 127        | 152        | 177        | 202        | 227        | —          | —          | —          | —           | 63             | 102 | 164 |
| 80             | 101     | 114       | 126        | 139        | 164        | 189        | 214        | 239        | 264        | 289        | —          | —           | 80             | 124 | 200 |
| 100            | 101     | 114       | 126        | 139        | 164        | 189        | 214        | 239        | 264        | 289        | —          | —           | 100            | 124 | 200 |
| 125            | 120     | 130       | 140        | 150        | 170        | 190        | 210        | 230        | 250        | 270        | 290        | 310         | 125            | 132 | 235 |

\* Model without air cushion is designed to include rubber bumpers. Since the bumpers are attached to the both sides of the piston, the overall length is longer than the cylinder with air cushion as follows:  $\phi 32$ ,  $\phi 40$ : +6 mm,  $\phi 50$ ,  $\phi 63$ : +8 mm,  $\phi 80$ ,  $\phi 100$ : +10 mm,  $\phi 125$ : +12 mm

**Standard/With Mounting Bracket**

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

**Axial foot: (L)**



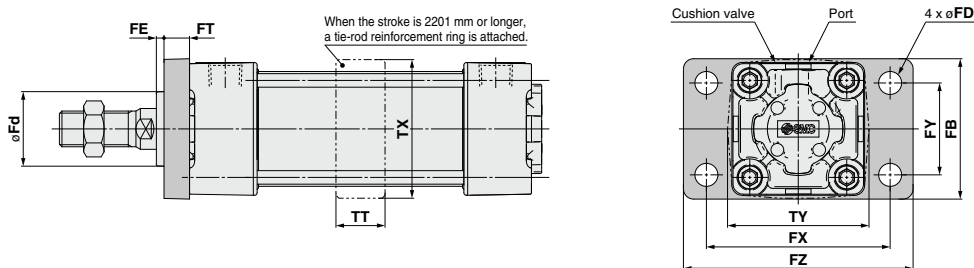
| Bore size [mm] | LD | LH | LS  | LT  | LX | LY    | LZ  | TT | TX  | TY  | X  | Y  | ZZ  |
|----------------|----|----|-----|-----|----|-------|-----|----|-----|-----|----|----|-----|
| 32             | 7  | 30 | 128 | 3.2 | 32 | 53    | 50  | 17 | 48  | 49  | 22 | 9  | 162 |
| 40             | 9  | 33 | 132 | 3.2 | 38 | 59    | 55  | 22 | 55  | 58  | 24 | 11 | 170 |
| 50             | 9  | 40 | 148 | 3.2 | 46 | 72.5  | 70  | 22 | 68  | 71  | 27 | 11 | 190 |
| 63             | 12 | 45 | 148 | 3.6 | 56 | 82.5  | 80  | 28 | 81  | 81  | 27 | 14 | 193 |
| 80             | 12 | 55 | 174 | 4.5 | 72 | 102.5 | 100 | 34 | 102 | 102 | 30 | 14 | 230 |
| 100            | 14 | 65 | 178 | 4.5 | 89 | 122   | 120 | 40 | 124 | 124 | 32 | 16 | 234 |
| 125            | 14 | 81 | 210 | 8   | 90 | 149   | 136 | 50 | 148 | 148 | 45 | 20 | 282 |

**Rubber Bumper**

| Bore size [mm] | LS  | ZZ  |
|----------------|-----|-----|
| 32             | 134 | 168 |
| 40             | 138 | 176 |
| 50             | 156 | 198 |
| 63             | 156 | 201 |
| 80             | 184 | 240 |
| 100            | 188 | 244 |
| 125            | 222 | 294 |

\* Model without air cushion is designed to include rubber bumpers. Since the bumpers are attached to the both sides of the piston, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

**Rod flange: (F)**



| Bore size [mm] | FB  | FD | FE | FT | FX  | FY  | FZ  | Fd   | TT | TX  | TY  |
|----------------|-----|----|----|----|-----|-----|-----|------|----|-----|-----|
| 32             | 50  | 7  | 3  | 10 | 64  | 32  | 79  | 24.5 | 17 | 48  | 49  |
| 40             | 55  | 9  | 3  | 10 | 72  | 36  | 90  | 29.5 | 22 | 55  | 58  |
| 50             | 70  | 9  | 2  | 12 | 90  | 45  | 110 | 35.5 | 22 | 68  | 71  |
| 63             | 80  | 9  | 2  | 12 | 100 | 50  | 120 | 38.5 | 28 | 81  | 81  |
| 80             | 100 | 12 | 4  | 16 | 126 | 63  | 153 | 41   | 34 | 102 | 102 |
| 100            | 120 | 14 | 4  | 16 | 150 | 75  | 178 | 46   | 40 | 124 | 124 |
| 125            | 138 | 14 | 7  | 20 | 180 | 102 | 216 | 57   | 50 | 148 | 148 |

\* Model without air cushion is designed to include rubber bumpers. Since the bumpers are attached to the both sides of the piston, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

- CJ1
- CJP
- CJ2
- JCM
- CM2
- CM3
- CG1
- CG3
- JMB
- MB**
- MB1
- CA2
- CS1
- CS2

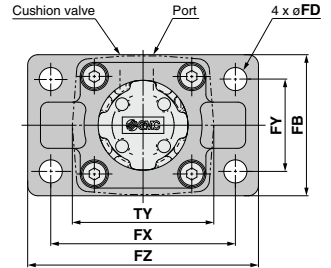
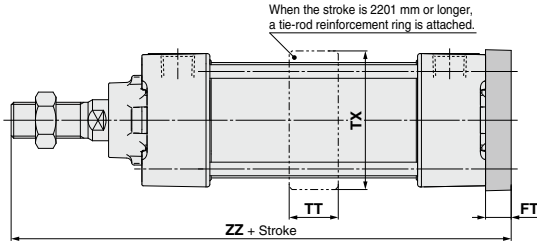
- D-□
- X□
- Technical Data

# MB Series

## Standard/With Mounting Bracket

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

### Head flange: (G)



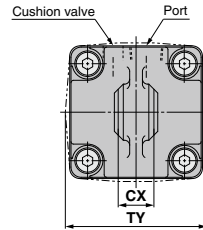
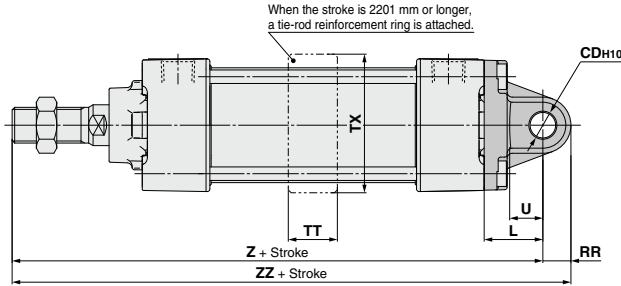
| Bore size [mm] | FB  | FD | FT | FX  | FY  | FZ  | TT | TX  | TY  | ZZ  |
|----------------|-----|----|----|-----|-----|-----|----|-----|-----|-----|
| 32             | 50  | 7  | 10 | 64  | 32  | 79  | 17 | 48  | 49  | 141 |
| 40             | 55  | 9  | 10 | 72  | 36  | 90  | 22 | 55  | 58  | 145 |
| 50             | 70  | 9  | 12 | 90  | 45  | 110 | 22 | 68  | 71  | 164 |
| 63             | 80  | 9  | 12 | 100 | 50  | 120 | 28 | 81  | 81  | 164 |
| 80             | 100 | 12 | 16 | 126 | 63  | 153 | 34 | 102 | 102 | 202 |
| 100            | 120 | 14 | 16 | 150 | 75  | 178 | 40 | 124 | 124 | 202 |
| 125            | 138 | 14 | 20 | 180 | 102 | 216 | 50 | 148 | 148 | 237 |

### Rubber Bumper

| Bore size [mm] | ZZ  |
|----------------|-----|
| 32             | 147 |
| 40             | 151 |
| 50             | 172 |
| 63             | 172 |
| 80             | 212 |
| 100            | 212 |
| 125            | 249 |

\* Model without air cushion is designed to include rubber bumpers. Since the bumpers are attached to the both sides of the piston, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

### Single clevis: (C)



| Bore size [mm] | CDH10                             | CX                                 | L  | RR   | TT | TX  | TY  | U  | Z   | ZZ    |
|----------------|-----------------------------------|------------------------------------|----|------|----|-----|-----|----|-----|-------|
| 32             | 10 <sup>+0.058</sup> <sub>0</sub> | 14 <sup>-0.1</sup> <sub>-0.3</sub> | 23 | 10.5 | 17 | 48  | 49  | 13 | 154 | 164.5 |
| 40             | 10 <sup>+0.058</sup> <sub>0</sub> | 14 <sup>-0.1</sup> <sub>-0.3</sub> | 23 | 11   | 22 | 55  | 58  | 13 | 158 | 169   |
| 50             | 14 <sup>+0.070</sup> <sub>0</sub> | 20 <sup>-0.1</sup> <sub>-0.3</sub> | 30 | 15   | 22 | 68  | 71  | 17 | 182 | 197   |
| 63             | 14 <sup>+0.070</sup> <sub>0</sub> | 20 <sup>-0.1</sup> <sub>-0.3</sub> | 30 | 15   | 28 | 81  | 81  | 17 | 182 | 197   |
| 80             | 22 <sup>+0.084</sup> <sub>0</sub> | 30 <sup>-0.1</sup> <sub>-0.3</sub> | 42 | 23   | 34 | 102 | 102 | 26 | 228 | 251   |
| 100            | 22 <sup>+0.084</sup> <sub>0</sub> | 30 <sup>-0.1</sup> <sub>-0.3</sub> | 42 | 23   | 40 | 124 | 124 | 26 | 228 | 251   |
| 125            | 25 <sup>+0.084</sup> <sub>0</sub> | 32 <sup>-0.1</sup> <sub>-0.3</sub> | 50 | 28   | 50 | 148 | 148 | 30 | 267 | 295   |

### Rubber Bumper

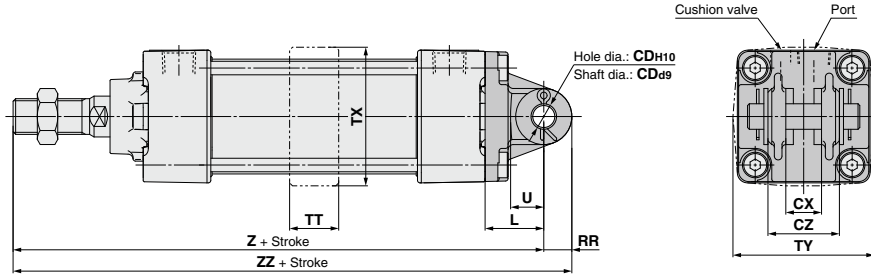
| Bore size [mm] | Z   | ZZ    |
|----------------|-----|-------|
| 32             | 160 | 170.5 |
| 40             | 164 | 175   |
| 50             | 190 | 205   |
| 63             | 190 | 205   |
| 80             | 238 | 261   |
| 100            | 238 | 261   |
| 125            | 279 | 307   |

\* Model without air cushion is designed to include rubber bumpers. Since the bumpers are attached to the both sides of the piston, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

**Standard/With Mounting Bracket**

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

**Double clevis: (D)**



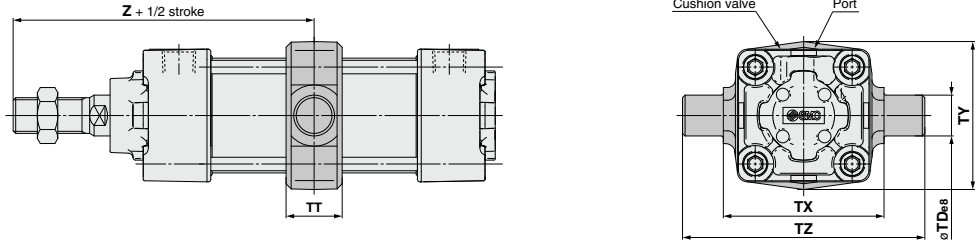
| Bore size [mm] | CDH10                             | CDø9                                   | CX                                 | CZ | L  | RR   | TT | TX  | TY  | U  | Z   | ZZ    |
|----------------|-----------------------------------|--|------------------------------------|----|----|------|----|-----|-----|----|-----|-------|
| 32             | 10 <sup>+0.058</sup> <sub>0</sub> | 10 <sup>-0.040</sup> <sub>-0.076</sub> | 14 <sup>+0.3</sup> <sub>+0.1</sub> | 28 | 23 | 10.5 | 17 | 48  | 49  | 13 | 154 | 164.5 |
| 40             | 10 <sup>+0.058</sup> <sub>0</sub> | 10 <sup>-0.04</sup> <sub>-0.076</sub>  | 14 <sup>+0.3</sup> <sub>+0.1</sub> | 28 | 23 | 11   | 22 | 55  | 58  | 13 | 158 | 169   |
| 50             | 14 <sup>+0.070</sup> <sub>0</sub> | 14 <sup>-0.050</sup> <sub>-0.093</sub> | 20 <sup>+0.3</sup> <sub>+0.1</sub> | 40 | 30 | 15   | 22 | 68  | 71  | 17 | 182 | 197   |
| 63             | 14 <sup>+0.070</sup> <sub>0</sub> | 14 <sup>-0.050</sup> <sub>-0.093</sub> | 20 <sup>+0.3</sup> <sub>+0.1</sub> | 40 | 30 | 15   | 28 | 81  | 81  | 17 | 182 | 197   |
| 80             | 22 <sup>+0.084</sup> <sub>0</sub> | 22 <sup>-0.065</sup> <sub>-0.117</sub> | 30 <sup>+0.3</sup> <sub>+0.1</sub> | 60 | 42 | 23   | 34 | 102 | 102 | 26 | 228 | 251   |
| 100            | 22 <sup>+0.084</sup> <sub>0</sub> | 22 <sup>-0.065</sup> <sub>-0.117</sub> | 30 <sup>+0.3</sup> <sub>+0.1</sub> | 60 | 42 | 23   | 40 | 124 | 124 | 26 | 228 | 251   |
| 125            | 25 <sup>+0.084</sup> <sub>0</sub> | 25 <sup>-0.065</sup> <sub>-0.117</sub> | 32 <sup>+0.3</sup> <sub>+0.1</sub> | 64 | 50 | 28   | 50 | 148 | 148 | 30 | 267 | 295   |

**Rubber Bumper**

| Bore size [mm] | Z   | ZZ    |
|----------------|-----|-------|
| 32             | 160 | 170.5 |
| 40             | 164 | 175   |
| 50             | 190 | 205   |
| 63             | 190 | 205   |
| 80             | 238 | 261   |
| 100            | 238 | 261   |
| 125            | 279 | 307   |

\* Model without air cushion is designed to include rubber bumpers. Since the bumpers are attached to the both sides of the piston, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

**Center trunnion: (T)**



| Bore size [mm] | TDes                                   | TT | TX  | TY  | TZ  | Z   |
|----------------|--|----|-----|-----|-----|-----|
| 32             | 12 <sup>-0.032</sup> <sub>-0.059</sub> | 17 | 50  | 49  | 74  | 89  |
| 40             | 16 <sup>-0.032</sup> <sub>-0.059</sub> | 22 | 63  | 58  | 95  | 93  |
| 50             | 16 <sup>-0.032</sup> <sub>-0.059</sub> | 22 | 75  | 71  | 107 | 105 |
| 63             | 20 <sup>-0.040</sup> <sub>-0.073</sub> | 28 | 90  | 87  | 130 | 105 |
| 80             | 20 <sup>-0.040</sup> <sub>-0.073</sub> | 34 | 110 | 110 | 150 | 129 |
| 100            | 25 <sup>-0.040</sup> <sub>-0.073</sub> | 40 | 132 | 136 | 182 | 129 |
| 125            | 25 <sup>-0.040</sup> <sub>-0.073</sub> | 50 | 160 | 160 | 210 | 157 |

**Rubber Bumper**

| Bore size [mm] | Z   |
|----------------|-----|
| 32             | 92  |
| 40             | 96  |
| 50             | 109 |
| 63             | 109 |
| 80             | 134 |
| 100            | 134 |
| 125            | 163 |

\* Model without air cushion is designed to include rubber bumpers. Since the bumpers are attached to the both sides of the piston, the "Z" dimension is longer than the cylinder with air cushion as follows: ø32, ø40: +3 mm, ø50, ø63: +4 mm, ø80, ø100: +5 mm, ø125: +6 mm

- CJ1
- CJP
- CJ2
- JCM
- CM2
- CM3
- CG1
- CG3
- JMB
- MB**
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Technical Data

# MB Series

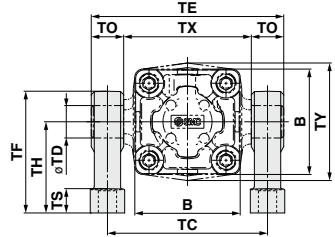
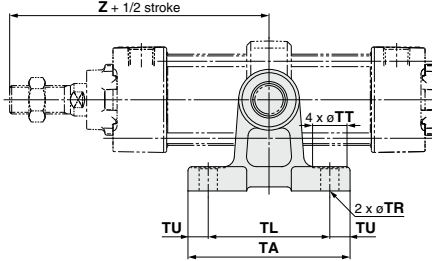
## Pivot Bracket/Trunnion and Double Clevis Pivot Bracket

### Part No.

| Bore size                     | MB□32  | MB□40  | MB□50  | MB□63  | MB□80  | MB□100 | MB□125 |
|-------------------------------|--------|--------|--------|--------|--------|--------|--------|
| Description                   | MB-S03 | MB-S04 | MB-S06 | MB-S10 | MB-S12 |        |        |
| Trunnion pivot bracket (Note) | MB-S03 |        | MB-S04 |        | MB-S06 |        | MB-S10 |
| Double clevis pivot bracket   | MB-B03 |        | MB-B05 |        | MB-B08 |        | MB-B12 |

(Note) Order 2 trunnion pivot brackets per cylinder.

### Trunnion pivot bracket

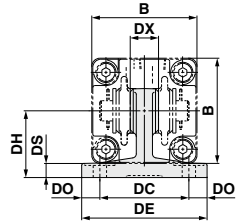
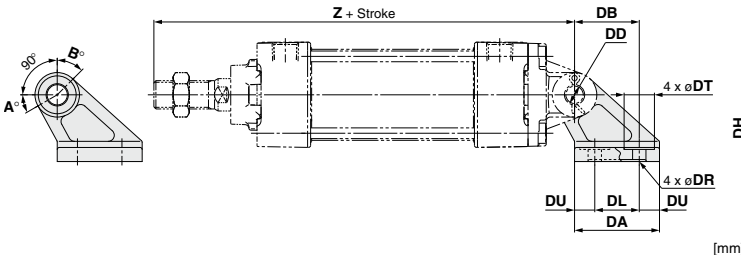


| Part no. | Bore size [mm] | B   | TA  | TL  | TU   | TC  | TX  | TE  | TO | TR   | TT | TS | TH | TF  | Z** | TD <sub>H10</sub>                 |
|----------|----------------|-----|-----|-----|------|-----|-----|-----|----|------|----|----|----|-----|-----|-----------------------------------|
| MB-S03   | 32             | 46  | 62  | 45  | 8.5  | 62  | 50  | 74  | 12 | 7    | 13 | 10 | 35 | 47  | 89  | 12 <sup>+0.070</sup> <sub>0</sub> |
|          | 40             | 52  | 80  | 60  | 10   | 80  | 63  | 97  | 17 | 9    | 17 | 12 | 45 | 60  | 93  | 16 <sup>+0.070</sup> <sub>0</sub> |
| MB-S04   | 50             | 65  | 80  | 60  | 10   | 92  | 75  | 109 | 17 | 9    | 17 | 12 | 45 | 60  | 105 | 16 <sup>+0.070</sup> <sub>0</sub> |
|          | 63             | 75  | 100 | 70  | 15   | 110 | 90  | 130 | 20 | 11   | 22 | 14 | 60 | 80  | 105 | 20 <sup>+0.084</sup> <sub>0</sub> |
| MB-S06   | 80             | 95  | 100 | 70  | 15   | 130 | 110 | 150 | 20 | 11   | 22 | 14 | 60 | 80  | 129 | 20 <sup>+0.084</sup> <sub>0</sub> |
|          | 100            | 114 | 120 | 90  | 15   | 158 | 132 | 184 | 26 | 13.5 | 24 | 17 | 75 | 100 | 129 | 25 <sup>+0.084</sup> <sub>0</sub> |
| MB-S12   | 125            | 136 | 142 | 105 | 18.5 | 186 | 160 | 212 | 26 | 13.5 | 24 | 25 | 85 | 115 | 157 | 25 <sup>+0.084</sup> <sub>0</sub> |

### Rubber Bumper

| Bore size [mm] | Z   |
|----------------|-----|
| 32             | 92  |
| 40             | 96  |
| 50             | 109 |
| 63             | 109 |
| 80             | 134 |
| 100            | 134 |
| 125            | 163 |

### Double clevis pivot bracket



| Part no. | Bore size [mm] | B   | DA | DB | DL | DU   | DC  | DX | DE  | DO   | DR   | DT | DS | DH | Z** | DD <sub>H10</sub>                 |
|----------|----------------|-----|----|----|----|------|-----|----|-----|------|------|----|----|----|-----|-----------------------------------|
| MB-B03   | 32             | 46  | 42 | 32 | 22 | 10   | 44  | 14 | 62  | 9    | 6.6  | 15 | 7  | 33 | 154 | 10 <sup>+0.058</sup> <sub>0</sub> |
|          | 40             | 52  | 42 | 32 | 22 | 10   | 44  | 14 | 62  | 9    | 6.6  | 15 | 7  | 33 | 158 | 10 <sup>+0.058</sup> <sub>0</sub> |
| MB-B05   | 50             | 65  | 53 | 43 | 30 | 11.5 | 60  | 20 | 81  | 10.5 | 9    | 18 | 8  | 45 | 182 | 14 <sup>+0.070</sup> <sub>0</sub> |
|          | 63             | 75  | 53 | 43 | 30 | 11.5 | 60  | 20 | 81  | 10.5 | 9    | 18 | 8  | 45 | 182 | 14 <sup>+0.070</sup> <sub>0</sub> |
| MB-B08   | 80             | 95  | 73 | 64 | 45 | 14   | 86  | 30 | 111 | 12.5 | 11   | 22 | 10 | 65 | 228 | 22 <sup>+0.084</sup> <sub>0</sub> |
|          | 100            | 114 | 73 | 64 | 45 | 14   | 86  | 30 | 111 | 12.5 | 11   | 22 | 10 | 65 | 228 | 22 <sup>+0.084</sup> <sub>0</sub> |
| MB-B12   | 125            | 136 | 90 | 78 | 60 | 15   | 110 | 32 | 136 | 13   | 13.5 | 24 | 14 | 75 | 267 | 25 <sup>+0.084</sup> <sub>0</sub> |

### Rubber Bumper

| Bore size [mm] | Z   |
|----------------|-----|
| 32             | 160 |
| 40             | 164 |
| 50             | 190 |
| 63             | 190 |
| 80             | 238 |
| 100            | 238 |
| 125            | 279 |

### Rotating Angle

| Bore size [mm] | A°  | B°  | A° + B° + 90° |
|----------------|-----|-----|---------------|
| 32, 40         | 25° | 45° | 160°          |
| 50, 63         | 40° | 60° | 190°          |
| 80, 100        | 30° | 55° | 175°          |
| 125            | 30° | 50° | 170°          |

\*\* Model without air cushion is designed to include rubber bumpers.

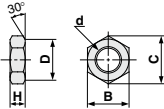
Since the bumpers are attached to the both sides of the piston, the "Z" dimension is longer than the cylinder with air cushion as follows: ø32, ø40: +3 mm, ø50, ø63: +4 mm, ø80, ø100: +5 mm, ø125: +6 mm

\* Model without air cushion is designed to include rubber bumpers.

Since the bumpers are attached to the both sides of the piston, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

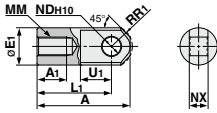
## Dimensions of Accessories

Rod end nut  
(Standard)



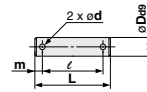
| Part no. | Bore size [mm] | d          | H  | B  | C    | D    |
|----------|----------------|------------|----|----|------|------|
| NT-03    | 32             | M10 x 1.25 | 6  | 17 | 19.6 | 16.5 |
| NT-04    | 40             | M14 x 1.5  | 8  | 22 | 25.4 | 21   |
| NT-05    | 50, 63         | M18 x 1.5  | 11 | 27 | 31.2 | 26   |
| NT-08    | 80             | M22 x 1.5  | 13 | 32 | 37.0 | 31   |
| NT-10    | 100            | M26 x 1.5  | 16 | 41 | 47.3 | 39   |
| NT-12M   | 125            | M27 x 2    | 16 | 41 | 47.3 | 39   |

I type  
Single knuckle joint



| Part no. | Bore size [mm] | A   | A <sub>1</sub> | E <sub>1</sub> | L <sub>1</sub> | MM         | R <sub>1</sub> | U <sub>1</sub> | NDH <sub>10</sub>                     | NX                                   |
|----------|----------------|-----|----------------|----------------|----------------|------------|----------------|----------------|---------------------------------------|--------------------------------------|
| I-03M    | 32             | 40  | 14             | 20             | 30             | M10 x 1.25 | 12             | 16             | 10 <sup>+0.10</sup> <sub>-0.30</sub>  | 14 <sup>+0.10</sup> <sub>-0.30</sub> |
| I-04M    | 40             | 50  | 19             | 22             | 40             | M14 x 1.5  | 12.5           | 19             | 10 <sup>+0.058</sup> <sub>-0.30</sub> | 14 <sup>+0.10</sup> <sub>-0.30</sub> |
| I-05M    | 50, 63         | 64  | 24             | 28             | 50             | M18 x 1.5  | 16.5           | 24             | 14 <sup>+0.070</sup> <sub>-0.30</sub> | 20 <sup>+0.10</sup> <sub>-0.30</sub> |
| I-08M    | 80             | 80  | 26             | 40             | 60             | M22 x 1.5  | 23.5           | 34             | 22 <sup>+0.084</sup> <sub>-0.30</sub> | 30 <sup>+0.10</sup> <sub>-0.30</sub> |
| I-10M    | 100            | 80  | 26             | 40             | 60             | M26 x 1.5  | 23.5           | 34             | 22 <sup>+0.084</sup> <sub>-0.30</sub> | 30 <sup>+0.10</sup> <sub>-0.30</sub> |
| I-12M    | 125            | 119 | 36             | 46             | 92             | M27 x 2    | 28.5           | 34             | 25 <sup>+0.084</sup> <sub>-0.30</sub> | 32 <sup>+0.10</sup> <sub>-0.30</sub> |

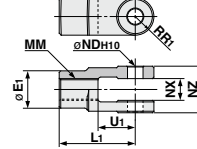
Knuckle joint pin  
Clevis pin



| Part no.                  | Bore size [mm]<br>Clevis/Knuckle | D <sub>09</sub>                        | L    | ℓ    | m   | d | Applicable split pin |
|---------------------------|----------------------------------|--|------|------|-----|---|----------------------|
| CD-M03 <sup>Note 1)</sup> | 32, 40                           | 10 <sup>-0.040</sup> <sub>-0.076</sub> | 44   | 36   | 4   | 3 | ø3 x 18 ℓ            |
| CD-M05 <sup>Note 1)</sup> | 50, 63                           | 14 <sup>-0.050</sup> <sub>-0.093</sub> | 60   | 51   | 4.5 | 4 | ø4 x 25 ℓ            |
| CD-M08 <sup>Note 1)</sup> | 80, 100                          | 22 <sup>-0.075</sup> <sub>-0.117</sub> | 82   | 72   | 5   | 4 | ø4 x 35 ℓ            |
| IY-12 <sup>Note 2)</sup>  | 125                              | 25 <sup>-0.085</sup> <sub>-0.117</sub> | 79.5 | 69.5 | 5   | 4 | ø4 x 40 ℓ            |

Note 1) Split pins and flat washers are included. Note 2) Only pins are included when shipped.

Y type  
Double knuckle joint



| Part no.                 | Bore size [mm] | E <sub>1</sub> | L <sub>1</sub> | MM         | R <sub>1</sub> | U <sub>1</sub> | NDH <sub>10</sub>                     | NX                                   | NZ                                   |
|--------------------------|----------------|----------------|----------------|------------|----------------|----------------|---------------------------------------|--------------------------------------|--------------------------------------|
| Y-03M <sup>Note 1)</sup> | 32             | 20             | 30             | M10 x 1.25 | 10             | 16             | 10 <sup>+0.058</sup> <sub>-0.30</sub> | 14 <sup>+0.30</sup> <sub>-0.10</sub> | 28 <sup>+0.10</sup> <sub>-0.30</sub> |
| Y-04M <sup>Note 1)</sup> | 40             | 22             | 40             | M14 x 1.5  | 11             | 19             | 10 <sup>+0.058</sup> <sub>-0.30</sub> | 14 <sup>+0.30</sup> <sub>-0.10</sub> | 28 <sup>+0.10</sup> <sub>-0.30</sub> |
| Y-05M <sup>Note 1)</sup> | 50, 63         | 28             | 50             | M18 x 1.5  | 14             | 24             | 14 <sup>+0.070</sup> <sub>-0.30</sub> | 20 <sup>+0.30</sup> <sub>-0.10</sub> | 40 <sup>+0.10</sup> <sub>-0.30</sub> |
| Y-08M <sup>Note 1)</sup> | 80             | 40             | 65             | M22 x 1.5  | 20             | 34             | 22 <sup>+0.084</sup> <sub>-0.30</sub> | 30 <sup>+0.30</sup> <sub>-0.10</sub> | 60 <sup>+0.10</sup> <sub>-0.30</sub> |
| Y-10M <sup>Note 1)</sup> | 100            | 40             | 65             | M26 x 1.5  | 20             | 34             | 22 <sup>+0.084</sup> <sub>-0.30</sub> | 30 <sup>+0.30</sup> <sub>-0.10</sub> | 60 <sup>+0.10</sup> <sub>-0.30</sub> |
| Y-12M <sup>Note 2)</sup> | 125            | 46             | 100            | M27 x 2    | 27             | 42             | 25 <sup>+0.084</sup> <sub>-0.30</sub> | 32 <sup>+0.30</sup> <sub>-0.10</sub> | 64 <sup>+0.10</sup> <sub>-0.30</sub> |

Note 1) A pin, split pins and flat washers are included. Note 2) A pin and split pins are included.

## Bracket Combinations

Bracket combination available ..... Refer to the figure below.

| Bracket for cylinder | Bracket for workpiece |               |                      |                      |                      |
|----------------------|-----------------------|---------------|----------------------|----------------------|----------------------|
|                      | Single clevis         | Double clevis | Single knuckle joint | Double knuckle joint | Clevis pivot bracket |
| Single clevis        | —                     | ①             | —                    | ②                    | —                    |
| Double clevis        | ③                     | —             | ④                    | —                    | ⑨                    |
| Single knuckle joint | —                     | ⑤             | —                    | ⑥                    | —                    |
| Double knuckle joint | ⑦                     | —             | ⑧                    | —                    | ⑩                    |

| No. | Appearance                           | No. | Appearance                                  |
|-----|--------------------------------------|-----|---|
| ①   | Single clevis + Double clevis        | ⑥   | Single knuckle joint + Double knuckle joint |
| ②   | Single clevis + Double knuckle joint | ⑦   | Double knuckle joint + Single clevis        |
| ③   | Double clevis + Single clevis        | ⑧   | Double knuckle joint + Single knuckle joint |
| ④   | Double clevis + Single knuckle joint | ⑨   | Double clevis + Clevis pivot bracket        |
| ⑤   | Single knuckle joint + Double clevis | ⑩   | Double knuckle joint + Clevis pivot bracket |

CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB

MB

MB1

CA2

CS1

CS2

D-□

-X□

Technical Data

# Air Cylinder: Standard Type Double Acting, Double Rod

# MBW Series

ø32, ø40, ø50, ø63, ø80, ø100, ø125



## How to Order



**MBW** **L** **32** **150** **Z**

**With auto switch** **MDBW** **L** **32** **150** **Z** **M9BW**

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

**Mounting type**

|          |                 |
|----------|-----------------|
| <b>B</b> | Basic           |
| <b>L</b> | Axial foot      |
| <b>F</b> | Rod flange      |
| <b>T</b> | Center trunnion |

\* Trunnion type is mounted before shipment.  
\* Other mounting brackets ø32 to ø100: Shipped together. ø125: Assembled before shipment.

**Bore size**

|            |        |
|------------|--------|
| <b>32</b>  | 32 mm  |
| <b>40</b>  | 40 mm  |
| <b>50</b>  | 50 mm  |
| <b>63</b>  | 63 mm  |
| <b>80</b>  | 80 mm  |
| <b>100</b> | 100 mm |
| <b>125</b> | 125 mm |

**Port thread type**

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

**Auto switch**

|            |                     |
|------------|---------------------|
| <b>Nil</b> | Without auto switch |
| <b>S</b>   | 3                   |
| <b>n</b>   | "n" pcs.            |

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

**Number of auto switches**

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

**Made to Order**  
For details, refer to page 403.

**Suffix (Cushion)**

|            |               |
|------------|---------------|
| <b>Nil</b> | Air cushion   |
| <b>N*</b>  | Rubber bumper |

**Suffix (Rod boot)**

|            |                                      |
|------------|--------------------------------------|
| <b>Nil</b> | None                                 |
| <b>J</b>   | Nylon tarpaulin (one end)            |
| <b>KJ</b>  | Nylon tarpaulin (both ends)          |
| <b>K</b>   | Heat resistant tarpaulin (one end)   |
| <b>KK</b>  | Heat resistant tarpaulin (both ends) |

**Cylinder stroke [mm]**  
Refer to "Standard Strokes" on page 403.

## Applicable Auto Switches/Refer to pages 1575 to 1701 for further information on auto switches.

| Type   | Special function                          | Electrical entry                    | Indicator/light                       | Wiring (Output)        | Load voltage |             | Auto switch model |               | Lead wire length [m] |                |       |       |              | Pre-wired connector | Applicable load |              |            |
|--|---|-------------------------------------|---------------------------------------|------------------------|--------------|-------------|-------------------|---------------|----------------------|----------------|-------|-------|--------------|---------------------|-----------------|--------------|------------|
|  |   |                                     |                                       |                        | DC           | AC          | Tie-rod mounting  | Band mounting | 0.5 (Nil)            | 1 (M)          | 3 (L) | 5 (Z) |              |                     |                 |              |            |
|  |   |                                     |                                       |                        |              |             |                   |               |                      |                |       |       | 3-wire (NPN) |                     |                 | 3-wire (PNP) | 2-wire     |
| Solid state auto switch                      | —   | Grommet                             | Yes                                   | 3-wire (NPN)           | 24 V         | 5 V, 12 V   | —                 | <b>M9N</b>    | ●                    | ●              | ●     | ○     | ○            | IC circuit          | Relay, PLC      |              |            |
|  |   |                                     |                                       | 3-wire (PNP)           |              |             |                   | <b>M9P</b>    | ●                    | ●              | ●     | ○     | ○            |                     |                 |              |            |
|  |   | 2-wire                              | <b>M9B</b>                            | ●                      | ●            | ●           | ○                 | ○             |                      |                |       |       |              |                     |                 |              |            |
|  |   | Terminal conduit                    | 3-wire (NPN)                          | 24 V                   | 5 V, 12 V    | —           | <b>G39</b>        | —             | —                    | —              | —     | —     |              |                     |                 |              |            |
|  | 2-wire                                    | <b>K39</b>                          | —                                     |                        |              |             | —                 | —             | —                    |                |       |       |              |                     |                 |              |            |
|  | Diagnostic indication (2-color indicator) | Grommet                             | Yes                                   | 3-wire (NPN)           | 24 V         | 5 V, 12 V   | —                 | <b>M9NW</b>   | ●                    | ●              | ●     | ○     | ○            | IC circuit          |                 |              |            |
|  |   |                                     |                                       | 3-wire (PNP)           |              |             |                   | <b>M9PW</b>   | ●                    | ●              | ●     | ○     | ○            |                     |                 |              |            |
|  |   | Water resistant (2-color indicator) | Grommet                               | Yes                    | 3-wire (NPN) | 24 V        | 5 V, 12 V         | —             | <b>M9NA</b> *1       | —              | ○     | ○     | ●            | ○                   |                 | IC circuit   |            |
|  |   |                                     |                                       |                        | 3-wire (PNP) |             |                   |               | <b>M9PA</b> *1       | —              | ○     | ○     | ●            | ○                   |                 |              |            |
|  |   |                                     | Diagnostic output (2-color indicator) | Terminal conduit       | Yes          | 2-wire      | 24 V              | 12 V          | —                    | <b>M9BA</b> *1 | —     | ○     | ○            | ●                   |                 | ○            | IC circuit |
| 4-wire (NPN)                                 |   |                                     |                                       |                        |              | <b>F59F</b> |                   |               |                      | —              | ●     | —     | ●            | ○                   | ○               |              |            |
| Magnetic field resistant (2-color indicator) | Grommet                                   | Yes                                 | 2-wire (Non-polar)                    | 24 V                   | 5 V, 12 V    | —           | <b>P3DWA</b>      | —             | ●                    | —              | ●     | ●     | ○            | —                   |                 |              |            |
|  |   |                                     | 2-wire (Non-polar)                    |                        |              |             | <b>P4DW</b>       | —             | —                    | —              | ●     | ●     | ○            |                     |                 |              |            |
| Reed auto switch                             | —   | Grommet                             | Yes                                   | 3-wire (Equiv. to NPN) | 24 V         | 5 V         | —                 | <b>A96</b>    | ●                    | —              | ●     | —     | —            | IC circuit          | Relay, PLC      |              |            |
|  |   |                                     |                                       | 100 V                  |              |             |                   | <b>A93</b>    | —                    | ●              | ●     | ●     | —            |                     |                 |              |            |
|  |   |                                     |                                       | 100 V or less          |              |             |                   | <b>A90</b>    | —                    | ●              | —     | —     | —            |                     |                 |              |            |
|  |   |                                     |                                       | 100 V, 200 V           |              |             |                   | <b>A54</b>    | —                    | ●              | —     | ●     | —            |                     |                 |              |            |
|  |   |                                     |                                       | 200 V or less          |              |             |                   | <b>A64</b>    | —                    | ●              | —     | ●     | —            |                     |                 |              |            |
|  |   | Terminal conduit                    | Yes                                   | No                     | 2-wire       | 24 V        | 12 V              | —             | <b>A33</b>           | —              | —     | —     | —            | —                   |                 | PLC          |            |
|  |   |                                     |                                       |                        |              |             |                   |               | <b>A34</b>           | —              | —     | —     | —            | —                   |                 |              |            |
|  |   |                                     |                                       |                        |              |             |                   |               | <b>A44</b>           | —              | —     | —     | —            | —                   |                 |              |            |
|  |   |                                     |                                       |                        |              |             |                   |               | <b>A59W</b>          | —              | ●     | —     | ●            | —                   |                 |              | —          |
|  |   |                                     |                                       |                        |              |             |                   |               | <b>A59W</b>          | —              | ●     | —     | ●            | —                   |                 |              | —          |

\*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Please contact SMC regarding water resistant types with the above model numbers.

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

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

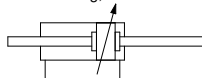
\* Since there are other applicable auto switches than listed above, refer to page 432 for details.

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





**Symbol**  
Double acting, Air cushion



**Made to Order**  
Click here for details

| Symbol | Specifications  |
|--------|---|
| -XA□   | Change of rod end shape   |
| -XB6   | Heat resistant cylinder (-10 to 150°C)  |
| -XC3   | Special port location*1 *2  |
| -XC4   | With heavy duty scraper   |
| -XC5   | Heat resistant cylinder (-10 to 110°C)  |
| -XC6   | Made of stainless steel*2   |
| -XC7   | Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel                                   |
| -XC14  | Change of trunnion bracket mounting position  |
| -XC22  | Fluororubber seal   |
| -XC30  | Rod trunnion  |
| -XC35  | With coil scraper   |
| -XC68  | Made of stainless steel (with hard chrome plated piston rod)*3                                      |
| -XC88  | Spatter resistant coil scraper, Lube-retainer, Grease for welding (Piston rod: Stainless steel 304) |
| -XC89  | Spatter resistant coil scraper, Lube-retainer, Grease for welding (Piston rod: S45C)                |
| -XC91  | Spatter resistant coil scraper, Grease for welding (Piston rod: S45C)                               |

- \*1 The cover shape is the same as the current product.
- \*2 ø125 only
- \*3 Except ø125

For special port location (-XC3), the mounting bracket and port location can be determined using the standard product corresponding to the operating conditions. Also, this is only applicable to -XC3BB, -XC3CC and -XC3DD with trunnion bracket.

For parts made of stainless steel (-XC6), use the same specification stainless steel with the surface treatment (with hard chrome plated piston rod) (-XC68).

Refer to pages 425 to 432 for cylinders with auto switches.

- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Minimum stroke for auto switch mounting
- Auto switch mounting brackets/Part no.
- Operating range

### Water Resistant Air Cylinder

Water resistant air cylinders are also available in the MB series, which are suitable for use on machine tools in an atmosphere with coolant and applicable to food machinery and automobile washing equipment in an environment with water splashes. Please refer to page 1125 for more information.

## Specifications

| Bore size [mm]                       | 32  | 40  | 50  | 63  | 80 | 100 | 125            |
|--------------------------------------|---|-----|-----|-----|----|-----|----------------|
| <b>Action</b>                        | Double acting, Double rod   |     |     |     |    |     |                |
| <b>Fluid</b>                         | Air   |     |     |     |    |     |                |
| <b>Proof pressure</b>                | 1.5 MPa   |     |     |     |    |     |                |
| <b>Max. operating pressure</b>       | 1.0 MPa   |     |     |     |    |     |                |
| <b>Min. operating pressure</b>       | 0.05 MPa  |     |     |     |    |     |                |
| <b>Ambient and fluid temperature</b> | Without auto switch: -10 to 70°C (No freezing)<br>With auto switch: -10 to 60°C |     |     |     |    |     |                |
| <b>Lubrication</b>                   | Not required (Non-lube)   |     |     |     |    |     |                |
| <b>Operating piston speed</b>        | 50 to 1000 mm/s   |     |     |     |    |     | 50 to 700 mm/s |
| <b>Allowable stroke tolerance</b>    | Up to 250: $^{+1.0}_0$ , 251 to 1000: $^{+1.4}_0$ , 1001 to 1500                |     |     |     |    |     |                |
| <b>Cushion</b> <sup>(Note)</sup>     | Air cushion or Rubber bumper  |     |     |     |    |     |                |
| <b>Port size (Rc, NPT, G)</b>        | 1/8   | 1/4 | 3/8 | 1/2 |    |     |                |
| <b>Mounting</b>                      | Basic, Axial foot, Rod flange, Center trunnion                                  |     |     |     |    |     |                |

Note) Kinetic energy absorbable by the cushion mechanism is identical to double acting, single rod.

## Standard Strokes

| Bore size  | Standard stroke   |                | Max. manufacturable stroke |
|------------|---|----------------|----------------------------|
|            | Stroke range ①  | Stroke range ② |                            |
| <b>32</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500                           | Up to 1000     | Up to 1800                 |
| <b>40</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500                           |                |                            |
| <b>50</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600                      | Up to 1200     |                            |
| <b>63</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600                      |                |                            |
| <b>80</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800            | Up to 1500     |                            |
| <b>100</b> | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800            |                |                            |
| <b>125</b> | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000 |                |                            |

Note 1) Manufacture of intermediate strokes is possible. (Spacers are not used.)

Note 2) Applicable strokes should be confirmed according to the usage. For details, refer to "Air Cylinders Model Selection" on front matter pages. In addition, the products that exceed the stroke range ① might not be able to fulfill the specifications due to the deflection etc.

Note 3) Please consult with SMC for manufacturability and the part numbers when exceeding the stroke range ②. Note 4) The stroke range with rod boot is up to 1000 mm. Please consult with SMC when exceeding 1000 mm strokes. Note 5) Using a stroke of a length which is smaller than the effective cushion length may result in reduced air cushion performance. Refer to "Technical Data 1" on page 1901 for details on the effective cushion length.

## Accessories

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

\* Refer to page 401 for dimensions and part numbers. (Refer to page 406 for rod boot.)

## Rod Boot Material

| Symbol   | Material                 | Max. ambient temp. |
|----------|--------------------------|--------------------|
| <b>J</b> | Nylon tarpaulin          | 70°C               |
| <b>K</b> | Heat resistant tarpaulin | 110°C*             |

\* Max. ambient temperature for rod boot itself.

## Mounting Brackets/Part No.

| Bore size [mm] | 32     | 40     | 50     | 63     | 80     | 100    | 125    |
|----------------|--------|--------|--------|--------|--------|--------|--------|
| Axial foot     | MB-L03 | MB-L04 | MB-L05 | MB-L06 | MB-L08 | MB-L10 | MB-L12 |
| Rod flange     | MB-F03 | MB-F04 | MB-F05 | MB-F06 | MB-F08 | MB-F10 | MB-F12 |

\* Order two foots per cylinder.

CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB

MB

MB1

CA2

CS1

CS2

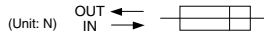
D-□

-X□

Technical Data

# MBW Series

## Theoretical Force



| Bore size [mm] | Rod diameter [mm] | Operating direction | Piston area [mm <sup>2</sup> ] | Operating pressure [MPa] |      |      |      |      |      |      |       |       |
|----------------|-------------------|---------------------|--------------------------------|--------------------------|------|------|------|------|------|------|-------|-------|
|                |                   |                     |                                | 0.2                      | 0.3  | 0.4  | 0.5  | 0.6  | 0.7  | 0.8  | 0.9   | 1.0   |
| <b>32</b>      | 12                | IN, OUT             | 691                            | 138                      | 207  | 276  | 346  | 415  | 484  | 553  | 622   | 691   |
| <b>40</b>      | 16                | IN, OUT             | 1056                           | 211                      | 317  | 422  | 528  | 634  | 739  | 845  | 950   | 1056  |
| <b>50</b>      | 20                | IN, OUT             | 1649                           | 330                      | 495  | 660  | 825  | 989  | 1154 | 1319 | 1484  | 1649  |
| <b>63</b>      | 20                | IN, OUT             | 2803                           | 561                      | 841  | 1121 | 1402 | 1682 | 1962 | 2242 | 2523  | 2803  |
| <b>80</b>      | 25                | IN, OUT             | 4536                           | 907                      | 1361 | 1814 | 2268 | 2722 | 3175 | 3629 | 4082  | 4536  |
| <b>100</b>     | 30                | IN, OUT             | 7147                           | 1429                     | 2144 | 2859 | 3574 | 4288 | 5003 | 5718 | 6432  | 7147  |
| <b>125</b>     | 32                | IN, OUT             | 11468                          | 2294                     | 3440 | 4588 | 5734 | 6881 | 8028 | 9174 | 10321 | 11468 |

Note) Theoretical force [N] = Pressure [MPa] x Piston area [mm<sup>2</sup>]

## Weights/Aluminum Tube

| Bore size [mm]                        |                                 | [kg] |      |      |      |      |      |       |
|---------------------------------------|---------------------------------|------|------|------|------|------|------|-------|
|                                       |                                 | 32   | 40   | 50   | 63   | 80   | 100  | 125   |
| Basic weight                          | Basic                           | 0.56 | 0.78 | 1.37 | 1.64 | 3.05 | 4.23 | 6.48  |
|                                       | Axial foot                      | 0.68 | 0.92 | 1.59 | 1.92 | 3.55 | 4.89 | 8.56  |
|                                       | Rod flange                      | 0.85 | 1.15 | 1.82 | 2.43 | 4.50 | 6.06 | 10.64 |
|                                       | Center trunnion                 | 0.85 | 1.14 | 1.85 | 2.44 | 4.60 | 5.92 | 9.46  |
| Additional weight per 50 mm of stroke | All mounting brackets           | 0.15 | 0.24 | 0.37 | 0.38 | 0.61 | 0.82 | 1.02  |
| Accessories                           | Single knuckle joint            | 0.15 | 0.23 | 0.26 | 0.26 | 0.60 | 0.83 | 1.08  |
|                                       | Double knuckle joint (with pin) | 0.22 | 0.37 | 0.43 | 0.43 | 0.87 | 1.27 | 1.58  |

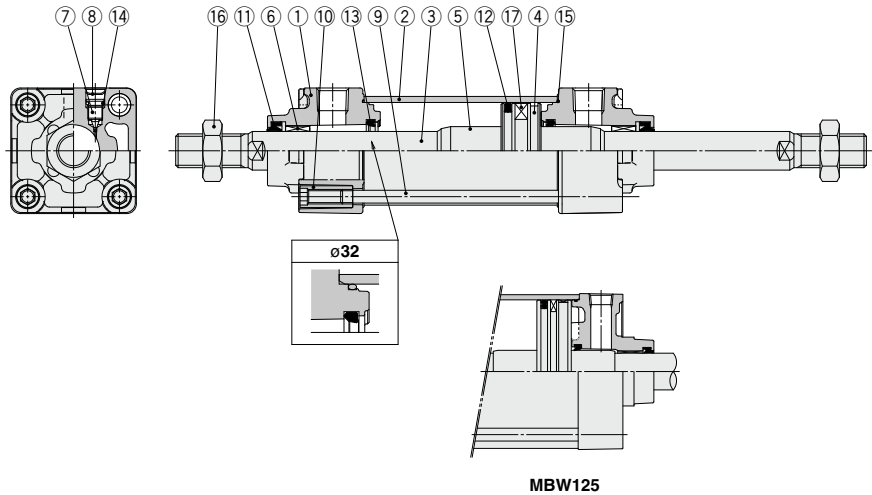
### Calculation

Example) **MBWB32-100Z** (Basic, ø32, 100 stroke)

- Basic weight..... 0.56 (Basic, ø32)
- Additional weight..... 0.15/50 stroke
- Cylinder stroke..... 100 stroke

$$0.56 + 0.15 \times 100/50 = \mathbf{0.86 \text{ kg}}$$

## Construction



### Component Parts

| No. | Description    | Material          | Qty | Note                     |
|-----|----------------|-------------------|-----|--------------------------|
| 1   | Rod cover      | Aluminum die-cast | 2   | Trivalent chromated      |
| 2   | Cylinder tube  | Aluminum alloy    | 1   | Hard anodized            |
| 3   | Piston rod     | Carbon steel      | 1   | Hard chrome plating      |
| 4   | Piston         | Aluminum alloy    | 1   |                          |
| 5   | Cushion ring   | Aluminum alloy    | 2   | Anodized                 |
| 6   | Bushing        | Bearing alloy     | 2   |                          |
| 7   | Cushion valve  | Steel wire        | 2   | Trivalent zinc chromated |
| 8   | Retaining ring | Steel for spring  | 2   | ø40 to ø125              |
| 9   | Tie-rod        | Carbon steel      | 4   | Trivalent zinc chromated |

| No. | Description          | Material     | Qty | Note                     |
|-----|----------------------|--------------|-----|--------------------------|
| 10  | Tie-rod nut          | Carbon steel | 8   | Trivalent zinc chromated |
| 11  | Rod seal             | NBR          | 2   |                          |
| 12  | Piston seal          | NBR          | 1   |                          |
| 13  | Cushion seal         | Urethane     | 2   |                          |
| 14  | Cushion valve seal   | NBR          | 2   |                          |
| 15  | Cylinder tube gasket | NBR          | 2   |                          |
| 16  | Rod end nut          | Rolled steel | 2   | Trivalent zinc chromated |
| 17  | Magnet               | —            | (1) |                          |

### Replacement Parts/Seal Kit

| Bore size [mm] | Kit no.     | Contents                      |
|----------------|-------------|-------------------------------|
| 32             | MBW32Z-PS   | Set of the nos.<br>①, ⑫, ⑬, ⑮ |
| 40             | CA2W40Z-PS  |                               |
| 50             | CA2W50Z-PS  |                               |
| 63             | CA2W63Z-PS  |                               |
| 80             | CA2W80Z-PS  |                               |
| 100            | CA2W100Z-PS |                               |
| 125            | MBW125-PS   |                               |

- \* Seal kits consist of items ①, ⑫, ⑬, ⑮, and can be ordered by using the seal kit number corresponding to each bore size.
- \* Trunnion type should not be disassembled. (Refer to page 434.)
- \* The seal kit includes a grease pack (10 g for ø32 to ø50, 20 g for ø63 and ø80, 30 g for ø100 and ø125).
- Order with the following part number when only the grease pack is needed.  
Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

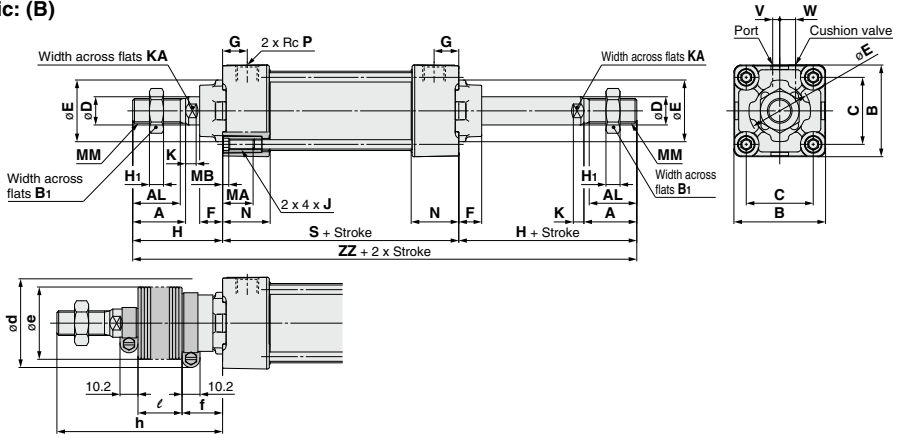
CJ1  
CJP  
CJ2  
JCM  
CM2  
CM3  
CG1  
CG3  
JMB  
MB  
MB1  
CA2  
CS1  
CS2

D-□  
-X□  
Technical Data

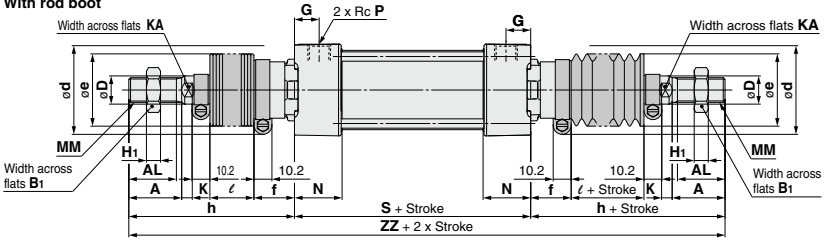
# MBW Series

## Standard

### Basic: (B)



### With rod boot



### Rubber Bumper

| Bore size [mm] | S   | ZZ  |
|----------------|-----|-----|
| 32             | 90  | 184 |
| 40             | 90  | 192 |
| 50             | 102 | 218 |
| 63             | 102 | 218 |
| 80             | 124 | 268 |
| 100            | 124 | 268 |
| 125            | 132 | 326 |

| Bore size [mm] | [mm] |      |     |                |      |    |    |    |      |    |                |            |    |    |    |    |            |      |     |     |      |      |     |
|----------------|------|------|-----|----------------|------|----|----|----|------|----|----------------|------------|----|----|----|----|------------|------|-----|-----|------|------|-----|
|                | A    | AL   | B   | B <sub>1</sub> | C    | D  | E  | F  | G    | H  | H <sub>1</sub> | J          | K  | KA | MA | MB | MM         | N    | P   | S   | V    | W    | ZZ  |
| 32             | 22   | 19.5 | 46  | 17             | 32.5 | 12 | 30 | 13 | 13   | 47 | 6              | M6 x 1     | 6  | 10 | 16 | 4  | M10 x 1.25 | 27   | 1/8 | 84  | 4    | 6.5  | 178 |
| 40             | 30   | 27   | 52  | 22             | 38   | 16 | 35 | 13 | 14   | 51 | 8              | M6 x 1     | 6  | 14 | 16 | 4  | M14 x 1.5  | 27   | 1/4 | 84  | 4    | 9    | 186 |
| 50             | 35   | 32   | 65  | 27             | 46.5 | 20 | 40 | 14 | 15.5 | 58 | 11             | M8 x 1.25  | 7  | 18 | 16 | 5  | M18 x 1.5  | 31.5 | 1/4 | 94  | 5    | 10.5 | 210 |
| 63             | 35   | 32   | 75  | 27             | 56.5 | 20 | 45 | 14 | 16.5 | 58 | 11             | M8 x 1.25  | 7  | 18 | 16 | 5  | M18 x 1.5  | 31.5 | 3/8 | 94  | 9    | 12   | 210 |
| 80             | 40   | 37   | 95  | 32             | 72   | 25 | 45 | 20 | 19   | 72 | 13             | M10 x 1.5  | 10 | 22 | 16 | 5  | M22 x 1.5  | 38   | 3/8 | 114 | 11.5 | 14   | 258 |
| 100            | 40   | 37   | 114 | 41             | 89   | 30 | 55 | 20 | 19   | 72 | 16             | M10 x 1.5  | 10 | 26 | 16 | 5  | M26 x 1.5  | 38   | 1/2 | 114 | 17   | 15   | 258 |
| 125            | 54   | 50   | 136 | 41             | 110  | 32 | 60 | 27 | 19   | 97 | 16             | M12 x 1.75 | 13 | 27 | 20 | 6  | M27 x 2.0  | 38   | 1/2 | 120 | 17   | 15   | 314 |

### With Rod Boot

| Bore size [mm] | [mm]    |           |            |            |            |            |            |            |            |            |            |             |         |           |            |            |            |            |            |            |            |            |            |             |   |  |  |  |  |  |
|----------------|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|---------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|---|--|--|--|--|--|
|                | d       |           |            | e          |            |            |            |            |            |            |            |             |         |           |            |            |            |            |            |            | h          |            |            |             |   |  |  |  |  |  |
|                | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 501 to 600 | 601 to 700 | 701 to 800 | 801 to 900 | 901 to 1000 | 1 to 50 | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 501 to 600 | 601 to 700 | 701 to 800 | 801 to 900 | 901 to 1000 |   |  |  |  |  |  |
| 32             | 54      | 36        | 23         | 12.5       | 25         | 37.5       | 50         | 75         | 100        | 125        | —          | —           | —       | —         | —          | —          | —          | —          | —          | —          | —          | —          | —          | —           | — |  |  |  |  |  |
| 40             | 56      | 41        | 23         | 12.5       | 25         | 37.5       | 50         | 75         | 100        | 125        | —          | —           | —       | —         | —          | —          | —          | —          | —          | —          | —          | —          | —          | —           | — |  |  |  |  |  |
| 50             | 64      | 51        | 25         | 12.5       | 25         | 37.5       | 50         | 75         | 100        | 125        | 150        | —           | —       | —         | —          | —          | —          | —          | —          | —          | —          | —          | —          | —           | — |  |  |  |  |  |
| 63             | 64      | 51        | 25         | 12.5       | 25         | 37.5       | 50         | 75         | 100        | 125        | 150        | —           | —       | —         | —          | —          | —          | —          | —          | —          | —          | —          | —          | —           | — |  |  |  |  |  |
| 80             | 68      | 56        | 29         | 12.5       | 25         | 37.5       | 50         | 75         | 100        | 125        | 150        | 175         | 200     | —         | —          | —          | —          | —          | —          | —          | —          | —          | —          | —           | — |  |  |  |  |  |
| 100            | 76      | 61        | 29         | 12.5       | 25         | 37.5       | 50         | 75         | 100        | 125        | 150        | 175         | 200     | —         | —          | —          | —          | —          | —          | —          | —          | —          | —          | —           | — |  |  |  |  |  |
| 125            | 82      | 75        | 27         | 10         | 20         | 30         | 40         | 60         | 80         | 100        | 120        | 140         | 160     | 180       | 200        | —          | —          | —          | —          | —          | —          | —          | —          | —           | — |  |  |  |  |  |

Note) ZZ indicates dimensions for double side rod boot. [mm]

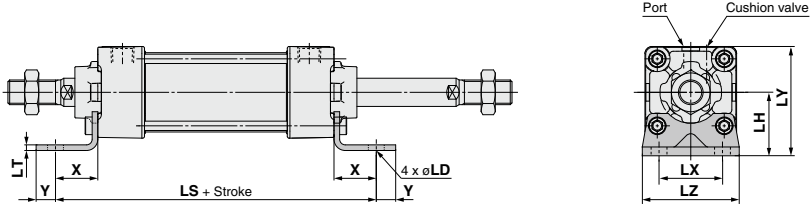
| Bore size [mm] | ZZ (Note) |           |            |            |            |            |            |            |            |            |            |             |
|----------------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
|                | 1 to 50   | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 501 to 600 | 601 to 700 | 701 to 800 | 801 to 900 | 901 to 1000 |
| 32             | 230       | 256       | 280        | 306        | 356        | 406        | 456        | —          | —          | —          | —          | —           |
| 40             | 246       | 272       | 296        | 322        | 372        | 422        | 472        | —          | —          | —          | —          | —           |
| 50             | 272       | 298       | 322        | 348        | 398        | 448        | 498        | 548        | —          | —          | —          | —           |
| 63             | 272       | 298       | 322        | 348        | 398        | 448        | 498        | 548        | —          | —          | —          | —           |
| 80             | 316       | 342       | 366        | 392        | 442        | 492        | 542        | 592        | 642        | 692        | —          | —           |
| 100            | 316       | 342       | 366        | 392        | 442        | 492        | 542        | 592        | 642        | 692        | —          | —           |
| 125            | 360       | 380       | 400        | 420        | 460        | 500        | 540        | 580        | 620        | 660        | 700        | 740         |

\* Model without air cushion is designed to include rubber bumpers. Since the bumpers are attached to the both sides of the piston, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

**Standard/With Mounting Bracket**

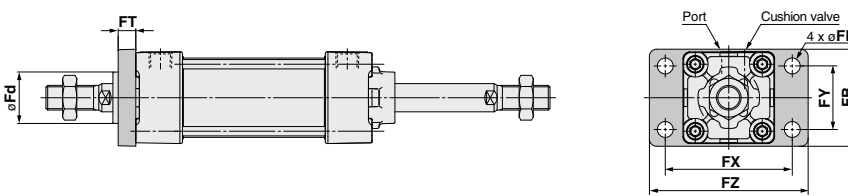
\* Refer to Basic (B) for other dimensions and with rod boot.

**Axial foot: (L)**



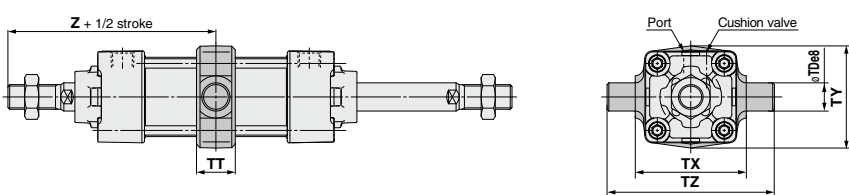
| Bore size [mm] | X  | Y  | LD | LH | LS* | LT  | LX | LY    | LZ  |
|----------------|----|----|----|----|-----|-----|----|-------|-----|
| 32             | 22 | 9  | 7  | 30 | 128 | 3.2 | 32 | 53    | 50  |
| 40             | 24 | 11 | 9  | 33 | 132 | 3.2 | 38 | 59    | 55  |
| 50             | 27 | 11 | 9  | 40 | 148 | 3.2 | 46 | 72.5  | 70  |
| 63             | 27 | 14 | 12 | 45 | 148 | 3.6 | 56 | 82.5  | 80  |
| 80             | 30 | 14 | 12 | 55 | 174 | 4.5 | 72 | 102.5 | 100 |
| 100            | 32 | 16 | 14 | 65 | 178 | 4.5 | 89 | 122   | 120 |
| 125            | 45 | 20 | 14 | 81 | 210 | 8   | 90 | 149   | 136 |

**Rod flange: (F)**



| Bore size [mm] | FB  | FD | FT | FX  | FY  | FZ  | Fd   |
|----------------|-----|----|----|-----|-----|-----|------|
| 32             | 50  | 7  | 10 | 64  | 32  | 79  | 24.5 |
| 40             | 55  | 9  | 10 | 72  | 36  | 90  | 29.5 |
| 50             | 70  | 9  | 12 | 90  | 45  | 110 | 35.5 |
| 63             | 80  | 9  | 12 | 100 | 50  | 120 | 38.5 |
| 80             | 100 | 12 | 16 | 126 | 63  | 153 | 41   |
| 100            | 120 | 14 | 16 | 150 | 75  | 178 | 46   |
| 125            | 138 | 14 | 20 | 180 | 102 | 216 | 57   |

**Center trunnion: (T)**



| Bore size [mm] | TDe8 | TT | TX  | TY  | TZ  | Z** |
|----------------|------|----|-----|-----|-----|-----|
| 32             | 12   | 17 | 50  | 49  | 74  | 89  |
| 40             | 16   | 22 | 63  | 58  | 95  | 93  |
| 50             | 16   | 22 | 75  | 71  | 107 | 105 |
| 63             | 20   | 28 | 90  | 87  | 130 | 105 |
| 80             | 20   | 34 | 110 | 110 | 150 | 129 |
| 100            | 25   | 40 | 132 | 136 | 182 | 129 |
| 125            | 25   | 50 | 160 | 160 | 210 | 157 |

\* Model without air cushion is designed to include rubber bumpers. Since the bumpers are attached to the both sides of the piston, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

\*\* Model without air cushion is designed to include rubber bumpers. Since the bumpers are attached to the both sides of the piston, the "Z" dimension is longer than the cylinder with air cushion as follows: ø32, ø40: +3 mm, ø50, ø63: +4 mm, ø80, ø100: +5 mm, ø125: +6 mm (For trunnion mounting)

- CJ1
- CJP
- CJ2
- JCM
- CM2
- CM3
- CG1
- CG3
- JMB
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□

Technical Data

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

# MBK Series



ø32, ø40, ø50, ø63, ø80, ø100



## How to Order

**MBK B 32 - 50 - Z - - -**

**MDBK B 32 - 50 - Z - - - M9BW - - -**

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

**Mounting type**

|   |                       |
|---|-----------------------|
| B | Basic/Without bracket |
| L | Axial foot            |
| F | Rod flange            |
| G | Head flange           |
| C | Single clevis         |
| D | Double clevis         |
| T | Center trunnion       |

**Bore size**

|     |        |
|-----|--------|
| 32  | 32 mm  |
| 40  | 40 mm  |
| 50  | 50 mm  |
| 63  | 63 mm  |
| 80  | 80 mm  |
| 100 | 100 mm |

**Port thread type**

|     |     |
|-----|-----|
| Nil | Rc  |
| TN  | NPT |
| TF  | G   |

**Accessories 1**

|     |               |
|-----|---------------|
| Nil | No bracket    |
| N   | Pivot bracket |

**Suffix (Cushion)**

|     |               |
|-----|---------------|
| Nil | Air cushion   |
| N*  | Rubber bumper |

**Suffix (Rod boot)**

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

**Auto switch**

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

**Number of auto switches**

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

**Made to Order**  
For details, refer to page 409.

**Accessories 2**

|     |                      |
|-----|----------------------|
| Nil | No bracket           |
| V   | Single knuckle joint |
| W   | Double knuckle joint |

\* Only for D and T mounting types.  
\* Pivot bracket is shipped together with the product.  
\* For details, refer to page 400.  
\* Since the bumpers are attached to the both sides of the piston for rubber bumper type, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm.  
\* A knuckle joint pin is not provided with the single knuckle joint.  
\* Rod end bracket is shipped together with the product.  
\* The screw-in amount of the piston rod end cannot be adjusted when a clevis bracket, trunnion bracket and knuckle joint are used together.

## Applicable Auto Switches

Refer to pages 1575 to 1701 for further information on auto switches.

| Type   | Special function                          | Electrical entry | Indicating light   | Wiring (Output)        | Load voltage |           | Auto switch model |                    | Lead wire length [m] |       |       |       | Pre-wired connector | Applicable load |            |
|--|---|------------------|--------------------|------------------------|--------------|-----------|-------------------|--------------------|----------------------|-------|-------|-------|---------------------|-----------------|------------|
|  |   |                  |                    |                        | DC           | AC        | Tie-rod mounting  | Band mounting      | 0.5 (Nil)            | 1 (M) | 3 (L) | 5 (Z) |                     |                 |            |
| Solid state auto switch                      | —   | Grommet          | No                 | 3-wire (NPN)           | 24 V         | 5 V, 12 V | —                 | M9N                | ●                    | ●     | ●     | ○     | ○                   | IC circuit      | Relay, PLC |
|  |   |                  |                    | 3-wire (PNP)           |              |           |                   | M9P                | ●                    | ●     | ●     | ○     | ○                   |                 |            |
|  |   | 2-wire           | M9B                | ●                      | ●            | ●         | ○                 | ○                  |                      |       |       |       |                     |                 |            |
|  |   | —                | G39                | —                      | —            | —         | —                 | —                  |                      |       |       |       |                     |                 |            |
|  | Diagnostic indication (2-color indicator) | Terminal conduit | Yes                | 3-wire (NPN)           | 24 V         | 5 V, 12 V | —                 | M9NW               | ●                    | ●     | ●     | ○     | ○                   | IC circuit      |            |
|  |   |                  |                    | 3-wire (PNP)           |              |           |                   | M9PW               | ●                    | ●     | ●     | ○     | ○                   |                 |            |
|  | Water resistant (2-color indicator)       | Grommet          | No                 | 2-wire                 | 24 V         | 12 V      | —                 | M9BW               | ●                    | ●     | ●     | ○     | ○                   | —               |            |
|  |   |                  |                    | 3-wire (NPN)           |              |           |                   | M9NA <sup>*1</sup> | —                    | ○     | ○     | ●     | ○                   |                 |            |
|  | Diagnostic output (2-color indicator)     | Grommet          | No                 | 3-wire (PNP)           | 24 V         | 5 V, 12 V | —                 | M9PA <sup>*1</sup> | —                    | ○     | ○     | ●     | ○                   | IC circuit      |            |
|  |   |                  |                    | 2-wire                 |              |           |                   | M9BA <sup>*1</sup> | —                    | ○     | ○     | ○     | ○                   |                 |            |
| Magnetic field resistant (2-color indicator) | Grommet                                   | No               | 4-wire (NPN)       | 24 V                   | 5 V, 12 V    | —         | F59F              | —                  | ●                    | —     | ●     | ○     | IC circuit          |                 |            |
|  |   |                  | 2-wire (Non-polar) |                        |              |           | P3DWA             | —                  | ●                    | —     | ●     | ○     |                     | ○               |            |
| Reed auto switch                             | —   | Grommet          | Yes                | 3-wire (Equip. to NPN) | 24 V         | 5 V       | —                 | A96                | —                    | ●     | —     | ●     | —                   | IC circuit      | Relay, PLC |
|  |   |                  |                    | —                      |              |           |                   | A93                | —                    | ●     | ●     | ●     | —                   |                 |            |
|  |   |                  |                    | —                      |              |           |                   | A90                | —                    | ●     | —     | ●     | —                   |                 |            |
|  |   |                  |                    | —                      |              |           |                   | A54                | —                    | ●     | —     | ●     | —                   |                 |            |
|  |   | Terminal conduit | No                 | Yes                    | 2-wire       | 24 V      | 12 V              | —                  | A64                  | —     | ●     | —     | ●                   | —               |            |
|  |   |                  |                    |                        |              |           |                   |                    | —                    | A33   | —     | —     | —                   | —               |            |
|  |   | DIN terminal     | No                 | Yes                    | 2-wire       | 24 V      | 100 V, 200 V      | —                  | A34                  | —     | —     | —     | —                   | —               |            |
|  |   |                  |                    |                        |              |           |                   |                    | —                    | A44   | —     | —     | —                   |                 |            |
| Grommet                                      | No  | Yes              | 2-wire             | 24 V                   | —            | —         | A59W              | —                  | ●                    | —     | ●     | —     | —                   |                 |            |
|  |   |                  |                    |                        |              |           | —                 | A59W               | —                    | ●     | —     | ●     |                     | —               |            |

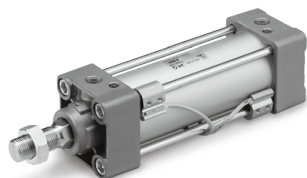
\*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.  
A water resistant type cylinder is recommended for use in an environment which requires water resistance.

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

\* Solid state auto switches marked with "○" are produced upon receipt of order.  
\* Since there are other applicable auto switches than listed above, refer to page 432 for details.  
\* The D-A9□/M9□/P3DWA□ auto switches are shipped together, (but not assembled). (However, auto switch mounting brackets are assembled for the D-A9□/M9□ before shipment.)

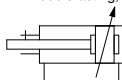


## Specifications



### Symbol

Double acting, Air cushion



| Bore size [mm]                               | 32  | 40   | 50              | 63   | 80              | 100 |
|--|---|------|-----------------|------|-----------------|-----|
| <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<br>With auto switch: -10 to 60°C (No freezing)           |      |                 |      |                 |     |
| <b>Lubricant</b>                             | Non-lube  |      |                 |      |                 |     |
| <b>Piston speed</b>                          | 50 to 1000 mm/s   |      |                 |      |                 |     |
| <b>Stroke length tolerance</b>               | Up to 250: $^{+1.0}_0$ , 251 to 1000: $^{+1.4}_0$ , 1001 to 1500: $^{+1.8}_0$             |      |                 |      |                 |     |
| <b>Cushion</b> <small>Note)</small>          | Air cushion or Rubber bumper  |      |                 |      |                 |     |
| <b>Port size (Rc, NPT, G)</b>                | 1/8   | 1/4  | 3/8             | 1/2  |                 |     |
| <b>Mounting</b>                              | Basic, Axial foot, Rod flange, Head flange, Single clevis, Double clevis, Center trunnion |      |                 |      |                 |     |
| <b>Non-rotating accuracy</b>                 | $\pm 0.5^\circ$   |      | $\pm 0.5^\circ$ |      | $\pm 0.3^\circ$ |     |
| <b>Allowable rotating torque N-m or less</b> | 0.25  | 0.45 | 0.64            | 0.79 | 0.93            |     |

Note) Kinetic energy absorbable by the cushion mechanism is identical to double acting single rod.



### Made to Order

[Click here for details](#)

| Symbol | Specifications  |
|--------|---|
| -XA□   | Change of rod end shape   |
| -XC3   | Special port location*  |
| -XC7   | Tie-rod, cushion valve, tie-rod nut, etc. 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                                |
| -XC14  | Change of trunnion bracket mounting position                        |
| -XC27  | Double clevis and double knuckle joint pins made of stainless steel |
| -XC30  | Rod trunnion  |

\* The cover shape is the same as the current product.

For special port location (-XC3), the mounting bracket and port location can be determined using the standard product corresponding to the operating conditions. Also, this is only applicable to -XC3BB, -XC3CC and -XC3DD with trunnion bracket.

Refer to pages 425 to 432 for cylinders with auto switches.

- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Minimum stroke for auto switch mounting
- Auto switch mounting brackets/Part no.
- Operating range

## Standard Strokes

| Bore size  | Standard stroke [mm]  |
|------------|---|
| <b>32</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500           |
| <b>40</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500           |
| <b>50</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600      |
| <b>63</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600      |
| <b>80</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700 |
| <b>100</b> | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700 |

Note 1) Manufacture of intermediate strokes is possible. (Spacers are not used.)

Note 2) Using a stroke of a length which is smaller than the effective cushion length may result in reduced air cushion performance. Refer to "Technical Data 1" on page 1901 for details on the effective cushion length.

## Accessories

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

\* Refer to page 401 for dimensions and part numbers. (Refer to page 396 for rod boot.)

## Rod Boot Material

| Symbol   | Material                 | Max. ambient temp. |
|----------|--------------------------|--------------------|
| <b>J</b> | Nylon tarpaulin          | 70°C               |
| <b>K</b> | Heat resistant tarpaulin | 110°C*             |

\* Max. ambient temperature for rod boot itself.

CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB

MB

MB1

CA2

CS1

CS2

D-□

-X□

Technical Data

# MBK Series

## Mounting Brackets/Part No.

| Bore size [mm]                | 32     | 40     | 50     | 63     | 80     | 100    |
|-------------------------------|--------|--------|--------|--------|--------|--------|
| Axial foot <sup>Note 1)</sup> | MB-L03 | MB-L04 | MB-L05 | MB-L06 | MB-L08 | MB-L10 |
| Rod/Head flange               | MB-F03 | MB-F04 | MB-F05 | MB-F06 | MB-F08 | MB-F10 |
| Single clevis                 | MB-C03 | MB-C04 | MB-C05 | MB-C06 | MB-C08 | MB-C10 |
| Double clevis                 | MB-D03 | MB-D04 | MB-D05 | MB-D06 | MB-D08 | MB-D10 |

Note 1) Order two foots per cylinder.

Note 2) Accessories for each mounting bracket are as follows. Axial foot, Rod/Head flange, Single clevis/Body mounting bolt; Double clevis/Body mounting bolt, Clevis pin, Flat washers and Split pins. → Refer to page 401 for details.

## Theoretical Force

OUT side is identical to double acting single rod. Refer to the table below for IN side.

| Bore size [mm] | Piston area [mm <sup>2</sup> ] |
|----------------|--------------------------------|
| 32             | 675                            |
| 40             | 1082                           |
| 50             | 1651                           |
| 63             | 2804                           |
| 80             | 4568                           |
| 100            | 7223                           |

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

## Weights

| Bore size [mm]                        |                                 | 32   | 40   | 50   | 63   | 80   | 100  |
|---------------------------------------|---------------------------------|------|------|------|------|------|------|
| Basic weight                          | Basic                           | 0.47 | 0.64 | 1.11 | 1.35 | 2.54 | 3.52 |
|                                       | Axial foot                      | 0.59 | 0.78 | 1.33 | 1.63 | 3.04 | 4.19 |
|                                       | Rod/Head flange                 | 0.76 | 1.01 | 1.56 | 2.14 | 3.99 | 5.35 |
|                                       | Single clevis                   | 0.72 | 0.87 | 1.45 | 1.98 | 3.65 | 5.10 |
|                                       | Double clevis                   | 0.73 | 0.91 | 1.54 | 2.14 | 3.94 | 5.37 |
|                                       | Center trunnion                 | 0.76 | 1.00 | 1.59 | 2.15 | 4.09 | 5.21 |
| Additional weight per 50 mm of stroke | All mounting brackets           | 0.12 | 0.15 | 0.24 | 0.26 | 0.39 | 0.50 |
| Accessories                           | Single knuckle joint            | 0.15 | 0.23 | 0.26 | 0.26 | 0.60 | 0.83 |
|                                       | Double knuckle joint (with pin) | 0.22 | 0.37 | 0.43 | 0.43 | 0.87 | 1.27 |

Calculation

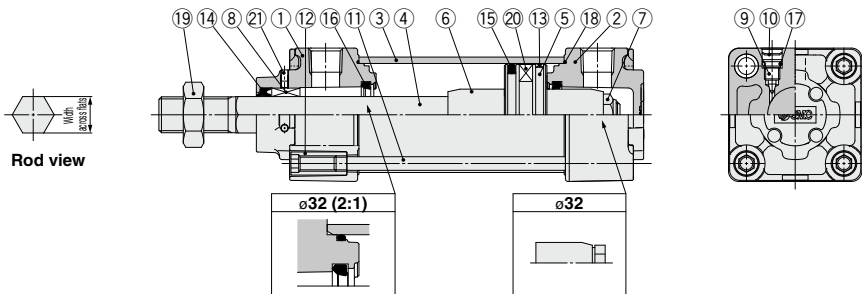
Example) **MBKB32-100Z** (Basic, ø32, 100 stroke)

- Basic weight..... 0.47 (Basic, ø32)
- Additional weight..... 0.12/50 stroke
- Cylinder stroke..... 100 stroke

$$0.47 + 0.12 \times 100/50 = 0.71 \text{ kg}$$



**Construction**



**Component Parts**

| No. | Description        | Material            | Q'ty | Note                     |
|-----|--------------------|---------------------|------|--------------------------|
| 1   | Rod cover          | Aluminum die-casted | 1    | Trivalent chromated      |
| 2   | Head cover         | Aluminum die-casted | 1    | Trivalent chromated      |
| 3   | Cylinder tube      | Aluminum alloy      | 1    | Hard anodized            |
| 4   | Piston rod         | Stainless steel     | 1    |                          |
| 5   | Piston             | Aluminum alloy      | 1    |                          |
| 6   | Cushion ring       | Rolled steel        | 2    | Zinc chromated           |
| 7   | Piston nut         | Rolled steel        | 1    | Zinc chromated           |
| 8   | Non-rotating guide | Bearing alloy       | 1    |                          |
| 9   | Cushion valve      | Steel wire          | 2    | Trivalent zinc chromated |
| 10  | Retaining ring     | Spring steel        | 2    | ø40 to ø100              |
| 11  | Tie-rod            | Carbon steel        | 4    | Trivalent zinc chromated |

| No. | Description                   | Material     | Q'ty | Note                           |
|-----|-------------------------------|--------------|------|--------------------------------|
| 12  | Tie-rod nut                   | Carbon steel | 8    | Trivalent zinc chromated       |
| 13  | Wear ring                     | Resin        | 1    |                                |
| 14* | Rod seal                      | NBR          | 1    |                                |
| 15* | Piston seal                   | NBR          | 1    |                                |
| 16* | Cushion seal                  | Urethane     | 2    |                                |
| 17  | Cushion valve seal            | NBR          | 2    |                                |
| 18* | Cylinder tube gasket          | NBR          | 2    |                                |
| 19  | Rod end nut                   | Rolled steel | 1    | Trivalent zinc chromated       |
| 20  | Magnet                        | —            | (1)  |                                |
| 21  | Hexagon socket head set screw | Steel wire   | 2    | Trivalent black zinc chromated |

**Replacement Parts/Seal Kit**

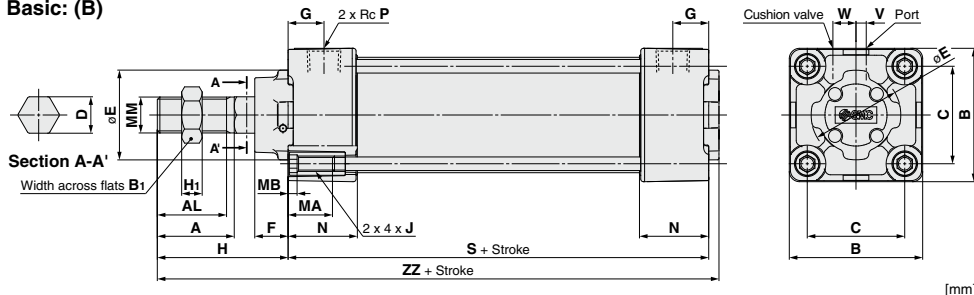
| Bore size [mm] | Kit no.    | Contents                          |
|----------------|------------|-----------------------------------|
| 32             | MBK32Z-PS  | Set of the nos.<br>14, 15, 16, 18 |
| 40             | MBK40Z-PS  |                                   |
| 50             | MBK50Z-PS  |                                   |
| 63             | MBK63Z-PS  |                                   |
| 80             | MBK80Z-PS  |                                   |
| 100            | MBK100Z-PS |                                   |

\* Seal kits consist of items 14, 15, 16, 18, and can be ordered by using the seal kit number corresponding to each bore size.  
 \* Seal kit includes a grease pack (ø32 to 50: 10 g, ø63, 80: 20 g, ø100: 30 g).  
 Order with the following part number when only the grease pack is needed.  
**Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)**

\* Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston;  
 ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm

**Without Mounting Bracket**

**Basic: (B)**



| Bore size [mm] | A  | AL   | B   | B <sub>1</sub> | C    | D    | E  | F  | G    | H  | H <sub>1</sub> | J         | MA | MB | MM         | N    | P   | S   | V    | W    | ZZ  |
|----------------|----|------|-----|----------------|------|------|----|----|------|----|----------------|-----------|----|----|------------|------|-----|-----|------|------|-----|
| 32             | 22 | 19.5 | 46  | 17             | 32.5 | 12.2 | 30 | 13 | 13   | 47 | 6              | M6 x 1    | 16 | 4  | M10 x 1.25 | 27   | 1/8 | 84  | 4    | 6.5  | 135 |
| 40             | 30 | 27   | 52  | 22             | 38   | 14.2 | 35 | 13 | 14   | 51 | 8              | M6 x 1    | 16 | 4  | M14 x 1.5  | 27   | 1/4 | 84  | 4    | 9    | 139 |
| 50             | 35 | 32   | 65  | 27             | 46.5 | 19   | 40 | 14 | 15.5 | 58 | 11             | M8 x 1.25 | 16 | 5  | M18 x 1.5  | 31.5 | 1/4 | 94  | 5    | 10.5 | 156 |
| 63             | 35 | 32   | 75  | 27             | 56.5 | 19   | 45 | 14 | 16.5 | 58 | 11             | M8 x 1.25 | 16 | 5  | M18 x 1.5  | 31.5 | 3/8 | 94  | 9    | 12   | 156 |
| 80             | 40 | 37   | 95  | 32             | 72   | 23   | 45 | 20 | 19   | 72 | 13             | M10 x 1.5 | 16 | 5  | M22 x 1.5  | 38   | 3/8 | 114 | 11.5 | 14   | 190 |
| 100            | 40 | 37   | 114 | 41             | 89   | 27   | 55 | 20 | 19   | 72 | 16             | M10 x 1.5 | 16 | 5  | M26 x 1.5  | 38   | 1/2 | 114 | 17   | 15   | 190 |

The dimensions for each mounting type and the dimensions with rod boot are the same as those for standard model (double acting, single rod).

- CJ1
- CJP
- CJ2
- JCM
- CM2
- CM3
- CG1
- CG3
- JMB
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□

Technical Data

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

## MBKW Series

ø32, ø40, ø50, ø63, ø80, ø100



### How to Order



**MBKW L 32 150 Z**

**With auto switch** **MDBKW L 32 150 Z-M9BW**

**Mounting type**

|          |                       |
|----------|-----------------------|
| <b>B</b> | Basic/Without bracket |
| <b>L</b> | Axial foot            |
| <b>F</b> | Rod flange            |
| <b>T</b> | Center trunnion       |

\* Mounting brackets other than trunnion type are shipped together.

**Bore size**

|            |        |
|------------|--------|
| <b>32</b>  | 32 mm  |
| <b>40</b>  | 40 mm  |
| <b>50</b>  | 50 mm  |
| <b>63</b>  | 63 mm  |
| <b>80</b>  | 80 mm  |
| <b>100</b> | 100 mm |

**Port thread type**

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

**Cylinder stroke [mm]**

Refer to "Standard Strokes" on page 413.

**Auto switch**

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

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

**Number of auto switches**

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

**Made to Order**

For details, refer to page 413.

**Suffix (Cushion)**

|            |               |
|------------|---------------|
| <b>Nil</b> | Air cushion   |
| <b>N*</b>  | Rubber bumper |

\* Since the bumpers are attached to the both sides of the piston for rubber bumper type, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm.

**Suffix (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) |

### Applicable Auto Switches/Refer to pages 1575 to 1701 for further information on auto switches.

| Type   | Special function                          | Electrical entry | Indicator light    | Wiring (Output)        | Load voltage |           | Auto switch model |                  | Lead wire length [m] |       |       | Pre-wired connector | Applicable load |            |            |            |            |   |
|--|---|------------------|--------------------|------------------------|--------------|-----------|-------------------|------------------|----------------------|-------|-------|---------------------|-----------------|------------|------------|------------|------------|---|
|  |   |                  |                    |                        | DC           | AC        | Tie-rod mounting  | Band mounting    | 0.5 (Nil)            | 1 (M) | 3 (L) |                     |                 | 5 (Z)      |            |            |            |   |
|  |   |                  |                    |                        |              |           |                   |                  |                      |       |       |                     |                 |            | —          | —          | —          | — |
| Solid state auto switch                      | —   | Grommet          | Yes                | 3-wire (NPN)           | 24 V         | 5 V, 12 V | —                 | M9N              | ●                    | ●     | ○     | ○                   | IC circuit      | Relay, PLC |            |            |            |   |
|  |   |                  |                    | 3-wire (PNP)           |              |           |                   | M9P              | ●                    | ●     | ○     | ○                   |                 |            |            |            |            |   |
|  |   | 2-wire           |                    | M9B                    | ●            | ●         | ○                 | ○                |                      |       |       |                     |                 |            |            |            |            |   |
|  |   | Terminal conduit |                    | 3-wire (NPN)           | 24 V         | 5 V, 12 V | —                 | G39              | —                    | —     | —     | —                   |                 |            | —          |            |            |   |
|  | 2-wire                                    | K39              | —                  | —                      |              |           |                   | —                | —                    |       |       |                     |                 |            |            |            |            |   |
|  | Diagnostic indication (2-color indicator) | Grommet          | Yes                | 3-wire (NPN)           | 24 V         | 5 V, 12 V | —                 | M9NW             | ●                    | ●     | ○     | ○                   | IC circuit      |            |            |            |            |   |
|  |   |                  |                    | 3-wire (PNP)           |              |           |                   | M9PW             | ●                    | ●     | ○     | ○                   |                 |            |            |            |            |   |
|  | Water resistant (2-color indicator)       | Grommet          | Yes                | 2-wire                 | 24 V         | 5 V, 12 V | —                 | M9BW             | ●                    | ●     | ○     | ○                   | —               |            |            |            |            |   |
|  |   |                  |                    | 3-wire (NPN)           |              |           |                   | M9NA*1           | —                    | ○     | ○     | ○                   |                 |            | ○          | IC circuit |            |   |
|  | Diagnostic output (2-color indicator)     | Grommet          | Yes                | 3-wire (PNP)           | 24 V         | 5 V, 12 V | —                 | M9PA*1           | —                    | ○     | ○     | ○                   | ○               |            | —          |            |            |   |
| 2-wire                                       |   |                  |                    | M9BA*1                 |              |           |                   | —                | ○                    | ○     | ○     | ○                   |                 |            |            |            |            |   |
| Magnetic field resistant (2-color indicator) | Grommet                                   | Yes              | 4-wire (NPN)       | 24 V                   | 5 V, 12 V    | —         | F59F              | ●                | —                    | ○     | ○     | IC circuit          |                 |            |            |            |            |   |
|  |   |                  | 2-wire (Non-polar) |                        |              |           | P3DWA             | ●                | ●                    | ●     | ○     |                     | —               |            |            |            |            |   |
| Reed auto switch                             | —   | Grommet          | Yes                | 3-wire (Equiv. to NPN) | 24 V         | 12 V      | —                 | A96              | ●                    | ●     | —     | —                   |                 | IC circuit | Relay, PLC |            |            |   |
|  |   |                  |                    | No                     |              |           |                   | 2-wire           | 100 V                | A93   | —     | ●                   | ●               |            |            | ●          | —          | — |
|  |   |                  |                    |                        |              |           |                   |                  | 100 V or less        | A90   | —     | ●                   | ●               |            |            | —          | IC circuit |   |
|  |   |                  |                    | Yes                    |              |           |                   | Terminal conduit | 100 V, 200 V         | A54   | —     | ●                   | ●               |            |            | —          |            | — |
|  | 200 V or less                             | A64              | —                  |                        | ●            | ●         | —                 |                  |                      |       |       |                     |                 |            |            |            |            |   |
|  | No  | DIN terminal     | Yes                | 2-wire                 | 24 V         | 12 V      | —                 | A33              | —                    | —     | —     | —                   | PLC             |            |            |            |            |   |
|  |   |                  |                    |                        |              |           |                   | A34              | —                    | —     | —     | —                   |                 |            |            |            |            |   |
|  | Diagnostic indication (2-color indicator) | Grommet          | Yes                | 2-wire                 | 24 V         | 12 V      | —                 | A44              | —                    | —     | —     | —                   | Relay, PLC      |            |            |            |            |   |
|  |   |                  |                    |                        |              |           |                   | A59W             | —                    | ●     | ●     | —                   |                 | —          |            |            |            |   |

\*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Please contact SMC regarding water resistant types with the above model numbers.

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW 3 m ..... L (Example) M9NWL 1 m ..... M (Example) M9NWM 5 m ..... Z (Example) M9NZW

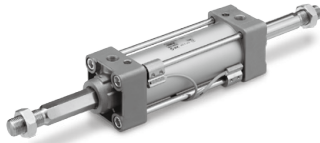
\* Solid state auto switches marked with "○" are produced upon receipt of order.

\* Since there are other applicable auto switches than listed above, refer to page 432 for details.

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

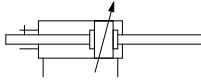
# Air Cylinder: Non-rotating Rod Type Double Acting, Double Rod **MBKW Series**

## Specifications



### Symbol

Double acting



**Made to Order**  
Click here for details

| Symbol | Specifications  |
|--------|---|
| -XC3   | Special port location*  |
| -XC7   | Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel |

\* The cover shape is the same as the current product.

For special port location (-XC3), the mounting bracket and port location can be determined using the standard product corresponding to the operating conditions. Also, this is only applicable to -XC3BB, -XC3CC and -XC3DD with trunnion bracket.

| Bore size [mm]                               | 32  | 40   | 50              | 63   | 80              | 100 |
|--|---|------|-----------------|------|-----------------|-----|
| <b>Action</b>                                | Double acting, Double rod   |      |                 |      |                 |     |
| <b>Fluid</b>                                 | Air   |      |                 |      |                 |     |
| <b>Proof pressure</b>                        | 1.5 MPa   |      |                 |      |                 |     |
| <b>Max. operating pressure</b>               | 1.0 MPa   |      |                 |      |                 |     |
| <b>Min. operating pressure</b>               | 0.05 MPa  |      |                 |      |                 |     |
| <b>Ambient and fluid temperature</b>         | Without auto switch: -10 to 70°C<br>With auto switch: -10 to 60°C (No freezing) |      |                 |      |                 |     |
| <b>Lubrication</b>                           | Non-lube  |      |                 |      |                 |     |
| <b>Operating piston speed</b>                | 50 to 1000 mm/s   |      |                 |      |                 |     |
| <b>Allowable stroke tolerance</b>            | Up to 250: $^{+1.0}_0$ , 251 to 800: $^{+1.4}_0$                                |      |                 |      |                 |     |
| <b>Cushion</b> <sup>Note)</sup>              | Air cushion or Rubber bumper  |      |                 |      |                 |     |
| <b>Port size (Rc, NPT, G)</b>                | 1/8   | 1/4  | 3/8             | 1/2  |                 |     |
| <b>Mounting</b>                              | Basic, Axial foot, Rod flange, Center trunnion                                  |      |                 |      |                 |     |
| <b>Non-rotating accuracy</b>                 | $\pm 0.5^\circ$   |      | $\pm 0.5^\circ$ |      | $\pm 0.3^\circ$ |     |
| <b>Allowable rotating torque N-m or less</b> | 0.25  | 0.45 | 0.64            | 0.79 | 0.93            |     |

Note) Kinetic energy absorbable by cushion mechanism is identical to double acting single rod.

## Standard Strokes

| Bore size  | Standard stroke [mm]  |
|------------|---|
| <b>32</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500           |
| <b>40</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500           |
| <b>50</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600      |
| <b>63</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600      |
| <b>80</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700 |
| <b>100</b> | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700 |

Note 1) Manufacture of intermediate strokes is possible. (Spacers are not used.)

Note 2) Using a stroke of a length which is smaller than the effective cushion length may result in reduced air cushion performance. Refer to "Technical Data 1" on page 1901 for details on the effective cushion length.

## Accessories

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

\* Refer to page 401 for dimensions and part numbers. (Except rod boot)

## Rod Boot Material

| Symbol   | Material                 | Max. ambient temp. |
|----------|--------------------------|--------------------|
| <b>J</b> | Nylon tarpaulin          | 70°C               |
| <b>K</b> | Heat resistant tarpaulin | 110°C*             |

\* Max. ambient temperature for rod boot itself.

## Mounting Brackets/Part No.

| Bore size [mm] | 32     | 40     | 50     | 63     | 80     | 100    |
|----------------|--------|--------|--------|--------|--------|--------|
| Axial foot     | MB-L03 | MB-L04 | MB-L05 | MB-L06 | MB-L08 | MB-L10 |
| Rod flange     | MB-F03 | MB-F04 | MB-F05 | MB-F06 | MB-F08 | MB-F10 |

Note) Order two foots per cylinder.

Refer to pages 425 to 432 for cylinders with auto switches.

- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Minimum stroke for auto switch mounting
- Auto switch mounting brackets/Part no.
- Operating range

CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB

MB

MB1

CA2

CS1

CS2

D-□

-X□

Technical Data

# MBKW Series

## Theoretical Force



| Bore size [mm] | Rod dia. [mm]<br>Width across flats [mm] | Operating direction | Piston area [mm <sup>2</sup> ] | Operating pressure [MPa] |      |      |      |      |      |      |      |      |  |
|----------------|--|---------------------|--------------------------------|--------------------------|------|------|------|------|------|------|------|------|--|
|                |  |                     |                                | 0.2                      | 0.3  | 0.4  | 0.5  | 0.6  | 0.7  | 0.8  | 0.9  | 1.0  |  |
| 32             | 12                                       | OUT                 | 691                            | 138                      | 207  | 276  | 346  | 415  | 484  | 553  | 622  | 691  |  |
|                | 12.2                                     | IN                  | 675                            | 135                      | 203  | 270  | 338  | 405  | 473  | 540  | 608  | 675  |  |
| 40             | 16                                       | OUT                 | 1056                           | 211                      | 317  | 422  | 528  | 634  | 739  | 845  | 950  | 1056 |  |
|                | 14.2                                     | IN                  | 1082                           | 216                      | 325  | 433  | 541  | 649  | 757  | 866  | 974  | 1082 |  |
| 50             | 20                                       | OUT                 | 1649                           | 330                      | 495  | 660  | 825  | 989  | 1154 | 1319 | 1484 | 1649 |  |
|                | 19                                       | IN                  | 1651                           | 330                      | 495  | 660  | 826  | 991  | 1156 | 1321 | 1486 | 1651 |  |
| 63             | 20                                       | OUT                 | 2803                           | 561                      | 841  | 1121 | 1402 | 1682 | 1962 | 2242 | 2523 | 2803 |  |
|                | 19                                       | IN                  | 2804                           | 561                      | 841  | 1122 | 1402 | 1682 | 1963 | 2243 | 2524 | 2804 |  |
| 80             | 25                                       | OUT                 | 4536                           | 907                      | 1361 | 1814 | 2268 | 2722 | 3175 | 3629 | 4082 | 4536 |  |
|                | 23                                       | IN                  | 4568                           | 914                      | 1370 | 1827 | 2284 | 2741 | 3198 | 3654 | 4111 | 4568 |  |
| 100            | 30                                       | OUT                 | 7147                           | 1429                     | 2144 | 2859 | 3574 | 4288 | 5003 | 5718 | 6432 | 7147 |  |
|                | 27                                       | IN                  | 7223                           | 1445                     | 2167 | 2889 | 3612 | 4334 | 5056 | 5778 | 6501 | 7223 |  |

Note) Theoretical force [N] = Pressure [MPa] x Piston area [mm<sup>2</sup>]

## Weights/Aluminum Tube

| Bore size [mm]                        |                                 | 32   | 40   | 50   | 63   | 80   | 100  |
|---------------------------------------|---------------------------------|------|------|------|------|------|------|
| Basic weight                          | Basic                           | 0.56 | 0.77 | 1.34 | 1.60 | 2.99 | 4.10 |
|                                       | Axial foot                      | 0.68 | 0.91 | 1.56 | 1.88 | 3.49 | 4.76 |
|                                       | Rod flange                      | 0.85 | 1.14 | 1.79 | 2.39 | 4.44 | 5.93 |
|                                       | Center trunnion                 | 0.85 | 1.13 | 1.82 | 2.40 | 4.54 | 5.79 |
| Additional weight per 50 mm of stroke | All mounting brackets           | 0.16 | 0.23 | 0.37 | 0.38 | 0.60 | 0.79 |
| Accessories                           | Single knuckle joint            | 0.15 | 0.23 | 0.26 | 0.26 | 0.6  | 0.83 |
|                                       | Double knuckle joint (with pin) | 0.22 | 0.37 | 0.43 | 0.43 | 0.87 | 1.27 |

[kg]

Calculation

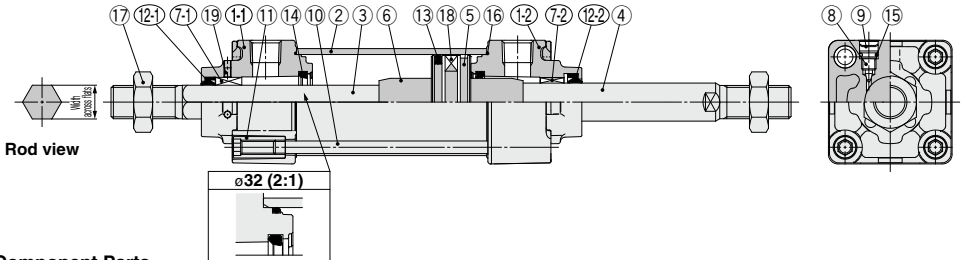
Example) **MBKW32-100Z** (Basic, ø32, 100 st)

• Basic weight ...0.56 (Basic, ø32)

• Additional weight ...0.16/50 stroke

$0.56 + 0.16 \times 100/50 = 0.88 \text{ kg}$

## Construction



## Component Parts

| No.   | Description          | Material            | Q'ty | Note                     |
|-------|----------------------|---------------------|------|--------------------------|
| 1-1   | Rod cover            | Aluminum die-casted | 1    | Non-rotating rod         |
| 1-2   | Rod cover            | Aluminum die-casted | 1    | Standard                 |
| 2     | Cylinder tube        | Aluminum alloy      | 1    | Hard anodized            |
| 3     | Piston rod A         | Stainless steel     | 1    | Non-rotating rod         |
| 4     | Piston rod B         | Carbon steel        | 1    | Standard                 |
| 5     | Piston               | Aluminum alloy      | 1    |                          |
| 6     | Cushion ring         | Rolled steel        | 2    | Zinc chromated           |
| 7-1   | Non-rotating guide   | Bearing alloy       | 1    | Non-rotating rod         |
| 7-2   | Bushing              | Bearing alloy       | 1    | Standard                 |
| 8     | Cushion valve        | Steel wire          | 2    | Trivalent zinc chromated |
| 9     | Retaining ring       | Spring steel        | 2    | ø40 to ø100              |
| 10    | Tie-rod              | Carbon steel        | 4    | Trivalent zinc chromated |
| 11    | Tie-rod nut          | Carbon steel        | 8    | Trivalent zinc chromated |
| 12-1* | Rod seal             | NBR                 | 1    | Non-rotating rod         |
| 12-2* | Rod seal             | NBR                 | 1    | Standard                 |
| 13*   | Piston seal          | NBR                 | 1    |                          |
| 14*   | Cushion seal         | Urethane            | 2    |                          |
| 15    | Cushion valve seal   | NBR                 | 2    |                          |
| 16*   | Cylinder tube gasket | NBR                 | 2    |                          |

| No. | Description                   | Material     | Q'ty | Note                           |
|-----|-------------------------------|--------------|------|--------------------------------|
| 17  | Rod end nut                   | Rolled steel | 2    | Trivalent zinc chromated       |
| 18  | Magnet                        | —            | (1)  |                                |
| 19  | Hexagon socket head set screw | Steel wire   | 2    | Trivalent black zinc chromated |

## Replacement Parts/Seal Kit

| Bore size [mm] | Kit no.     | Contents                      |
|----------------|-------------|-------------------------------|
| 32             | MBKW32Z-PS  | Set of the nos.<br>⑫, ⑬, ⑭, ⑮ |
| 40             | MBKW40Z-PS  |                               |
| 50             | MBKW50Z-PS  |                               |
| 63             | MBKW63Z-PS  |                               |
| 80             | MBKW80Z-PS  |                               |
| 100            | MBKW100Z-PS |                               |

\* Seal kits consist of items ⑫, ⑬, ⑭, ⑮, and can be ordered by using the seal kit number corresponding to each bore size.

\* Trunnion type should not be disassembled. (Refer to page 434.)

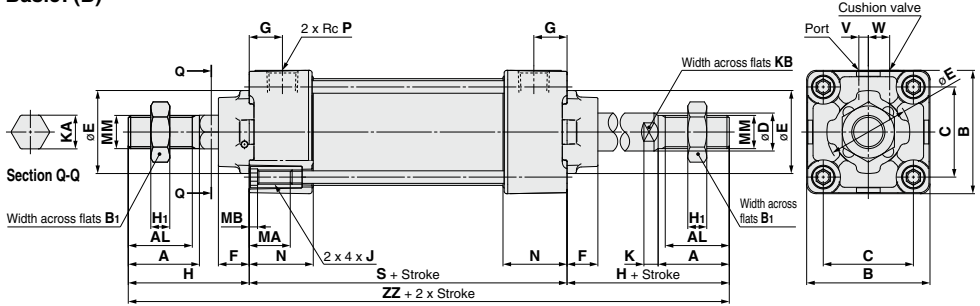
\* Seal kit includes a grease pack (ø32 to 50: 10 g, ø63, 80: 20 g, ø100: 30 g).

Order with the following part number when only the grease pack is needed.

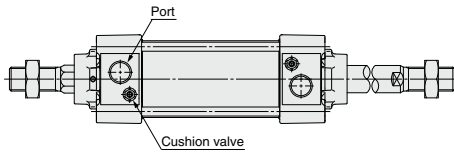
**Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)**

**Standard**

**Basic: (B)**



**Positional relationship between port and cushion valve**



- CJ1**
- CJP**
- CJ2**
- JCM**
- GM2**
- CM3**
- CG1**
- CG3**
- JMB**
- MB**
- MB1**
- CA2**
- CS1**
- CS2**

| Bore size [mm] | [mm] |      |     |                |      |    |    |    |      |    |                |           |    |      |    |
|----------------|------|------|-----|----------------|------|----|----|----|------|----|----------------|-----------|----|------|----|
|                | A    | AL   | B   | B <sub>1</sub> | C    | D  | E  | F  | G    | H  | H <sub>1</sub> | J         | K  | KA   | KB |
| <b>32</b>      | 22   | 19.5 | 46  | 17             | 32.5 | 12 | 30 | 13 | 13   | 47 | 6              | M6 x 1    | 6  | 12.2 | 10 |
| <b>40</b>      | 30   | 27   | 52  | 22             | 38   | 16 | 35 | 13 | 14   | 51 | 8              | M6 x 1    | 6  | 14.2 | 14 |
| <b>50</b>      | 35   | 32   | 65  | 27             | 46.5 | 20 | 40 | 14 | 15.5 | 58 | 11             | M8 x 1.25 | 7  | 19   | 18 |
| <b>63</b>      | 35   | 32   | 75  | 27             | 56.5 | 20 | 45 | 14 | 16.5 | 58 | 11             | M8 x 1.25 | 7  | 19   | 18 |
| <b>80</b>      | 40   | 37   | 95  | 32             | 72   | 25 | 45 | 20 | 19   | 72 | 13             | M10 x 1.5 | 10 | 23   | 22 |
| <b>100</b>     | 40   | 37   | 114 | 41             | 89   | 30 | 55 | 20 | 19   | 72 | 16             | M10 x 1.5 | 10 | 27   | 26 |

| Bore size [mm] | [mm] |    |            |      |     |     |      |      |     |
|----------------|------|----|------------|------|-----|-----|------|------|-----|
|                | MA   | MB | MM         | N    | P   | S*  | V    | W    | ZZ* |
| <b>32</b>      | 16   | 4  | M10 x 1.25 | 27   | 1/8 | 84  | 4    | 6.5  | 178 |
| <b>40</b>      | 16   | 4  | M14 x 1.5  | 27   | 1/4 | 84  | 4    | 9    | 186 |
| <b>50</b>      | 16   | 5  | M18 x 1.5  | 31.5 | 1/4 | 94  | 5    | 10.5 | 210 |
| <b>63</b>      | 16   | 5  | M18 x 1.5  | 31.5 | 3/8 | 94  | 9    | 12   | 210 |
| <b>80</b>      | 16   | 5  | M22 x 1.5  | 38   | 3/8 | 114 | 11.5 | 14   | 258 |
| <b>100</b>     | 16   | 5  | M26 x 1.5  | 38   | 1/2 | 114 | 17   | 15   | 258 |

\* Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston; ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm

The dimensions for each mounting type are the same as those for standard model (double acting, double rod). Refer to pages 406 and 407.

- D
- X
- Technical Data

# Air Cylinder: With End Lock

## MBB Series



ø32, ø40, ø50, ø63, ø80, ø100

### How to Order



**MBB** **L** **32** **50** **H** **N**

With auto switch

**MDBB** **L** **32** **50** **H** **N** **M9BW**

With auto switch  
(Built-in magnet)

Mounting type

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

Bore size

|            |        |
|------------|--------|
| <b>32</b>  | 32 mm  |
| <b>40</b>  | 40 mm  |
| <b>50</b>  | 50 mm  |
| <b>63</b>  | 63 mm  |
| <b>80</b>  | 80 mm  |
| <b>100</b> | 100 mm |

Manual release

|          |             |
|----------|-------------|
| <b>N</b> | Non-locking |
| <b>L</b> | Locking     |

Made to Order  
For details, refer to page 417.

Number of auto switches

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

Locking position

|          |                      |
|----------|----------------------|
| <b>H</b> | Locking at head end  |
| <b>R</b> | Locking at rod end   |
| <b>W</b> | Locking at both ends |

### 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) MDBBB40-100

Port thread type

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

Cylinder stroke [mm]

Refer to "Standard Strokes" on page 417.

Suffix (Rod boot)

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

Auto switch

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

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

### Applicable Auto Switches/Refer to pages 1575 to 1701 for further information on auto switches.

| Type                    | Special function | Electrical entry       | Indicate light | Wiring (Output)    | Load voltage |             | Auto switch model |               | Lead wire length [m] |       |       |       | Pre-wired connector | Applicable load |            |
|-------------------------|------------------|------------------------|----------------|--------------------|--------------|-------------|-------------------|---------------|----------------------|-------|-------|-------|---------------------|-----------------|------------|
|                         |                  |                        |                |                    | DC           | AC          | Tie-rod mounting  | Band mounting | 0.5 (Nil)            | 1 (M) | 3 (L) | 5 (Z) |                     |                 |            |
|                         |                  |                        |                |                    |              |             |                   |               |                      |       |       |       |                     |                 |            |
| Solid state auto switch | —                | Grommet                | Yes            | 3-wire (NPN)       | 24 V         | 5 V, 12 V   | —                 | <b>M9N</b>    | ●                    | ●     | ●     | ○     | ○                   | IC circuit      | Relay, PLC |
|                         |                  |                        |                | 3-wire (PNP)       |              |             |                   | 12 V          | <b>M9P</b>           | ●     | ●     | ●     | ○                   |                 |            |
|                         |                  | 2-wire                 |                | 5 V, 12 V          | —            | <b>M9B</b>  | ●                 | ●             | ●                    | ○     | ○     |       |                     |                 |            |
|                         |                  | 3-wire (NPN)           |                |                    |              | 12 V        | <b>G39</b>        | —             | —                    | —     | —     | —     |                     |                 |            |
|                         |                  | 2-wire                 |                | 24 V               | 5 V, 12 V    |             | —                 | <b>K39</b>    | —                    | —     | —     | —     |                     |                 |            |
|                         | 3-wire (NPN)     | <b>M9NW</b>            |                |                    |              | ●           |                   | ●             | ●                    | ○     | ○     |       |                     |                 |            |
|                         | 3-wire (PNP)     | <b>M9PW</b>            |                | ●                  | ●            | ●           | ○                 | ○             |                      |       |       |       |                     |                 |            |
|                         | 2-wire           | <b>M9BW</b>            |                | ●                  | ●            | ●           | ○                 | ○             |                      |       |       |       |                     |                 |            |
|                         | 3-wire (NPN)     | <b>M9NA</b> *1         |                | —                  | ○            | ○           | ●                 | ○             | ○                    |       |       |       |                     |                 |            |
|                         | 3-wire (PNP)     | <b>M9PA</b> *1         |                | —                  | ○            | ○           | ●                 | ○             | ○                    |       |       |       |                     |                 |            |
| 2-wire                  | <b>M9BA</b> *1   | —                      | ○              | ○                  | ●            | ○           | ○                 |               |                      |       |       |       |                     |                 |            |
| Reed auto switch        | —                | Grommet                | Yes            | 4-wire (NPN)       | 24 V         | 5 V, 12 V   | —                 | <b>F59F</b>   | ●                    | —     | ●     | ○     | ○                   | IC circuit      | Relay, PLC |
|                         |                  |                        |                | 2-wire (Non-polar) |              |             |                   | —             | <b>P3DWA</b>         | ●     | —     | ●     | ○                   |                 |            |
|                         |                  | 3-wire (Equiv. to NPN) |                | 5 V                | —            | <b>P4DW</b> | —                 |               | —                    | ●     | ●     | ○     |                     |                 |            |
|                         |                  | —                      |                |                    |              | 100 V       | —                 | <b>A96</b>    | —                    | ●     | —     | ●     | —                   |                 |            |
|                         |                  | —                      |                | 100 V or less      | 12 V         |             |                   | —             | <b>A93</b>           | —     | ●     | ●     | ●                   |                 |            |
|                         | —                | 100 V, 200 V           |                |                    |              | —           | <b>A90</b>        |               | —                    | ●     | —     | ●     | —                   |                 |            |
|                         | —                |                        |                | 200 V or less      | —            |             | —                 | <b>A54</b>    | —                    | ●     | —     | ●     | —                   |                 |            |
|                         | —                | 100 V, 200 V           |                |                    |              | —           |                   | —             | <b>A64</b>           | —     | ●     | —     | ●                   |                 |            |
|                         | —                |                        |                | —                  | —            |             | —                 |               | <b>A33</b>           | —     | —     | —     | —                   |                 |            |
|                         | —                | —                      |                |                    |              | —           |                   | —             | <b>A34</b>           | —     | —     | —     | —                   |                 |            |
| —                       | —                |                        | —              | —                  | <b>A44</b>   |             | —                 |               | —                    | —     | —     | —     |                     |                 |            |
| —                       |                  | —                      |                |                    | —            | —           | <b>A59W</b>       | —             | ●                    | —     | ●     | —     |                     |                 |            |

\*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Please contact SMC regarding water resistant types with the above model numbers.

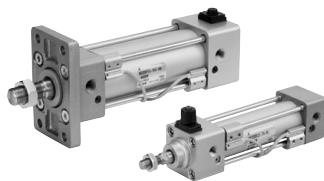
\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW 3 m ..... L (Example) M9NWL  
1 m ..... M (Example) M9NWM 5 m ..... Z (Example) M9NWZ

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

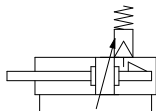
\* Since there are other applicable auto switches than listed above, refer to page 432 for details.

\* The D-A9□/M9□/P3DWA□A auto switches are shipped together, (but not assembled). (However, auto switch mounting brackets are assembled for the D-A9□/M9□ before shipment.)

## Specifications



**Symbol**  
Air cushion



**Made to Order**  
[Click here for details](#)

| Symbol | Specifications  |
|--------|---|
| -XA□   | Change of rod end shape   |
| -XC7   | Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel   |
| -XC10  | Dual stroke cylinder/Double rod type                                |
| -XC14  | Change of trunnion bracket mounting position                        |
| -XC27  | Double clevis and double knuckle joint pins made of stainless steel |
| -XC29  | Double knuckle joint with spring pin                                |
| -XC30  | Rod trunnion  |

\* All Made-to-Order products have the same cover shapes as the current products.

Refer to pages 425 to 432 for cylinders with auto switches.

- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Minimum stroke for auto switch mounting
- Auto switch mounting brackets/Part no.
- Operating range

| Bore size [mm]                       | 32  | 40  | 50 | 63  | 80 | 100 |
|--------------------------------------|---|-----|----|-----|----|-----|
| <b>Action</b>                        | Double acting, Single rod   |     |    |     |    |     |
| <b>Fluid</b>                         | Air   |     |    |     |    |     |
| <b>Proof pressure</b>                | 1.5 MPa   |     |    |     |    |     |
| <b>Max. operating pressure</b>       | 1.0 MPa   |     |    |     |    |     |
| <b>Min. operating pressure</b>       | 0.15 MPa*   |     |    |     |    |     |
| <b>Ambient and fluid temperature</b> | Without auto switch: -10 to 70°C<br>With auto switch: -10 to 60°C (No freezing)           |     |    |     |    |     |
| <b>Lubrication</b>                   | Non-lube  |     |    |     |    |     |
| <b>Operating piston speed</b>        | 50 to 1000 mm/s   |     |    |     |    |     |
| <b>Allowable stroke tolerance</b>    | Up to 250: $+1.0_0$ , 251 to 1000: $+1.4_0$ , 1001 to 1500: $+1.8_0$                      |     |    |     |    |     |
| <b>Cushion</b>                       | Air cushion   |     |    |     |    |     |
| <b>Port size (Rc, NPT, G)</b>        | 1/8   | 1/4 |    | 3/8 |    | 1/2 |
| <b>Mounting</b>                      | Basic, Axial foot, Rod flange, Head flange, Single clevis, Double clevis, Center trunnion |     |    |     |    |     |

\* 0.05 MPa except locking parts

## Locking Specifications

| Locking position       | Head end, Rod end, Both ends   |     |      |      |      |      |
|------------------------|--------------------------------|-----|------|------|------|------|
|                        | ø32                            | ø40 | ø50  | ø63  | ø80  | ø100 |
| Holding force (Max.) N | 550                            | 860 | 1340 | 2140 | 3450 | 5390 |
| Back lash              | 1.5 mm or less                 |     |      |      |      |      |
| Manual release         | Non-locking type, Locking type |     |      |      |      |      |

## Standard Strokes

| Bore size  | Standard stroke [mm]   |    |    |    |    |     |
|------------|--|----|----|----|----|-----|
|            | 32   | 40 | 50 | 63 | 80 | 100 |
| <b>32</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500                |    |    |    |    |     |
| <b>40</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500                |    |    |    |    |     |
| <b>50</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600           |    |    |    |    |     |
| <b>63</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600           |    |    |    |    |     |
| <b>80</b>  | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800 |    |    |    |    |     |
| <b>100</b> | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800 |    |    |    |    |     |

Note 1) Intermediate strokes are available. (No spacer is used.)

Note 2) Using a stroke of a length which is smaller than the effective cushion length may result in reduced air cushion performance. Refer to "Technical Data 1" on page 1901 for details on the effective cushion length.

## Accessories

| Mounting |                                    | Basic | Axial foot | Rod flange | Head flange | Single clevis | Double clevis | Center trunnion |
|----------|------------------------------------|-------|------------|------------|-------------|---------------|---------------|-----------------|
| Standard | Rod end nut                        | ●     | ●          | ●          | ●           | ●             | ●             | ●               |
|          | Clevis pin                         | —     | —          | —          | —           | —             | ●             | —               |
|          | Locking release bolt (N type only) | ●     | ●          | ●          | ●           | ●             | ●             | ●               |
| Option   | Single knuckle joint               | ●     | ●          | ●          | ●           | ●             | ●             | ●               |
|          | Double knuckle joint (with pin)    | ●     | ●          | ●          | ●           | ●             | ●             | ●               |
|          | Rod boot                           | ●     | ●          | ●          | ●           | ●             | ●             | ●               |

\* Refer to page 401 for dimensions and part numbers. (Except locking release bolt and rod boot)

CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB

MB

MB1

CA2

CS1

CS2

D-□

-X□

Technical Data

# MBB Series

## Weights/Aluminum Tube

| Bore size [mm]                        |                                 | 32   | 40   | 50   | 63   | 80   | 100  |
|---------------------------------------|---------------------------------|------|------|------|------|------|------|
| Basic weight                          | Basic                           | 0.50 | 0.69 | 1.19 | 1.47 | 2.73 | 3.7  |
|                                       | Axial foot                      | 0.68 | 0.93 | 1.56 | 1.93 | 3.61 | 4.8  |
|                                       | Rod/Head flange                 | 0.79 | 1.06 | 1.64 | 2.26 | 4.18 | 5.53 |
|                                       | Single clevis                   | 0.75 | 0.92 | 1.53 | 2.1  | 3.84 | 5.28 |
|                                       | Double clevis                   | 0.76 | 0.96 | 1.62 | 2.26 | 4.13 | 5.55 |
|                                       | Center trunnion                 | 0.79 | 1.05 | 1.67 | 2.27 | 4.28 | 5.39 |
| Additional weight per 50 mm of stroke | All mounting brackets           | 0.11 | 0.16 | 0.26 | 0.27 | 0.42 | 0.56 |
| Accessories                           | Single knuckle joint            | 0.15 | 0.23 | 0.26 | 0.26 | 0.60 | 0.83 |
|                                       | Double knuckle joint (with pin) | 0.22 | 0.37 | 0.43 | 0.43 | 0.87 | 1.27 |

## Mounting Brackets/Part No.

| Bore size [mm]                | 32     | 40     | 50     | 63     | 80     | 100    |
|-------------------------------|--------|--------|--------|--------|--------|--------|
| Axial foot <sup>Note 1)</sup> | MB-L03 | MB-L04 | MB-L05 | MB-L06 | MB-L08 | MB-L10 |
| Rod/Head flange               | MB-F03 | MB-F04 | MB-F05 | MB-F06 | MB-F08 | MB-F10 |
| Single clevis                 | MB-C03 | MB-C04 | MB-C05 | MB-C06 | MB-C08 | MB-C10 |
| Double clevis                 | MB-D03 | MB-D04 | MB-D05 | MB-D06 | MB-D08 | MB-D10 |

Note 1) Order two feet per cylinder.

Note 2) Accessories for each mounting bracket are as follows.

Axial foot, Rod/Head flange, Single clevis/Body mounting bolt; Double clevis/Body mounting bolt, Clevis pins, Flat washer and Split pins. → Refer to page 401 for details.

## Additional Weight of Locking Part

| Bore size [mm]                 |                          | 32   | 40   | 50   | 63   | 80   | 100  |
|--------------------------------|--------------------------|------|------|------|------|------|------|
| Manual release non-locking (N) | Locking at head end (H)  | 0.08 | 0.13 | 0.21 | 0.30 | 0.75 | 1.1  |
|                                | Locking at rod end (R)   | 0.08 | 0.13 | 0.20 | 0.29 | 0.71 | 1.03 |
|                                | Locking at both ends (W) | 0.16 | 0.26 | 0.41 | 0.59 | 1.46 | 2.13 |
| Manual release locking (L)     | Locking at head end (H)  | 0.09 | 0.15 | 0.23 | 0.32 | 0.78 | 1.13 |
|                                | Locking at rod end (R)   | 0.09 | 0.15 | 0.22 | 0.31 | 0.74 | 1.06 |
|                                | Locking at both ends (W) | 0.18 | 0.30 | 0.45 | 0.63 | 1.52 | 2.19 |

Calculation

Example) **MBBL32-100-HN**

- Basic weight..... 0.68
- Additional weight..... 0.11/50 stroke
- Cylinder stroke..... 100 stroke
- Locking weight..... 0.08 (Locking at head end, manual release non-locking type)

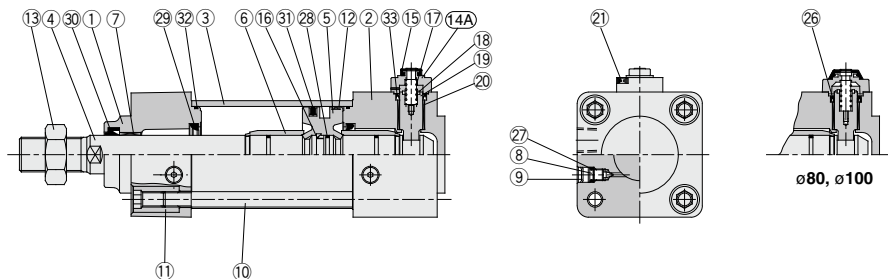
$$0.68 + 0.11 \times 100/50 + 0.08 = \mathbf{0.98 \text{ kg}}$$



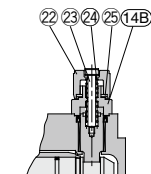
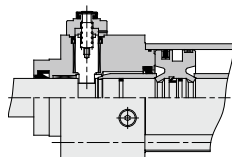
## Construction

### Locking at head end

Manual release non-locking type: N



### Locking at rod end



Manual release locking type: L

### Component Parts

| No. | Description    | Material         | Note                     |
|-----|----------------|------------------|--------------------------|
| 1   | Rod cover      | Aluminum alloy   | Metallic painted         |
| 2   | Head cover     | Aluminum alloy   | Metallic painted         |
| 3   | Cylinder tube  | Aluminum alloy   | Hard anodized            |
| 4   | Piston rod     | Carbon steel     | Hard chrome plating      |
| 5   | Piston         | Aluminum alloy   | Chromated                |
| 6   | Cushion ring   | Aluminum alloy   | Anodized                 |
| 7   | Bushing        | Bearing alloy    |                          |
| 8   | Cushion valve  | Steel wire       | Trivalent zinc chromated |
| 9   | Retaining ring | Steel for spring | ø40 to ø100              |
| 10  | Tie-rod        | Carbon steel     | Trivalent zinc chromated |
| 11  | Tie-rod nut    | Carbon steel     | Trivalent zinc chromated |
| 12  | Wear ring      | Resin            |                          |
| 13  | Rod end nut    | Carbon steel     | Trivalent zinc chromated |
| 14A | Cover A        | Aluminum alloy   | Painted black            |
| 14B | Cover B        | Carbon steel     | Tuffride                 |
| 15  | Rubber cover   | Synthetic rubber |                          |
| 16  | Piston holder  | Urethane         |                          |

### Component Parts

| No. | Description          | Material      | Note                              |
|-----|----------------------|---------------|-----------------------------------|
| 17  | Lock spring          | Steel wire    |                                   |
| 18  | Bumper               | Urethane      |                                   |
| 19  | Lock piston          | Carbon steel  | Hardened, Hard chrome plating     |
| 20  | Lock bushing         | Copper alloy  |                                   |
| 21  | Bolt with hex. hole  | Alloyed steel | Black zinc chromated              |
| 22  | M/O knob             | Zinc alloy    | Painted black                     |
| 23  | M/O bolt             | Alloyed steel | Black zinc chromated, Painted red |
| 24  | M/O spring           | Steel wire    | Zinc chromated                    |
| 25  | Stopper ring         | Carbon steel  | Zinc chromated                    |
| 26  | Seal retainer        | Rolled steel  | ø80, ø100 only                    |
| 27  | Cushion valve seal   | NBR           |                                   |
| 28  | Piston gasket        | NBR           |                                   |
| 29* | Cushion seal         | Urethane      |                                   |
| 30* | Rod seal             | NBR           |                                   |
| 31* | Piston seal          | NBR           |                                   |
| 32* | Cylinder tube gasket | NBR           |                                   |
| 33* | Lock piston seal     | NBR           |                                   |

### Replacement Parts/Seal Kit (Locking at head or rod end)

| Bore size [mm] | Kit no.   | Contents                              |
|----------------|-----------|---------------------------------------|
| 32             | MBB32-PS  | Set of the nos.<br>29, 30, 31, 32, 33 |
| 40             | MBB40-PS  |                                       |
| 50             | MBB50-PS  |                                       |
| 63             | MBB63-PS  |                                       |
| 80             | MBB80-PS  |                                       |
| 100            | MBB100-PS |                                       |

### Replacement Parts/Seal Kit (Locking at both ends)

| Bore size [mm] | Kit no.     | Contents                              |
|----------------|-------------|---------------------------------------|
| 32             | MBB32-PS-W  | Set of the nos.<br>29, 30, 31, 32, 33 |
| 40             | MBB40-PS-W  |                                       |
| 50             | MBB50-PS-W  |                                       |
| 63             | MBB63-PS-W  |                                       |
| 80             | MBB80-PS-W  |                                       |
| 100            | MBB100-PS-W |                                       |

\* Seal kits consist of items 29 to 33, and can be ordered by using the seal kit number corresponding to each bore size.

\* Trunnion type should not be disassembled. (Refer to page 434.)

\* Seal kit includes a grease pack (ø32 to 50: 10 g, ø63, 80: 20 g, ø100: 30 g).

Order with the following part number when only the grease pack is needed.

Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB

MB

MB1

CA2

CS1

CS2

D-□

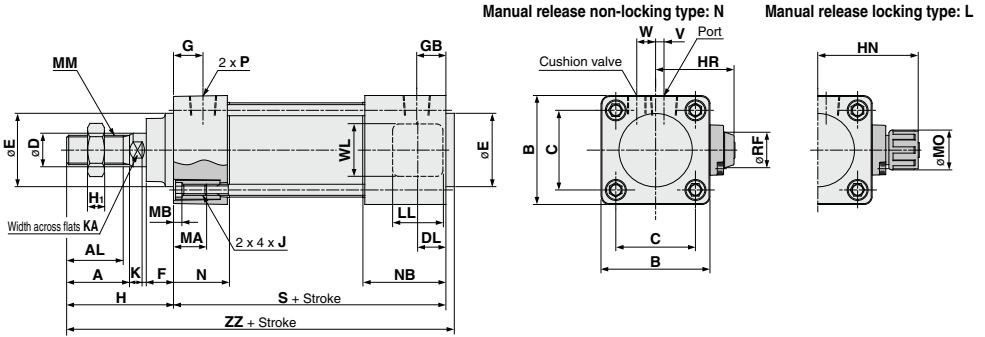
-X□

Technical Data

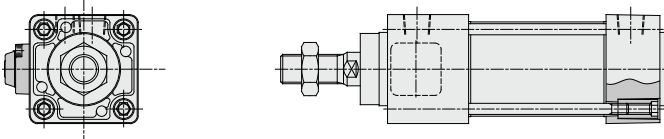
# MBB Series

## Basic: (B)

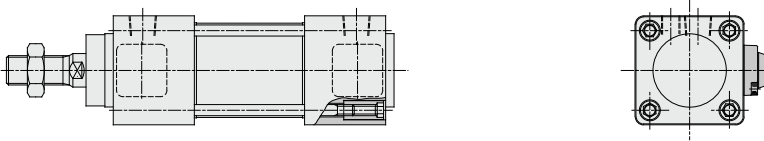
Locking at head end: MBBB   —  — H□



Locking at rod end: MBBB   —  — R□



Locking at both ends: MBBB   —  — W□



-H□/R□

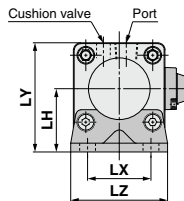
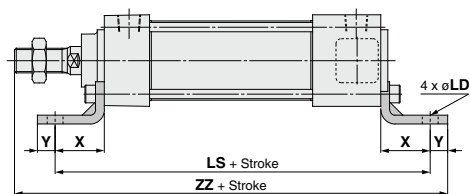
| Bore size [mm] | AL   | KA | A  | B   | C    | D  | DL | E  | F  | G    | GB   | H <sub>1</sub> | H  | HR   | HN   | J         | K  | LL | MA | MB |
|----------------|------|----|----|-----|------|----|----|----|----|------|------|----------------|----|------|------|-----------|----|----|----|----|
| 32             | 19.5 | 10 | 22 | 46  | 32.5 | 12 | 9  | 30 | 13 | 13   | 21   | 6              | 47 | 33.5 | 45   | M6 x 1    | 6  | 15 | 16 | 4  |
| 40             | 27   | 14 | 30 | 52  | 38   | 16 | 12 | 35 | 13 | 14   | 27   | 8              | 51 | 38.5 | 52.5 | M6 x 1    | 6  | 21 | 16 | 4  |
| 50             | 32   | 18 | 35 | 65  | 46.5 | 20 | 13 | 40 | 14 | 15.5 | 27.5 | 11             | 58 | 45   | 59   | M8 x 1.25 | 7  | 21 | 16 | 5  |
| 63             | 32   | 18 | 35 | 75  | 56.5 | 20 | 13 | 45 | 14 | 16.5 | 28.5 | 11             | 58 | 50   | 64   | M8 x 1.25 | 7  | 21 | 16 | 5  |
| 80             | 37   | 22 | 40 | 95  | 72   | 25 | 16 | 45 | 20 | 19   | 37   | 13             | 72 | 62   | 76.5 | M10 x 1.5 | 10 | 30 | 16 | 5  |
| 100            | 37   | 26 | 40 | 114 | 89   | 30 | 16 | 55 | 20 | 19   | 37   | 16             | 72 | 71.5 | 86   | M10 x 1.5 | 10 | 30 | 16 | 5  |

-W□

| Bore size [mm] | MM         | MO | N    | NB   | P   | RF | S   | V    | W    | WL | ZZ  | S   | ZZ  |
|----------------|------------|----|------|------|-----|----|-----|------|------|----|-----|-----|-----|
| 32             | M10 x 1.25 | 15 | 27   | 35   | 1/8 | 11 | 92  | 4    | 6.5  | 24 | 143 | 100 | 151 |
| 40             | M14 x 1.5  | 19 | 27   | 40   | 1/4 | 11 | 97  | 4    | 9    | 24 | 152 | 110 | 165 |
| 50             | M18 x 1.5  | 19 | 31.5 | 43.5 | 1/4 | 11 | 106 | 5    | 10.5 | 24 | 168 | 118 | 180 |
| 63             | M18 x 1.5  | 19 | 31.5 | 43.5 | 3/8 | 11 | 106 | 9    | 12   | 24 | 168 | 118 | 180 |
| 80             | M22 x 1.5  | 23 | 38   | 56   | 3/8 | 21 | 132 | 11.5 | 14   | 40 | 208 | 150 | 226 |
| 100            | M26 x 1.5  | 23 | 38   | 56   | 1/2 | 21 | 132 | 17   | 15   | 40 | 208 | 150 | 226 |

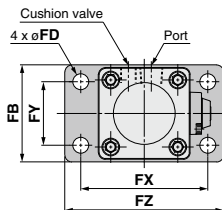
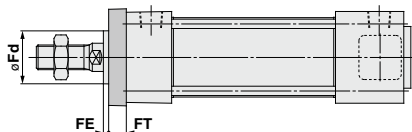
**With Mounting Bracket**

**Axial foot: (L) / Locking at head end: (-H□)**



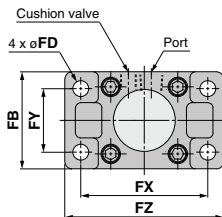
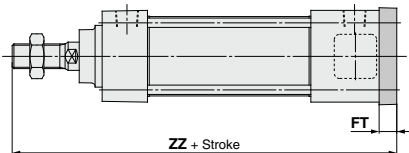
| -H□/-R□        |    |    |    |    |     |     |    |       |     |     | [mm] |     | -W□ |  |
|----------------|----|----|----|----|-----|-----|----|-------|-----|-----|------|-----|-----|--|
| Bore size [mm] | X  | Y  | LD | LH | LS  | LT  | LX | LY    | LZ  | ZZ  | LS   | ZZ  |     |  |
| 32             | 22 | 9  | 7  | 30 | 136 | 3.2 | 32 | 53    | 50  | 170 | 144  | 178 |     |  |
| 40             | 24 | 11 | 9  | 33 | 145 | 3.2 | 38 | 59    | 55  | 183 | 158  | 196 |     |  |
| 50             | 27 | 11 | 9  | 40 | 160 | 3.2 | 46 | 72.5  | 70  | 202 | 172  | 214 |     |  |
| 63             | 27 | 14 | 12 | 45 | 160 | 3.6 | 56 | 82.5  | 80  | 205 | 172  | 217 |     |  |
| 80             | 30 | 14 | 12 | 55 | 192 | 4.5 | 72 | 102.5 | 100 | 248 | 210  | 266 |     |  |
| 100            | 32 | 16 | 14 | 65 | 196 | 4.5 | 89 | 122   | 120 | 252 | 214  | 270 |     |  |

**Rod flange: (F) / Locking at head end: (-H□)**



| -H□/-R□/-W□    |     |    |    |    |     |    |     |      |  |  | [mm] |  |
|----------------|-----|----|----|----|-----|----|-----|------|--|--|------|--|
| Bore size [mm] | FB  | FD | FE | FT | FX  | FY | FZ  | Fd   |  |  |      |  |
| 32             | 50  | 7  | 3  | 10 | 64  | 32 | 79  | 25   |  |  |      |  |
| 40             | 55  | 9  | 3  | 10 | 72  | 36 | 90  | 31   |  |  |      |  |
| 50             | 70  | 9  | 2  | 12 | 90  | 45 | 110 | 38.5 |  |  |      |  |
| 63             | 80  | 9  | 2  | 12 | 100 | 50 | 120 | 39.5 |  |  |      |  |
| 80             | 100 | 12 | 4  | 16 | 126 | 63 | 153 | 45   |  |  |      |  |
| 100            | 120 | 14 | 4  | 16 | 150 | 75 | 178 | 54   |  |  |      |  |

**Head flange: (G) / Locking at head end: (-H□)**



| -H□/-R□        |     |    |    |     |    |     |     |     |  | [mm] |  | -W□ |  |
|----------------|-----|----|----|-----|----|-----|-----|-----|--|------|--|-----|--|
| Bore size [mm] | FB  | FD | FT | FX  | FY | FZ  | ZZ  | ZZ  |  |      |  |     |  |
| 32             | 50  | 7  | 10 | 64  | 32 | 79  | 149 | 157 |  |      |  |     |  |
| 40             | 55  | 9  | 10 | 72  | 36 | 90  | 158 | 171 |  |      |  |     |  |
| 50             | 70  | 9  | 12 | 90  | 45 | 110 | 176 | 188 |  |      |  |     |  |
| 63             | 80  | 9  | 12 | 100 | 50 | 120 | 176 | 188 |  |      |  |     |  |
| 80             | 100 | 12 | 16 | 126 | 63 | 153 | 220 | 238 |  |      |  |     |  |
| 100            | 120 | 14 | 16 | 150 | 75 | 178 | 220 | 238 |  |      |  |     |  |

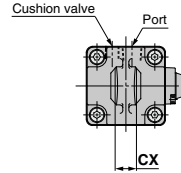
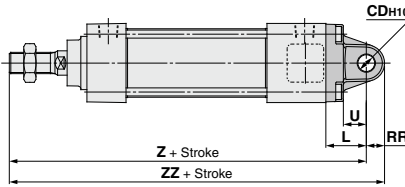
- CJ1
- CJP
- CJ2
- JCM
- CM2
- CM3
- CG1
- CG3
- JMB
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Technical Data

# MBB Series

## With Mounting Bracket

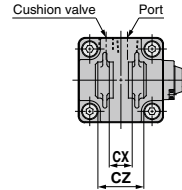
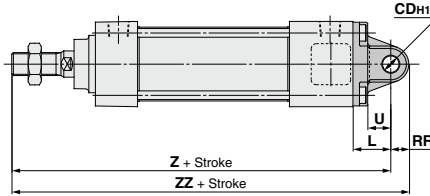
Single clevis: (C) / Locking at head end: (-H□)



-H□-R□

| Bore size [mm] | [mm] |      |    |       |                             |     |       |     | -W□   |  |
|----------------|------|------|----|-------|-----------------------------|-----|-------|-----|-------|--|
|                | L    | RR   | U  | CDH10 | CX <sup>+0.1<br/>-0.3</sup> | Z   | ZZ    | Z   | ZZ    |  |
| 32             | 23   | 10.5 | 13 | 10    | 14                          | 162 | 172.5 | 170 | 180.5 |  |
| 40             | 23   | 11   | 13 | 10    | 14                          | 171 | 182   | 184 | 195   |  |
| 50             | 30   | 15   | 17 | 14    | 20                          | 194 | 209   | 206 | 221   |  |
| 63             | 30   | 15   | 17 | 14    | 20                          | 194 | 209   | 206 | 221   |  |
| 80             | 42   | 23   | 26 | 22    | 30                          | 246 | 269   | 264 | 287   |  |
| 100            | 42   | 23   | 26 | 22    | 30                          | 246 | 269   | 264 | 287   |  |

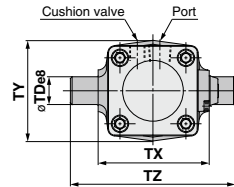
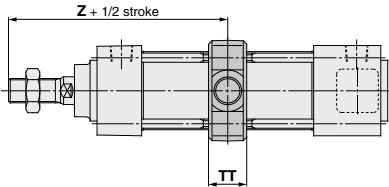
Double clevis: (D) / Locking at head end: (-H□)



-H□-R□

| Bore size [mm] | [mm] |      |    |       |                             |    |     |       | -W□ |       |
|----------------|------|------|----|-------|-----------------------------|----|-----|-------|-----|-------|
|                | L    | RR   | U  | CDH10 | CX <sup>+0.3<br/>-0.1</sup> | CZ | Z   | ZZ    | Z   | ZZ    |
| 32             | 23   | 10.5 | 13 | 10    | 14                          | 28 | 162 | 172.5 | 170 | 180.5 |
| 40             | 23   | 11   | 13 | 10    | 14                          | 28 | 171 | 182   | 184 | 195   |
| 50             | 30   | 15   | 17 | 14    | 20                          | 40 | 194 | 209   | 206 | 221   |
| 63             | 30   | 15   | 17 | 14    | 20                          | 40 | 194 | 209   | 206 | 221   |
| 80             | 42   | 23   | 26 | 22    | 30                          | 60 | 246 | 269   | 264 | 287   |
| 100            | 42   | 23   | 26 | 22    | 30                          | 60 | 246 | 269   | 264 | 287   |

Center trunnion: (T) / Locking at head end: (-H□)



-H□

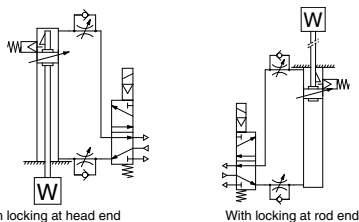
| Bore size [mm] | [mm] |    |     |     |     |     |     | -R□-W□ |   |
|----------------|------|----|-----|-----|-----|-----|-----|--------|---|
|                | TDøø | TT | TX  | TY  | TZ  | Z   | Z   | Z      | Z |
| 32             | 12   | 17 | 50  | 49  | 74  | 89  | 97  |        |   |
| 40             | 16   | 22 | 63  | 58  | 95  | 93  | 106 |        |   |
| 50             | 16   | 22 | 75  | 71  | 107 | 105 | 117 |        |   |
| 63             | 20   | 28 | 90  | 87  | 130 | 105 | 117 |        |   |
| 80             | 20   | 34 | 110 | 110 | 150 | 129 | 147 |        |   |
| 100            | 25   | 40 | 132 | 136 | 182 | 129 | 147 |        |   |

## Cautions for Using

### 1. Use recommended pneumatic circuit.

#### ⚠ Caution

For correct operation of locking or releasing mechanism, use the following pneumatic circuit.



#### ① Do not use a 3-position solenoid valve.

Avoid using circuit with 3-position solenoid valve (especially closed center, metal seal type).

When pressure is trapped in the port with locking mechanism, end lock is free. When utilizing a 3-position closed center valve, even if the lock is engaged, it may become unlocked due to pressure leakage either across the piston or the valve spool.

#### ② Back pressure is required to release lock.

Before starting operation, supply air to side without locking mechanism as figure above. (or side without locking the piston rod for models with locking at both ends.) Otherwise, lock may not be released. (Refer to "Release of lock".)

#### ③ Release lock when mounting or adjusting the cylinder.

If mounting is done with lock engaged, lock may be damaged.

#### ④ Use with load 50% or less of rated capacity.

If cylinder is used over 50% load capacity, lock may be damaged.

#### ⑤ Do not use multiple cylinders synchronously.

Avoid using 2 or more end lock cylinders synchronously to perform a single task because one of the cylinders may not allow lock to release.

#### ⑥ Use a speed controller as meter-out.

Meter-in control may not allow lock to release.

#### ⑦ Use complete stroke or cylinder at side with lock.

If cylinder piston does not reach end of stroke, lock may not be engaged or released.

### 2. Operating pressure

#### ⚠ Caution

Use pressures 0.15 MPa or more at port with locking mechanism. Otherwise, lock will not be released.

### 3. Exhaust speed

#### ⚠ Caution

When pressures at port with locking mechanism is decreased to 0.05 MPa or less, it is automatically locked. When exhaust pipe at port with locking mechanism is thin and long or speed controller is distanced from cylinder port, exhaust speed is slow and will require additional time for lock engagement. Clogging the silencer mounted on exhaust port of solenoid valve leads to the same result.

### 4. Relationship with cushion

#### ⚠ Caution

When cushion valve at side with locking mechanism is fully closed or nearly fully closed, piston rod may not reach the stroke end. Thus lock is not established. And when locking is done with the cushion valve nearly fully closed, adjust the cushion valve since lock may not be released.

### 5. Release of lock

#### ⚠ Warning

When lock is to be released, supply air pressure to the port without the locking mechanism, this relieves the load from the lock mechanism. (Refer to recommended pneumatic circuit.) When port without lock mechanism is exhausted and locking mechanism is loaded, the lock may be damaged due to excessive force on lock during release. Also, piston rod will operate immediately.

### 6. Manual release

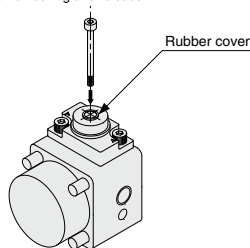
#### ⚠ Caution

##### Non-locking type

Insert attached bolt from upper side of rubber cover (no need to remove rubber cover), tighten locking piston and pull bolt, lock will be released. When bolt is released, locking begins to take place. Thread size, required pulling force and stroke are listed below.

| Bore size [mm] | Thread size          | Pulling force | Stroke [mm] |
|----------------|----------------------|---------------|-------------|
| 32             | ≥ M2.5 x 0.45 x 25 L | 4.9 N         | 2           |
| 40, 50, 63     | ≥ M3 x 0.5 x 30 L    | 10 N          | 3           |
| 80, 100        | ≥ M5 x 0.8 x 40 L    | 24.5 N        | 3           |

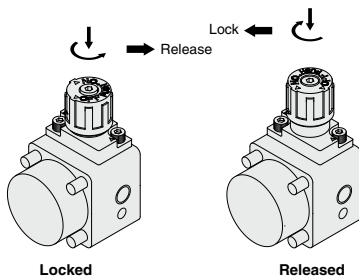
\* Remove bolt under normal operations.  
It may cause malfunction of locking and release.



#### Locking type

Turn 90° counterclockwise while pushing the M/O knob. Lock is released when ▲ on the cap and ▼ OFF mark on the M/O knob correspond. (Lock remains released.)

When locking is desired, turn 90° clockwise while fully pushing the M/O knob and correspond ▲ on the cap and ▲ ON mark on the M/O knob. Confirm the correct position by click sound "click". Otherwise, lock may not be engaged.



CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB

MB

MB1

CA2

CS1

CS2

D-□

-X□

Technical Data



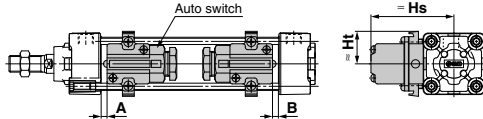
# MB Series

# Auto Switch Mounting

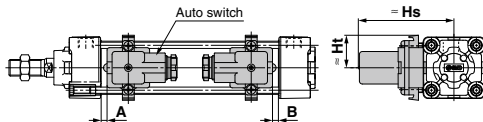
## Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

<Band mounting>

D-G39/K39/A3□



D-A44



<Tie-rod mounting>

D-M9□/M9□V

D-M9□W/M9□WV

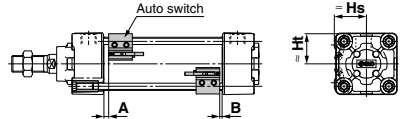
D-M9□A/M9□AV

D-A9□/A9□V

D-Y59□/Y69□/Y7P/Y7PV

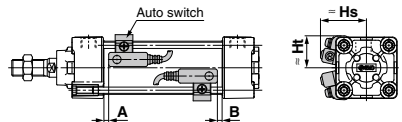
D-Y7□W/Y7□WV/Y7BA

D-Z7□/Z80



D-A5□/A6□

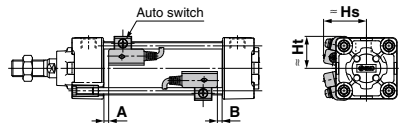
D-A59W



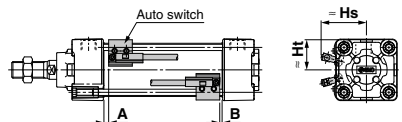
D-F5□/J59

D-F5□W/J59W/F5BA

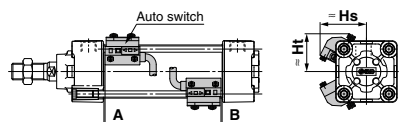
D-F59F/F5NT



D-P3DWA



D-P4DW



CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB

MB

MB1

CA2

CS1

CS2

D-□

-X□

Technical  
Data

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

### Auto Switch Proper Mounting Position (Standard type)

[mm]

| Auto switch model | D-M9□<br>D-M9□V<br>D-M9□W<br>D-M9□WV<br>D-M9□A<br>D-M9□AV |      | D-A9□<br>D-A9□V |     | D-F5□<br>D-J59<br>D-F59F |      | D-F5NT |      | D-A5□<br>D-A6□ |     | D-A59W |     | D-G39<br>D-K39<br>D-A3□<br>D-A44 |     | D-Y59□<br>D-Y69□<br>D-Y7P<br>D-Y7PV<br>D-Y7H<br>D-Y7□W<br>D-Y7□WV<br>D-Z7□<br>D-Z8□ |     | D-P3DWA |      | D-P4DW |     |
|-------------------|---|------|-----------------|-----|--------------------------|------|--------|------|----------------|-----|--------|-----|----------------------------------|-----|---|-----|---------|------|--------|-----|
|                   | A   | B    | A               | B   | A                        | B    | A      | B    | A              | B   | A      | B   | A                                | B   | A   | B   | A       | B    | A      | B   |
| <b>32</b>         | 10  | 8    | 6               | 4   | 6.5                      | 4.5  | 11.5   | 9.5  | 0              | 0   | 4      | 2   | 0                                | 0   | 3.5   | 1.5 | 5.5     | 3.5  | 3      | 1   |
| <b>40</b>         | 9   | 9    | 5               | 5   | 5.5                      | 5.5  | 10.5   | 10.5 | 0              | 0   | 3      | 3   | 0                                | 0   | 2.5   | 2.5 | 4.5     | 4.5  | 2      | 2   |
| <b>50</b>         | 10  | 9    | 6               | 5   | 6.5                      | 5.5  | 11.5   | 10.5 | 0              | 0   | 4      | 3   | 0                                | 0   | 3.5   | 2.5 | 5.5     | 4.5  | 3      | 2   |
| <b>63</b>         | 10  | 9    | 6               | 5   | 6.5                      | 5.5  | 11.5   | 10.5 | 0              | 0   | 4      | 3   | 0                                | 0   | 3.5   | 2.5 | 5.5     | 4.5  | 3      | 2   |
| <b>80</b>         | 14.5  | 11.5 | 10.5            | 7.5 | 11                       | 8    | 16     | 13   | 4.5            | 1.5 | 8.5    | 5.5 | 4.5                              | 1.5 | 8   | 5   | 10      | 7    | 7.5    | 4.5 |
| <b>100</b>        | 14  | 12   | 10              | 8   | 10.5                     | 8.5  | 15.5   | 13.5 | 4              | 2   | 8      | 6   | 4                                | 2   | 7.5   | 5.5 | 9.5     | 7.5  | 7      | 5   |
| <b>125</b>        | 16  | 16   | 12              | 12  | 12.5                     | 12.5 | 17.5   | 17.5 | 6              | 6   | 10     | 10  | 6                                | 6   | 9.5   | 9.5 | 11.5    | 11.5 | 9      | 9   |

\* Models with rubber bumper have different dimensions for auto switch proper mounting positions (A and B). Add the following values to both A and B: 3 mm (ø32 and 40), 4 mm (ø50 and 63), 5 mm (ø80 and 100), 6 mm (ø125).

Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

### Auto Switch Proper Mounting Height (Standard type)

[mm]

| Auto switch model | D-M9□<br>D-M9□W<br>D-M9□A<br>D-A9□ |      | D-A9□V |      | D-M9□V<br>D-M9□WV<br>D-M9□AV |      | D-F5□<br>D-J59<br>D-F59F<br>D-F5□W<br>D-J59W<br>D-F5BA<br>D-F5NT |      | D-A5□<br>D-A6□<br>D-A59W |      | D-G39<br>D-K39<br>D-A3□ |      | D-A44 |      | D-Y59□<br>D-Y7P<br>D-Y7□W<br>D-Y7BA<br>D-Z7□<br>D-Z8□ |      | D-Y69□<br>D-Y7PV<br>D-Y7□WV |      | D-P3DWA |      | D-P4DW |      |
|-------------------|------------------------------------|------|--------|------|------------------------------|------|--|------|--------------------------|------|-------------------------|------|-------|------|---|------|-----------------------------|------|---------|------|--------|------|
|                   | Hs                                 | Ht   | Hs     | Ht   | Hs                           | Ht   | Hs   | Ht   | Hs                       | Ht   | Hs                      | Ht   | Hs    | Ht   | Hs  | Ht   | Hs                          | Ht   | Hs      | Ht   | Hs     | Ht   |
| <b>32</b>         | 24.5                               | 23   | 27.5   | 23   | 30.5                         | 23   | 32.5   | 25   | 35                       | 24.5 | 67                      | 27.5 | 77    | 27.5 | 25.5  | 23   | 26.5                        | 23   | 38      | 31   | 38     | 31   |
| <b>40</b>         | 28.5                               | 25.5 | 31.5   | 25.5 | 34                           | 25.5 | 36.5   | 27.5 | 38.5                     | 27.5 | 71.5                    | 27.5 | 81.5  | 27.5 | 29.5  | 26   | 30                          | 26   | 39      | 25.5 | 42     | 33   |
| <b>50</b>         | 33.5                               | 31   | 36     | 31   | 38.5                         | 31   | 41   | 34   | 43.5                     | 34.5 | 77                      | —    | 87    | —    | 33.5  | 31   | 34.5                        | 31   | 43      | 31   | 46.5   | 39   |
| <b>63</b>         | 38.5                               | 36   | 40.5   | 36   | 43                           | 36   | 46   | 39   | 48.5                     | 39.5 | 83.5                    | —    | 93.5  | —    | 39  | 36   | 40                          | 36   | 48      | 36   | 51.5   | 44   |
| <b>80</b>         | 46.5                               | 45   | 49     | 45   | 52                           | 45   | 52.5   | 46.5 | 55                       | 46.5 | 92.5                    | —    | 103   | —    | 47.5  | 45   | 48.5                        | 45   | 56.5    | 45   | 58     | 51.5 |
| <b>100</b>        | 54                                 | 53.5 | 57     | 53.5 | 59.5                         | 53.5 | 59.5   | 55   | 62                       | 55   | 103                     | —    | 113.5 | —    | 55.5  | 53.5 | 56.5                        | 53.5 | 64.5    | 53.5 | 65.5   | 60.5 |
| <b>125</b>        | 65.5                               | 64.5 | 68.5   | 64.5 | 71                           | 64.5 | 70.5   | 66.5 | 71.5                     | 66.5 | 115                     | —    | 125   | —    | 67.5  | 65   | 68.5                        | 65   | 76      | 64.5 | 76.5   | 72   |



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

**Auto Switch Proper Mounting Position (Non-rotating rod type, With end lock)**

[mm]

| Auto switch model | D-M9□<br>D-M9□V<br>D-M9□W<br>D-M9□WV<br>D-M9□A<br>D-M9□AV |      | D-A9□<br>D-A9□V |     | D-F5□<br>D-J59<br>D-F59F |     | D-F5NT |     | D-A5□<br>D-A6□ |     | D-A59W |     | D-G39<br>D-K39<br>D-A3□<br>D-A44 |     | D-Y59□<br>D-Y69□<br>D-Y7P<br>D-Y7PV<br>D-Y7H<br>D-Y7□W<br>D-Y7□WV<br>D-Z7□<br>D-Z8□ |     | D-P3DWA |     | D-P4DW |     |
|-------------------|---|------|-----------------|-----|--------------------------|-----|--------|-----|----------------|-----|--------|-----|----------------------------------|-----|---|-----|---------|-----|--------|-----|
|                   | A   | B    | A               | B   | A                        | B   | A      | B   | A              | B   | A      | B   | A                                | B   | A   | B   | A       | B   | A      | B   |
| <b>32</b>         | 10.5  | 8    | 6.5             | 4   | 7                        | 4.5 | 12     | 9.5 | 0.5            | 0   | 4.5    | 2   | 0.5                              | 0   | 4   | 1.5 | 5.5     | 3.5 | 3.5    | 1   |
| <b>40</b>         | 10.5  | 8    | 6.5             | 4   | 7                        | 4.5 | 12     | 9.5 | 0.5            | 0   | 4.5    | 2   | 0.5                              | 0   | 4   | 1.5 | 6       | 3.5 | 3.5    | 1   |
| <b>50</b>         | 11  | 8.5  | 7               | 4.5 | 7.5                      | 5   | 12.5   | 10  | 1              | 0   | 5      | 2.5 | 1                                | 0   | 4.5   | 2   | 6.5     | 4   | 4      | 1.5 |
| <b>63</b>         | 11  | 8.5  | 7               | 4.5 | 7.5                      | 5   | 12.5   | 10  | 1              | 0   | 5      | 2.5 | 1                                | 0   | 4.5   | 2   | 6.5     | 4   | 4      | 1.5 |
| <b>80</b>         | 14  | 12.5 | 10              | 8.5 | 10.5                     | 9   | 15.5   | 14  | 4              | 2.5 | 8      | 6.5 | 4                                | 2.5 | 7.5   | 6   | 9.5     | 8   | 7      | 5.5 |
| <b>100</b>        | 14  | 12.5 | 10              | 8.5 | 10.5                     | 9   | 15.5   | 14  | 4              | 2.5 | 8      | 6.5 | 4                                | 2.5 | 7.5   | 6   | 9.5     | 8   | 7      | 5.5 |

\* Models with rubber bumper have different dimensions for auto switch proper mounting positions (A and B). Add the following values to both A and B: 3 mm (ø32 and 40), 4 mm (ø50 and 63), 5 mm (ø80 and 100).  
 Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

**Auto Switch Proper Mounting Height (Non-rotating rod type, With end lock)**

[mm]

| Auto switch model | D-M9□<br>D-M9□W<br>D-M9□A<br>D-A9□ |      | D-A9□V |      | D-M9□V<br>D-M9□WV<br>D-M9□AV |      | D-F5□<br>D-J59<br>D-F59F<br>D-F5□W<br>D-J59W<br>D-F5BA<br>D-F5NT |      | D-A5□<br>D-A6□<br>D-A59W |      | D-G39<br>D-K39<br>D-A3□ |      | D-A44 |      | D-Y59□<br>D-Y7P<br>D-Y7□W<br>D-Y7BA<br>D-Z7□<br>D-Z8□ |      | D-Y69□<br>D-Y7PV<br>D-Y7□WV |      | D-P3DWA |      | D-P4DW |      |
|-------------------|------------------------------------|------|--------|------|------------------------------|------|--|------|--------------------------|------|-------------------------|------|-------|------|---|------|-----------------------------|------|---------|------|--------|------|
|                   | Hs                                 | Ht   | Hs     | Ht   | Hs                           | Ht   | Hs   | Ht   | Hs                       | Ht   | Hs                      | Ht   | Hs    | Ht   | Hs  | Ht   | Hs                          | Ht   | Hs      | Ht   | Hs     | Ht   |
| <b>32</b>         | 24.5                               | 23   | 27.5   | 23   | 30.5                         | 23   | 32.5   | 25   | 35                       | 24.5 | 67                      | 27.5 | 77    | 27.5 | 25.5  | 23   | 26.5                        | 23   | 38      | 31   | 38     | 31   |
| <b>40</b>         | 28.5                               | 25.5 | 31.5   | 25.5 | 34                           | 25.5 | 36.5   | 27.5 | 38.5                     | 27.5 | 71.5                    | 27.5 | 81.5  | 27.5 | 29.5  | 26   | 30                          | 26   | 39      | 25.5 | 42     | 33   |
| <b>50</b>         | 33.5                               | 31   | 36     | 31   | 38.5                         | 31   | 41   | 34   | 43.5                     | 34.5 | 77                      | —    | 87    | —    | 33.5  | 31   | 34.5                        | 31   | 43      | 31   | 46.5   | 39   |
| <b>63</b>         | 38.5                               | 36   | 40.5   | 36   | 43                           | 36   | 46   | 39   | 48.5                     | 39.5 | 83.5                    | —    | 93.5  | —    | 39  | 36   | 40                          | 36   | 48      | 36   | 51.5   | 44   |
| <b>80</b>         | 46.5                               | 45   | 49     | 45   | 52                           | 45   | 52.5   | 46.5 | 55                       | 46.5 | 92.5                    | —    | 103   | —    | 47.5  | 45   | 48.5                        | 45   | 56.5    | 45   | 58     | 51.5 |
| <b>100</b>        | 54                                 | 53.5 | 57     | 53.5 | 59.5                         | 53.5 | 59.5   | 55   | 62                       | 55   | 103                     | —    | 113.5 | —    | 55.5  | 53.5 | 56.5                        | 53.5 | 64.5    | 53.5 | 65.5   | 60.5 |

- CJ1**
- CJP**
- CJ2**
- JCM**
- CM2**
- CM3**
- CG1**
- CG3**
- JMB**
- MB**
- MB1**
- CA2**
- CS1**
- CS2**

- D-□**
- X□**
- Technical Data

## Minimum Stroke for Auto Switch Mounting

### Mounting Brackets Except Center Trunnion

n: Number of auto switches [mm]

| Auto switch model  | Number of auto switches                   | ø32, ø40, ø50, ø63  | ø80, ø100   | ø125 <small>Note 2)</small>   |
|--|---|---|---|---|
| <b>D-M9□</b><br><b>D-M9□W</b>  | 2 (Different surfaces, same surface)<br>1 | 15  |   |   |
|  | n   | $15 + 40 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> |   |   |
| <b>D-M9□V</b><br><b>D-M9□WV</b>  | 2 (Different surfaces, same surface)<br>1 | 10  |   |   |
|  | n   | $10 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> |   |   |
| <b>D-M9□A</b>  | 2 (Different surfaces, same surface)<br>1 | 15  |   |   |
|  | n   | $15 + 40 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> |   |   |
| <b>D-M9□AV</b>   | 2 (Different surfaces, same surface)<br>1 | 15  |   |   |
|  | n   | $15 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> |   |   |
| <b>D-A9□</b>   | 2 (Different surfaces, same surface)<br>1 | 15  |   |   |
|  | n   | $15 + 40 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> |   |   |
| <b>D-A9□V</b>  | 2 (Different surfaces, same surface)<br>1 | 10  |   |   |
|  | n   | $10 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> |   |   |
| <b>D-G39</b><br><b>D-K39</b><br><b>D-A3□</b>   | 2 (Different surfaces)                    | 35  |   |   |
|  | 2 (Same surface)                          | 100   |   |   |
|  | n (Different surfaces)                    | $35 + 30 (n - 2)$<br>(n = 2, 3, 4...)                                   |   |   |
|  | n (Same surface)                          | $100 + 100 (n - 2)$<br>(n = 2, 3, 4...)                                 |   |   |
|  | 1   | 10  |   |   |
| <b>D-A44</b>   | 2 (Different surfaces)                    | 35  |   |   |
|  | 2 (Same surface)                          | 55  |   |   |
|  | n (Different surfaces)                    | $35 + 30 (n - 2)$<br>(n = 2, 3, 4...)                                   |   |   |
|  | n (Same surface)                          | $55 + 50 (n - 2)$<br>(n = 2, 3, 4...)                                   |   |   |
|  | 1   | 10  |   |   |
| <b>D-F5□</b><br><b>D-J59</b><br><b>D-F5□W</b><br><b>D-J59W</b><br><b>D-F5BA</b><br><b>D-F59F</b> | 2 (Different surfaces, same surface)<br>1 | 15  | 25  | 25  |
|  | n (Same surface)                          | $15 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> | $25 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> | $25 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> |
|  | 1   | 10  | 25  | 25  |
|  | 2 (Different surfaces, same surface)<br>1 | 15  | 20  | 20  |
| <b>D-A5□</b><br><b>D-A6□</b>   | 2 (Different surfaces, same surface)<br>1 | 20  | 25  | 25  |
|  | n (Different surfaces)                    | $15 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> | $20 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> | $20 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> |
| <b>D-A59W</b>  | 2 (Different surfaces, same surface)<br>1 | 20  | 25  | 25  |
|  | n (Same surface)                          | $20 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> | $25 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> | $25 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> |
|  | 1   | 15  | 25  | 25  |
| <b>D-F5NT</b>  | 2 (Different surfaces, same surface)<br>1 | 15  | 25  | 30  |
|  | n (Same surface)                          | $15 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> | $25 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> | $30 + 55 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> |
|  | 1   | 10  | 25  | 30  |
| <b>D-Y59□</b><br><b>D-Y7P</b><br><b>D-Y7□W</b><br><b>D-Z7□</b><br><b>D-Z80</b>                   | 2 (Different surfaces, same surface)<br>1 | 15  |   |   |
|  | n   | $15 + 40 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <small>Note 1)</small> |   |   |

Note 1) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation.

Note 2) Non-rotating rod type and with end lock are applicable to ø32 to ø100.

## Minimum Stroke for Auto Switch Mounting

### Mounting Brackets Except Center Trunnion

n: Number of auto switches [mm]

| Auto switch model           | Number of auto switches              | ø32, ø40, ø50, ø63, ø80, ø100                             | ø125 Note 3)  |
|-----------------------------|--------------------------------------|---|---|
| D-Y69□<br>D-Y7PV<br>D-Y7□WV | 2 (Different surfaces, same surface) | 10  |   |
|                             | n                                    | $10 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8... ) Note 1) |   |
| D-Y7BA                      | 2 (Different surfaces, same surface) | 20  |   |
|                             | n                                    | $20 + 45 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8... ) Note 1) |   |
| D-P3DWA                     | 2 (Different surfaces, same surface) | 15  |   |
|                             | n                                    | $15 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8... ) Note 1) |   |
| D-P4DW                      | 2 (Different surfaces, same surface) | 15  | 20  |
|                             | n                                    | $15 + 65 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8... ) Note 1) | $20 + 65 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8... ) Note 1) |

Note 1) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation.

Note 3) Non-rotating rod type and with end lock are applicable to ø32 to ø100.

### Center Trunnion

n: Number of auto switches [mm]

| Auto switch model | Number of auto switches              | ø32   | ø40   | ø50   | ø63   | ø80  | ø100   | ø125 Note 3) |
|-------------------|--------------------------------------|---|---|---|---|--|--|--------------|
| D-M9□<br>D-M9□W   | 2 (Different surfaces, same surface) | 75  | 80  | 85  | 90  | 95   | 105  |              |
|                   | n                                    | $75 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $80 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $85 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $90 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $95 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2)  | $105 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) |              |
| D-M9□V<br>D-M9□WV | 2 (Different surfaces, same surface) | 50  | 55  | 60  | 65  | 70   | 80   |              |
|                   | n                                    | $50 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $55 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $60 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $65 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $70 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2)  | $80 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2)  |              |
| D-M9□A            | 2 (Different surfaces, same surface) | 80  | 85  | 90  | 95  | 100  | 110  |              |
|                   | n                                    | $80 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $85 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $90 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $95 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $100 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $110 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) |              |
| D-M9□AV           | 2 (Different surfaces, same surface) | 55  | 60  | 65  | 70  | 75   | 85   |              |
|                   | n                                    | $55 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $60 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $65 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $70 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $75 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2)  | $85 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2)  |              |
| D-A9□             | 2 (Different surfaces, same surface) | 70  | 75  | 80  | 85  | 95   | 100  |              |
|                   | n                                    | $70 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $75 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $80 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $85 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $95 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2)  | $100 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) |              |
| D-A9□V            | 2 (Different surfaces, same surface) | 45  | 50  | 55  | 60  | 70   | 75   |              |
|                   | n                                    | $45 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $50 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $55 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $60 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2) | $70 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2)  | $75 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16... ) Note 2)  |              |

Note 2) When "n" is an odd number, a multiple of 4 that is larger than this odd number is used for the calculation.

Note 3) Non-rotating rod type and with end lock are applicable to ø32 to ø100.

CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB

MB

MB1

CA2

CS1

CS2

D-□

-X□

Technical  
Data

## Minimum Stroke for Auto Switch Mounting

### Center Trunnion

n: Number of auto switches [mm]

| Auto switch model                                 | Number of auto switches              | ø32   | ø40   | ø50   | ø63   | ø80   | ø100  | ø125 (Note 3) |
|---|--------------------------------------|---|---|---|---|---|---|---------------|
| D-G39<br>D-K39<br>D-A3□                           | 2 (Different surfaces)               | 60  | 65  | 75  | 80  | 85  | 90  | 90            |
|   | 2 (Same surface)                     | 90  | 95  | 100   | 105   | 110   | 125   |               |
|   | n (Different surfaces)               | $60 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    | $65 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    | $75 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    | $80 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    | $85 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    | $90 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    |               |
|   | n (Same surface)                     | $90 + 100 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>   | $95 + 100 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>   | $100 + 100 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>  | $105 + 100 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>  | $110 + 100 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>  | $125 + 100 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>  |               |
| D-A44   | 1                                    | 60  | 65  | 75  | 80  | 85  | 90  |               |
|   | 2 (Different surfaces)               | 70  | 75  | 80  | 85  | 90  |   |               |
|   | 2 (Same surface)                     | 70  | 75  | 80  | 85  | 90  |   |               |
|   | n (Different surfaces)               | $70 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    | $75 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    | $80 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    | $85 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    | $90 + 30 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    |   |               |
| D-F5□/J59<br>D-F5□W<br>D-J59W<br>D-F5BA<br>D-F59F | n (Same surface)                     | $70 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    | $75 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    | $80 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    | $85 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    | $90 + 50 \frac{(n-2)}{2}$<br>(n = 2, 4, 6, 8...) <sup>Note 1</sup>    |   |               |
|   | 1                                    | 70  | 75  | 80  | 85  | 90  |   |               |
|   | 2 (Different surfaces, same surface) | 90  | 95  | 110   | 115   | 120   | 130   |               |
|   | n (Same surface)                     | $90 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $95 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $110 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $115 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $120 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $130 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> |               |
| D-F5NT  | 1                                    | 90  | 95  | 110   | 115   | 120   | 130   |               |
|   | 2 (Different surfaces, same surface) | 100   | 105   | 120   | 125   | 130   | 140   |               |
|   | n (Same surface)                     | $100 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $105 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $120 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $125 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $130 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $140 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> |               |
| D-A5□<br>D-A6□                                    | 1                                    | 100   | 105   | 120   | 125   | 130   | 140   |               |
|   | n (Same surface)                     | $60 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $80 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $105 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $110 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $115 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> |   |               |
| D-A59W  | 1                                    | 60  | 70  | 85  | 110   | 115   | 120   |               |
|   | 2 (Different surfaces, same surface) | 60  | 70  | 85  | 110   | 115   | 120   |               |
|   | n (Same surface)                     | $60 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $70 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $85 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $110 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $115 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $120 + 55 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> |               |
| D-Y59□<br>D-Y7P<br>D-Y7□W<br>D-Z7□<br>D-Z80       | 1                                    | 60  | 70  | 85  | 110   | 115   | 120   |               |
|   | 2 (Different surfaces, same surface) | 80  | 85  | 90  | 95  | 100   | 105   |               |
|   | n                                    | $80 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $85 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $90 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $95 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $100 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $105 + 40 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> |               |
| D-Y69□<br>D-Y7PV<br>D-Y7□WV                       | 1                                    | 60  | 65  | 70  | 75  | 85  | 85  |               |
|   | 2 (Different surfaces, same surface) | 60  | 65  | 70  | 75  | 85  | 85  |               |
|   | n                                    | $60 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $65 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $70 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $75 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $85 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $85 + 30 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  |               |
| D-Y7BA  | 1                                    | 85  | 90  | 100   | 105   | 110   | 115   |               |
|   | 2 (Different surfaces, same surface) | 85  | 90  | 100   | 105   | 110   | 115   |               |
|   | n                                    | $85 + 45 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $90 + 45 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $100 + 45 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $105 + 45 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $110 + 45 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $115 + 45 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> |               |
| D-P3DWA   | 1                                    | 80  | 85  | 90  | 95  | 100   |   |               |
|   | 2 (Different surfaces, same surface) | 80  | 85  | 90  | 95  | 100   |   |               |
|   | n                                    | $80 + 50 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $85 + 50 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $90 + 50 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $95 + 50 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup>  | $100 + 50 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> |   |               |
| D-P4DW  | 1                                    | 120   | 130   | 140   | 150   |   |   |               |
|   | 2 (Different surfaces, same surface) | 120   | 130   | 140   | 150   |   |   |               |
|   | n                                    | $120 + 65 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $130 + 65 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $140 + 65 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> | $150 + 65 \frac{(n-4)}{2}$<br>(n = 4, 8, 12, 16...) <sup>Note 2</sup> |   |   |               |

Note 1) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation.

Note 2) When "n" is an odd number, a multiple of 4 that is larger than this odd number is used for the calculation.

Note 3) Non-rotating rod type and with end lock are applicable to ø32 to ø100.

**Auto Switch Mounting Brackets/Part No.**

| Auto switch model   | Bore size [mm] |           |           |           |           |           |           |
|---|----------------|-----------|-----------|-----------|-----------|-----------|-----------|
|   | ø32            | ø40       | ø50       | ø63       | ø80       | ø100      | ø125      |
| D-M9□/M9□V<br>D-M9□W/M9□WV<br>D-M9□A/M9□AV<br>D-A9□/A9□V            | BMB5-032       | BMB5-032  | BA7-040   | BA7-040   | BA7-063   | BA7-063   | BA7-080   |
| D-A3□/A44<br>D-G39/K39  | BMB2-032       | BMB2-040  | BMB1-050  | BMB1-063  | BMB1-080  | BMB1-100  | BS1-125   |
| D-F5□/J59<br>D-F5□W/J59W<br>D-F59F/F5BA<br>D-F5NT<br>D-A5□/A6□/A59W | BT-03          | BT-03     | BT-05     | BT-05     | BT-06     | BT-06     | BT-08     |
| D-P3DWA   | BA10-032S      | BA10-040S | BA10-050S | BA10-050S | BA10-063S | BA10-063S | BA10-080S |
| D-P4DW  | BMB3T-040      | BMB3T-040 | BMB3T-050 | BMB3T-050 | BMB3T-080 | BMB3T-080 | BAP2T-080 |
| D-Y59□/Y69□<br>D-Y7P/Y7PV<br>D-Y7□W/Y7□WV<br>D-Y7BA<br>D-Z7□/Z80    | BMB4-032       | BMB4-032  | BMB4-050  | BMB4-050  | BA4-063   | BA4-063   | BA4-080   |

**[Stainless Steel Mounting Screw]**

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

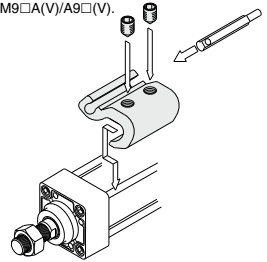
BBA1: For D-A5/A6/F5/J5 types

Note 1) Refer to page 1689 for details on the BBA1.

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

Note 2) When using the D-M9□A(V) or Y7BA, do not use the steel set screws which are included with the auto switch mounting brackets above (BMB5-032, BA7-□□□, BMB4-□□□, BA4-□□□). Order a stainless steel screw kit (BBA1) separately, and use the M4 x 6 L stainless steel set screws included in the BBA1.

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

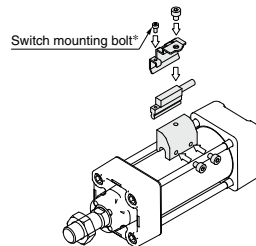


**Operating Range**

| Auto switch model                                   | Bore size [mm] |     |     |     |     |      |     |
|---|----------------|-----|-----|-----|-----|------|-----|
|   | 32             | 40  | 50  | 63  | 80  | 100  | 125 |
| D-M9□/M9□V<br>D-M9□W/M9□WV<br>D-M9□A/M9□AV          | 4              | 4.5 | 4.5 | 4.5 | 5   | 6    | 7   |
| D-Y59□/Y69□<br>D-Y7P/Y7□V<br>D-Y7□W/Y7□WV<br>D-Y7BA | 5.5            | 5.5 | 7   | 7.5 | 6.5 | 5.5  | 7   |
| D-F5□/J59<br>D-F5□W/J59W<br>D-F5BA/F5NT<br>D-F59F   | 3.5            | 4   | 4   | 4.5 | 4.5 | 4.5  | 5   |
| D-G39/K39   | 9              | 9   | 9   | 10  | 10  | 11   | 11  |
| D-P3DWA   | 3              | 4.5 | 4.5 | 5   | 5   | 5.5  | 6.5 |
| D-P4DW  | 4              | 4   | 4   | 4.5 | 4   | 4.5  | 4.5 |
| D-A9□/A9□V  | 7              | 7.5 | 8.5 | 9.5 | 9.5 | 10.5 | 12  |
| D-Z7□/Z80   | 7.5            | 8.5 | 7.5 | 9.5 | 9.5 | 10.5 | 13  |
| D-A5□/A6□   | 9              | 9   | 10  | 11  | 11  | 11   | 10  |
| D-A59W  | 13             | 13  | 13  | 14  | 14  | 15   | 17  |
| D-A3□/A44   | 9              | 9   | 10  | 11  | 11  | 11   | 10  |

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

<Mounting example for ø32, D-P3DWA>



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

- CJ1
- CJP
- CJ2
- JCM
- CM2
- CM3
- CG1
- CG3
- JMB
- MB**
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Technical Data

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

Refer to pages 1575 to 1701 for the detailed specifications.

| Type        | Model               | Electrical entry        | Features                                     |
|-------------|---------------------|-------------------------|--|
| Solid state | D-M9NV/M9PV/M9BV    | Grommet (Perpendicular) | —  |
|             | D-Y69A/Y69B/Y7PV    |                         | Diagnostic indication (2-color indicator)    |
|             | D-M9NVW/M9PWV/M9BWW |                         | Water resistant (2-color indicator)          |
|             | D-Y7NWW/Y7PWV/Y7BWW |                         | Magnetic field resistant (2-color indicator) |
|             | D-M9NAV/M9PAV/M9BAV |                         | —  |
|             | D-P4DW              |                         | Diagnostic indication (2-color indicator)    |
|             | D-F59/F5P/J59       | Grommet (In-line)       | Water resistant (2-color indicator)          |
|             | D-Y59A/Y59B/Y7P     |                         | With timer                                   |
|             | D-Y7H               |                         | Magnetic field resistant (2-color indicator) |
|             | D-F59W/F5PW/J59W    |                         | —  |
|             | D-Y7NWW/Y7PWV/Y7BWW |                         | Without indicator light                      |
|             | D-F5BA/Y7BA         |                         | —  |
|             | D-F5NT              |                         | Without indicator light                      |
|             | D-P5DW              |                         | —  |
| Reed        | D-A93V/A96V         | Grommet (Perpendicular) | —  |
|             | D-A90V              | Grommet (In-line)       | Without indicator light                      |
|             | D-A53/A56/Z73/Z76   |                         | —  |
|             | D-A67/Z80           |                         | Without indicator light                      |

\* With pre-wired connector is also available for solid state switches. For details, refer to pages 1648 and 1649.

\* Normally closed (NC = b contact) solid state auto switches (D-M9□E(V)/Y7G/Y7H) are also available. For details, refer to pages 1592-1 and 1595.



## 1 Cylinder with Heat Resistant Reed Auto Switch (-10 to 120°C)

Symbol  
**-X1184**

### Applicable Series

| Description   | Model | Action                    | Note |
|---------------|-------|---------------------------|------|
| Standard type | MB    | Double acting, Single rod |      |

### How to Order

MDB  Standard model no. Z –  Pivot bracket  Rod end bracket –  Heat resistant reed auto switch  – X1184

| Switch model |                | Number of switches |             |
|--------------|----------------|--------------------|-------------|
| Symbol       | Description    | Symbol             | Description |
| Nil          | Without switch | S                  | 1 pc.       |
| B30          | D-B30          | Nil                | 2 pcs.      |
| B30J         | D-B30J         | n                  | n pcs.      |
| B31          | D-B31          |                    |             |
| B31J         | D-B31J         |                    |             |
| B35          | D-B35          |                    |             |
| B35J         | D-B35J         |                    |             |

Cylinder with heat resistant reed auto switch

\* Refer to pages 1671 to 1673 for details about the D-B3 auto switch and the Specific Product Precautions.

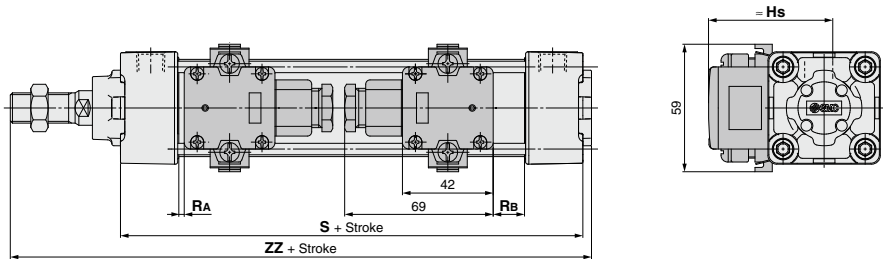
### Specifications

|                           |                       |
|---------------------------|-----------------------|
| Ambient temperature range | -10°C to 120°C        |
| Bore size                 | 40, 50, 63, 80, 100   |
| Seal material             | Fluororubber          |
| Grease                    | Heat resistant grease |

### Warning Precautions

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

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



| Bore size | S   | ZZ  | Hs   | RA  | RB   | Minimum mounting stroke    |                 | Auto switch mounting bracket part number |
|-----------|-----|-----|------|-----|------|----------------------------|-----------------|--|
|           |     |     |      |     |      | Other than center trunnion | Center trunnion |  |
| 40        | 99  | 154 | 57.5 | 2.5 | 14.5 | 1 pc.: 50 st or more       | 200 st or more  | BMB2-040                                 |
| 50        | 109 | 171 | 63   | 3.5 | 14.5 | 2 pcs.: Different surfaces | 200 st or more  | BMB1-050                                 |
| 63        | 109 | 171 | 69.5 | 0.5 | 14.5 | 50 st or more              | 200 st or more  | BMB1-063                                 |
| 80        | 129 | 205 | 78.5 | 2.5 | 22.5 | 2 pcs.: Same surface       | 210 st or more  | BMB1-080                                 |
| 100       | 129 | 205 | 89   | 1   | 22   | 220 st or more             | 210 st or more  | BMB1-100                                 |

CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB

MB

MB1

CA2

CS1

CS2

D-□

-X□

Technical Data



## MB Series

# Specific Product Precautions

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 12 for Actuator and Auto Switch Precautions.

### Adjustment

#### Warning

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

Crimping ( $\phi 32$ ) or a retaining ring ( $\phi 40$  to  $\phi 100$ ) is provided to prevent the accidental removal of the cushion valve. Do not open the valve beyond the mechanism. If air is supplied, the cushion valve may shoot out from the cover.

| Bore size [mm] | Cushion valve width across flats [mm] | Hexagon wrench                       |
|----------------|---------------------------------------|--------------------------------------|
| 32, 40         | 2.5                                   | JIS 4648<br>Hexagonal wrench key 2.5 |
| 50, 63         | 3                                     | JIS 4648<br>Hexagonal wrench key 3   |
| 80, 100, 125   | 4                                     | JIS 4648<br>Hexagonal wrench key 4   |

##### 2. Use the air cushion at the end of cylinder stroke.

Select the cylinder with bumper if the cushion valve is to be fully opened. Otherwise, tie-rods or piston assembly may be damaged.

##### 3. When replacing mounting brackets, use a hexagon wrench.

| Bore size [mm] |        | Bolt            | Width across flats [mm] | Tightening torque [N·m] |
|----------------|--------|-----------------|-------------------------|-------------------------|
| 32, 40         |        | MB-32-48-C1247A | 4                       | 5.1                     |
| 50, 63         |        | MB-50-48-C1249A | 5                       | 11                      |
| 80, 100        | Foot   | MB-80-48AC1251A | 6                       | 25                      |
|                | Others | MB-80-48BC1251A |                         |                         |
| 125            | Foot   | CE00008         | 8                       | 30.1                    |
|                | Others | CE00032         |                         |                         |

##### 4. When replacing mounting brackets, tie-rod nuts on the cylinder body become loosened.

After retightening the tie-rod nuts with the proper tightening torque (Refer to Adjustment 3.), mount a mounting bracket.

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

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

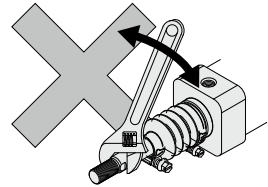
### With Rod Boot

### Handling

#### Caution

##### 1. Do not turn the piston rod with the rod boot kept locked.

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



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