

Combinations of Standard Products and Made

Series MB1

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

| Symbol | Specification | Applicable bore size | MB1 (Standard) | | | |
|----------------------|---|----------------------|----------------|----------------------|-------------|------|
| | | | Double acting | | | |
| | | | Air | | Rubber | |
| | | | ø32 to ø100 | ø125 | ø32 to ø100 | ø125 |
| Standard | Standard | ø32 to ø125 | ● | ● | ● | ● |
| Long st | Long stroke | | ○ | ○ | ○ | ○ |
| D | Built-in magnet | | ● | ● | ● | ● |
| MB1□-□ $\frac{1}{2}$ | With rod boot | | ● | ● | ● | ● |
| 10- | Clean series | | ○ | ○ | ○ | ○ |
| 20- | Copper ^{Note 3)} and Fluorine-free | | ● | ○ | ● | ○ |
| MB1□ $\frac{1}{2}$ | Water resistant | | ● | ○ | ● | ○ |
| XA□ | Change of rod end shape | | ⊙ | ○ | ⊙ | ○ |
| XB5 | Oversized rod cylinder | | ⊙ | ○ | ○ | ○ |
| XB6 | Heat-resistant cylinder (-10 to 150°C) | | ⊙ | ○ | ○ | ○ |
| XB13 | Low-speed cylinder (5 to 50 mm/s) | ○ | ○ | ○ | ○ | |
| XC3 | Special port position | ⊙ | ○ | ⊙ | ○ | |
| XC4 | With heavy duty scraper | ⊙ | ○ | ⊙ | ○ | |
| XC5 | Heat-resistant cylinder (-10 to 110°C) | ⊙ | ○ | ○ | ○ | |
| 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 | ⊙ | ○ | ⊙ | ○ | |
| XC22 | Fluororubber seal | ⊙ | ○ | ⊙ | ○ | |
| XC27 | Double clevis pins made of Stainless steel (Stainless steel 304) | ⊙ | ⊙ | ⊙ | ⊙ | |
| XC29 | Double knuckle joint with spring pin | ⊙ | ○ | ⊙ | ○ | |
| XC30 | Rod side trunnion | ⊙ ^{Note 1)} | ○ | ⊙ ^{Note 1)} | ○ | |
| XC35 | With coil scraper | ⊙ | ○ | ⊙ | ○ | |
| XC59 | Fluororubber seal, Built-in hard plastic magnet | ⊙ | ○ | ⊙ | ○ | |
| XC65 | XC6 + XC7 specifications | ⊙ | ○ | ⊙ | ○ | |
| X846 | Fastener strips mounted on switch mounting grooves | ⊙ | ⊙ | ⊙ | ⊙ | |

Note 1) For Series MB1, a T bracket can be used only when selecting XC30.

Note 2) XC10 specification for Series MBK is the non-rotating type on both sides. For only one side, submit a special order request form.

Note 3) Copper is not allowed to use for the externally exposed part.

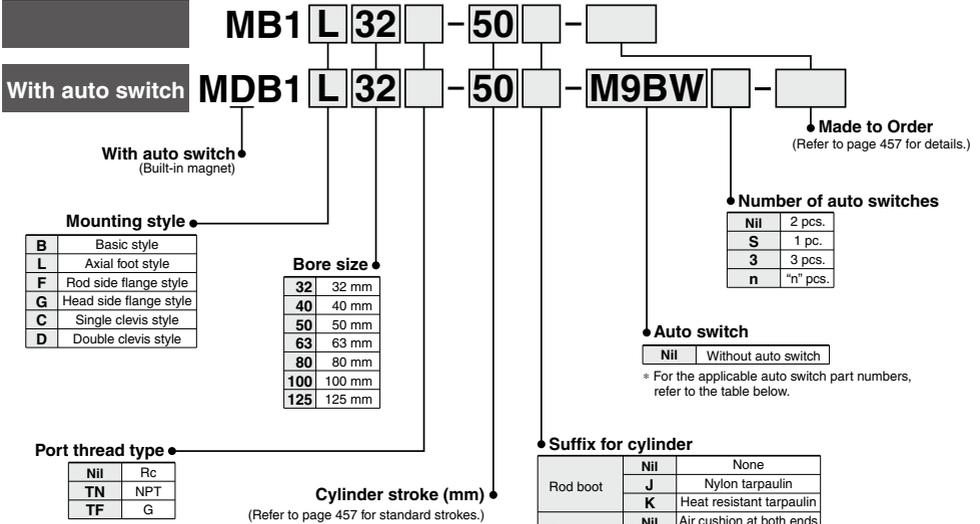
Square Tube Type Air Cylinder: Standard Type

Double Acting, Single Rod

Series MB1

ø32, ø40, ø50, ø63, ø80, ø100, ø125

How to Order



Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) MDB1F40-100

Note) In the case of w/o air cushion, it comes with rubber bumper.
Besides, 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, ø125: +12 mm.

Applicable Auto Switches/Refer to pages 1559 to 1673 for further information on auto switches.

| Type | Special function | Electrical entry | Indicator light | Wiring (Output) | Load voltage | | Auto switch model | | Lead wire length (m) | | | | Pre-wired connector | Applicable load | |
|--------------------------------------|--|------------------|-----------------|-------------------------|---------------|-----------|-------------------|--------------|----------------------|------------|-------|-------|---------------------|-----------------|------------|
| | | | | | DC | AC | Perpendicular | In-line | 0.5 (Nil) | 1 (M) | 3 (L) | 5 (Z) | | | |
| Solid state auto switch | — | Grommet | Yes | 3-wire (NPN) | 24 V | 5 V, 12 V | — | M9NV | M9N | ● | ● | ● | ○ | IC circuit | Relay, PLC |
| | | | | 3-wire (PNP) | | | | M9PV | M9P | ● | ● | ● | ○ | | |
| | | | | 2-wire | | | | M9BV | M9B | ● | ● | ● | ○ | | |
| | | | | 2-wire | | | | M9BW | M9W | ● | ● | ● | ○ | | |
| | Diagnostic indication (2-color indication) | | | 3-wire (NPN) | 5 V, 12 V | — | M9NVW | M9NW | ● | ● | ● | ○ | IC circuit | | |
| | | | | 3-wire (PNP) | | | M9PVW | M9PW | ● | ● | ● | ○ | | | |
| | | | | 2-wire | | | M9BWW | M9BW | ● | ● | ● | ○ | | | |
| | | | | 2-wire | | | M9BVAW | M9BAW | ● | ● | ● | ○ | | | |
| Water resistant (2-color indication) | 3-wire (NPN) | 5 V, 12 V | — | M9NAV * | M9NA * | ○ | ○ | ● | ○ | IC circuit | | | | | |
| | 3-wire (PNP) | | | M9PAV * | M9PA * | ○ | ○ | ● | ○ | | | | | | |
| | 2-wire | | | M9BAV * | M9BA * | ○ | ○ | ● | ○ | | | | | | |
| | 2-wire | | | M9BAV * | M9BA * | ○ | ○ | ● | ○ | | | | | | |
| Reed auto switch | — | Grommet | No | 3-wire (NPN equivalent) | 24 V | 12 V | — | A96V | A96 | ● | — | ● | — | IC circuit | — |
| | | | | 2-wire | | | | A93V | A93 | ● | — | ● | — | | |
| | | | | 2-wire | | | | A90V | A90 | ● | — | ● | — | | |

** 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. Consult with SMC regarding water resistant types for ø125.

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

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

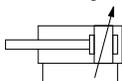
* Since there are other applicable auto switches than listed above, refer to page 474 for details.
* For details about auto switches with pre-wired connector, refer to pages 1626 and 1627.
* Auto switches are shipped together (not assembled).

Square Tube Type Air Cylinder: Standard Type Double Acting, Single Rod **Series MB1**



Symbol

Double acting, Air cushion



Made to Order Made to Order: Individual Specifications
(For details, refer to page 475.)

| Symbol | Specifications |
|--------|--|
| -X846 | Fastener strips mounted on switch mounting grooves |

Made to Order Specifications
(For details, refer to pages 1675 to 1818.)

| Symbol | Specifications |
|--------|---|
| -XA□ | Change of rod end shape |
| -XB5 | Oversized rod cylinder |
| -XB6 | Heat resistant cylinder (150°C) |
| -XC3 | Special port location |
| -XC4 | With heavy duty scraper |
| -XC5 | Heat resistant cylinder (110°C) |
| -XC6 | Piston rod and rod end nut made of stainless steel |
| -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 type cylinder |
| -XC22 | Fluororubber seals |
| -XC27 | Double clevis pin and double knuckle pin made of stainless steel |
| -XC29 | Double knuckle joint with spring pin |
| -XC30 | Rod side trunnion |
| -XC35 | With coil scraper |
| -XC59 | Fluororubber seals Built-in hard plastic magnet |
| -XC65 | XC6 + XC7 specifications |

Refer to pages 473 and 474 for cylinders with auto switches.

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

Specifications

| Bore size (mm) | 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 (No freezing) | | | | | | |
| | With auto switch -10 to 60°C (No freezing) | | | | | | |
| Lubrication | Not required (Non-lube) | | | | | | |
| Piston speed | 50 to 1000 mm/s | | | | | | 50 to 700 mm/s |
| Stroke length tolerance | Up to 250: $^{+1.0}_0$, 251 to 1000: $^{+1.4}_0$, 1001 to 1500: $^{+1.8}_0$ | | | | | | |
| Cushion | Both ends (Air cushion) ^{Note} | | | | | | |
| Port size (Rc, NPT, G) | 1/8 | 1/4 | 3/8 | 1/2 | | | |
| Mounting | Basic style, Foot style, Rod side flange style, Head side flange style | | | | | | |
| | Single clevis style, Double clevis style | | | | | | |

Note) In the case of w/o air cushion, it comes with rubber bumper.

Standard Stroke

| Bore size (mm) | Standard stroke (mm) | Maximum manufacturable stroke |
|----------------|--|-------------------------------|
| 32 | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500 | 700 |
| 40 | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500 | 800 |
| 50 | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600 | 1000 |
| 63 | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600 | 1000 |
| 80 | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800 | 1000 |
| 100 | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800 | 1000 |
| 125 | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 1000 | 1400 |

Note) Intermediate strokes are available, too. (Spacer is not used.)

Accessory

| Mounting | | Basic style | Foot style | Rod side flange style | Head side flange style | Single clevis style | Double clevis style |
|--------------------|---------------------------------|-------------|------------|-----------------------|------------------------|---------------------|---------------------|
| Standard equipment | Rod end nut | ● | ● | ● | ● | ● | ● |
| | Clevis pin | — | — | — | — | — | ● |
| Option | Single knuckle joint | ● | ● | ● | ● | ● | ● |
| | Double knuckle joint (With pin) | ● | ● | ● | ● | ● | ● |
| | Rod boot | ● | ● | ● | ● | ● | ● |

Mounting Bracket Part No.

| Bore size (mm) | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
|--------------------|--------|--------|--------|--------|--------|--------|--------|
| Foot ¹⁾ | MB-L03 | MB-L04 | MB-L05 | MB-L06 | MB-L08 | MB-L10 | MB-L12 |
| | 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 foot brackets per cylinder.

Note 2) Accessories for each mounting bracket are as follows. Foot, flange, single clevis/body mounting bolt, double clevis/body mounting bolt, clevis pins, cotter pins and flat washer. Refer to page 463 for details.

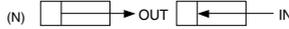
Rod Boot Material

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

* Maximum ambient temperature for the rod boot itself.

Series MB1

Theoretical Output



| Bore size (mm) | Rod size (mm) | Operating direction | Piston area (mm ²) | 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 output (N) = Pressure (MPa) x Piston area (mm²)

Weight

(kg)

| Bore size (mm) | | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
|--|---------------------------|------|------|------|------|------|------|------|
| Basic weight | Basic style | 0.53 | 0.72 | 1.24 | 1.54 | 2.84 | 3.83 | 5.68 |
| | Foot style | 0.65 | 0.86 | 1.46 | 1.82 | 3.34 | 4.49 | 7.76 |
| | Flange style | 0.82 | 1.09 | 1.69 | 2.33 | 4.29 | 7.14 | 9.84 |
| | Single clevis style | 0.78 | 0.95 | 1.58 | 2.17 | 3.95 | 7.0 | 8.25 |
| | Double clevis style | 0.79 | 0.99 | 1.67 | 2.33 | 4.24 | 7.52 | 8.45 |
| Additional weight per each 50 mm of stroke | All mounting brackets | 0.16 | 0.21 | 0.33 | 0.37 | 0.56 | 0.72 | 0.94 |
| | Accessory bracket | 0.15 | 0.23 | 0.26 | 0.26 | 0.60 | 0.83 | 1.10 |
| | Double knuckle (With pin) | 0.22 | 0.37 | 0.43 | 0.43 | 0.87 | 1.27 | 0.91 |

Calculation:

(Example) MB1B32-100 (Basic style/ø32, 100 st)

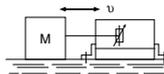
- Basic weight.....0.53 (Basic style, ø32)
 - Additional weight.....0.16/50 mm stroke
 - Cylinder stroke.....100 mm stroke
- $$0.53 + 0.16 \times 100/50 = 0.85 \text{ kg}$$

Kinetic Energy Absorbable by the Cushion Mechanism

| Bore size (mm) | Effective cushion length (mm) | Kinetic energy absorbable (J) |
|----------------|---------------------------------|-------------------------------|
| 32 | 18.8 | 2.2 |
| 40 | 18.8 | 3.4 |
| 50 | 21.3 | 5.9 |
| 63 | 21.3 | 11 |
| 80 | 30.3 | 20 |
| 100 | 29.3 | 29 |
| 125 | Rod side 31.4 Head side 29.4 | 43 |

With Air Cushion

At the stroke end, when stopping a large amount of kinetic energy generated by a large load and high speed operation, compression of air is used to absorb the impact without transmitting vibration to the surroundings. The purpose of an air cushion is not to reduce the speed of a piston as it nears the stroke end. The kinetic energy of load can be found using the following formula.



$$E_k = \frac{M}{2} v^2$$

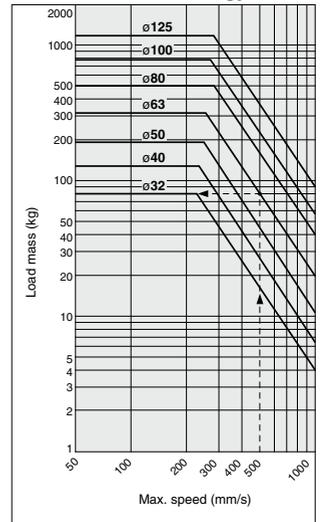
E_k : Kinetic energy (J)

M : Mass of load (kg)

v : Piston speed (m/s)

If the kinetic energy obtained is no greater than the absorbable kinetic energy shown in the table above, the life of the cushion seal will be 10 million cycles or more.

Allowable Kinetic Energy

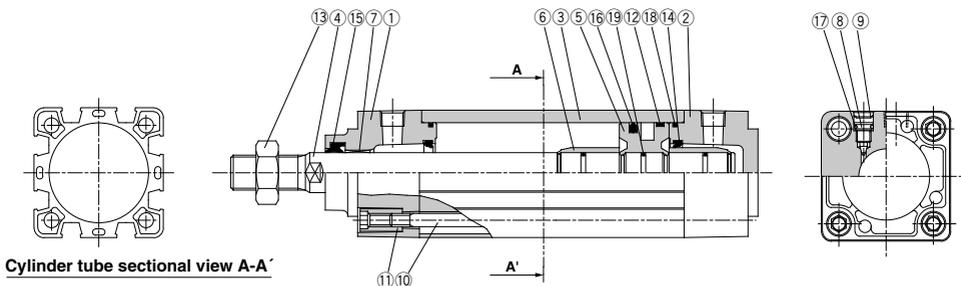


Example) Load limit at rod end when the air cylinder ø63 is actuated with max. speed of 500 mm/s.

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

Square Tube Type Air Cylinder: Standard Type Double Acting, Single Rod **Series MB1**

Construction



Cylinder tube sectional view A-A'

Component Parts

| No. | Description | Material | Note |
|-----|----------------|---------------------|--------------------|
| 1 | Rod cover | Aluminum die-casted | Metallic painted |
| 2 | Head cover | Aluminum die-casted | Metallic painted |
| 3 | Cylinder tube | Aluminum alloy | Hard anodized |
| 4 | Piston rod | Carbon steel | Hard chrome plated |
| 5 | Piston | Aluminum alloy | Chromated |
| 6 | Cushion ring | Aluminum alloy | Anodized |
| 7 | Bushing | Lead-bronze casted | |
| 8 | Cushion valve | Steel wire | Nickel plated |
| 9 | Retaining ring | Spring steel | ø40 to ø100 |
| 10 | Tie-rod | Carbon steel | Zinc chromated |
| 11 | Tie-rod nut | Carbon steel | Nickel plated |
| 12 | Wear ring | Resin | |
| 13 | Rod end nut | Carbon steel | Nickel plated |

| No. | Description | Material | Note |
|-----|----------------------|----------|------|
| 14* | Cushion seal | Urethane | |
| 15* | Rod seal | NBR | |
| 16* | Piston seal | NBR | |
| 17 | Cushion valve seal | NBR | |
| 18* | Cylinder tube gasket | NBR | |
| 19 | Piston gasket | NBR | |

Replacement Parts/Seal Kit

| Bore size (mm) | Kit no. | Contents |
|----------------|----------|-------------------------------------|
| 32 | MB32-PS | Set of the above nos. ⑭, ⑮, ⑯, ⑰ |
| 40 | MB40-PS | |
| 50 | MB50-PS | |
| 63 | MB63-PS | |
| 80 | MB80-PS | |
| 100 | MB100-PS | |

* Seal kit includes 14 to 16, 18. Order the seal kit, based on each bore size.

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

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

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

Water Resistant Air Cylinders

As compared to the standard cylinder, anti-coolant performance has been improved, and suitable for using under the atmosphere having coolant in the machine tools. Improved water resistant air cylinder, Series MB is also available, which is compliant for the environment having water splashed on the food machinery, or car washing machine, etc. Refer to page 1121 for details.

CJ1

CJP

CJ2
-Z

CJ2

CM2
-Z

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

CS2

D-□

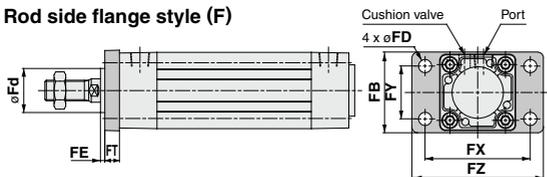
-X□

Technical
data

Square Tube Type Air Cylinder: Standard Type Double Acting, Single Rod **Series MB1**

Standard Type: With Mounting Bracket

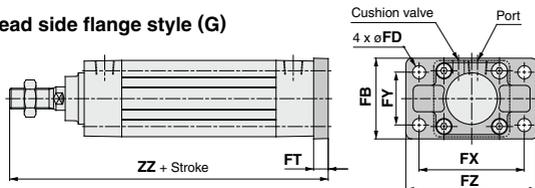
Rod side flange style (F)



Rod Side Flange Style

| Bore size (mm) | Stroke range | FB | FD | FE | FT | FX | FY | FZ | Fd |
|----------------|--------------|-----|----|----|----|-----|-----|-----|------|
| 32 | to 700 | 50 | 7 | 3 | 10 | 64 | 32 | 79 | 25 |
| 40 | to 800 | 55 | 9 | 3 | 10 | 72 | 36 | 90 | 31 |
| 50 | to 1000 | 70 | 9 | 2 | 12 | 90 | 45 | 110 | 38.5 |
| 63 | to 1000 | 80 | 9 | 2 | 12 | 100 | 50 | 120 | 39.5 |
| 80 | to 1000 | 100 | 12 | 4 | 16 | 126 | 63 | 153 | 45.5 |
| 100 | to 1000 | 120 | 14 | 4 | 16 | 150 | 75 | 178 | 54 |
| 125 | to 1400 | 138 | 14 | 7 | 20 | 180 | 102 | 216 | 57.5 |

Head side flange style (G)



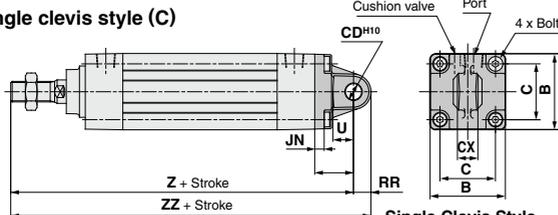
Without Air Cushion

| Bore size (mm) | ZZ |
|----------------|-----|
| 32 | 147 |
| 40 | 151 |
| 50, 63 | 172 |
| 80, 100 | 212 |
| 125 | 249 |

Head Side Flange Style

| Bore size (mm) | Stroke range | FB | FD | FT | FX | FY | FZ | ZZ ^a |
|----------------|--------------|-----|----|----|-----|-----|-----|-----------------|
| 32 | to 500 | 50 | 7 | 10 | 64 | 32 | 79 | 141 |
| 40 | to 500 | 55 | 9 | 10 | 72 | 36 | 90 | 145 |
| 50 | to 600 | 70 | 9 | 12 | 90 | 45 | 110 | 164 |
| 63 | to 600 | 80 | 9 | 12 | 100 | 50 | 120 | 164 |
| 80 | to 800 | 100 | 12 | 16 | 126 | 63 | 153 | 202 |
| 100 | to 800 | 120 | 14 | 16 | 150 | 75 | 178 | 202 |
| 125 | to 1000 | 138 | 14 | 20 | 180 | 102 | 216 | 237 |

Single clevis style (C)



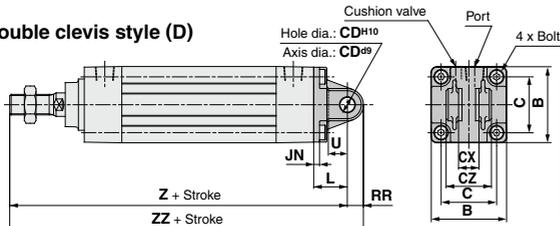
Without Air Cushion

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

Single Clevis Style

| Bore size (mm) | Stroke range | B | C | JN | L | RR | U | CDH10 | CX ^{4,3} _{4,1} | Z ^a | ZZ ^a | Bolt |
|----------------|--------------|-----|------|----|----|------|----|-------|----------------------------------|----------------|-----------------|------------------------------|
| 32 | to 500 | 46 | 32.5 | 5 | 23 | 10.5 | 13 | 10 | 14 | 154 | 164.5 | MB-32-48-C1247 |
| 40 | to 500 | 52 | 38 | 5 | 23 | 11 | 13 | 10 | 14 | 158 | 169 | (M6 x 1 x 18L, Low head) |
| 50 | to 600 | 65 | 46.5 | 6 | 30 | 15 | 17 | 14 | 20 | 182 | 197 | MB-50-48-C1249 |
| 63 | to 600 | 75 | 56.5 | 6 | 30 | 15 | 17 | 14 | 20 | 182 | 197 | (M8 x 1.25 x 18L, Low head) |
| 80 | to 800 | 95 | 72 | 8 | 42 | 23 | 26 | 22 | 30 | 228 | 251 | MB-80-48BC1251 |
| 100 | to 800 | 114 | 89 | 8 | 42 | 23 | 26 | 22 | 30 | 228 | 251 | (M10 x 1.5 x 22L, Low head) |
| 125 | to 1000 | 136 | 110 | 10 | 50 | 28 | 30 | 25 | 32 | 267 | 295 | (M12 x 1.75 x 28L, Low head) |

Double clevis style (D)



Overall length of rod/head side flange, single/double clevis, and method for longitudinal mounting

^a When there is no air cushion, the unit is equipped with rubber bumpers.

Besides, 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, ø125, +12 mm.

Without Air Cushion

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

Double Clevis Style

| Bore size (mm) | Stroke range | B | C | JN | L | RR | U | CDH10 | CX ^{4,3} _{4,1} | CZ | Z ^a | ZZ ^a | Bolt |
|----------------|--------------|-----|------|----|----|------|----|-------|----------------------------------|----|----------------|-----------------|------------------------------|
| 32 | to 500 | 46 | 32.5 | 5 | 23 | 10.5 | 13 | 10 | 14 | 28 | 154 | 164.5 | MB-32-48-C1247 |
| 40 | to 500 | 52 | 38 | 5 | 23 | 11 | 13 | 10 | 14 | 28 | 158 | 169 | (M6 x 1 x 18L, Low head) |
| 50 | to 600 | 65 | 46.5 | 6 | 30 | 15 | 17 | 14 | 20 | 40 | 182 | 197 | MB-50-48-C1249 |
| 63 | to 600 | 75 | 56.5 | 6 | 30 | 15 | 17 | 14 | 20 | 40 | 182 | 197 | (M8 x 1.25 x 18L, Low head) |
| 80 | to 800 | 95 | 72 | 8 | 42 | 23 | 26 | 22 | 30 | 60 | 228 | 251 | MB-80-48BC1251 |
| 100 | to 800 | 114 | 89 | 8 | 42 | 23 | 26 | 22 | 30 | 60 | 228 | 251 | (M10 x 1.5 x 22L, Low head) |
| 125 | to 1000 | 136 | 110 | 10 | 50 | 28 | 30 | 25 | 32 | 64 | 267 | 295 | (M12 x 1.75 x 28L, Low head) |

CJ1

CJP

CJ2
-Z

CM2

CM2
-Z

CM2

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

CS2

D-□

-X□

Technical data

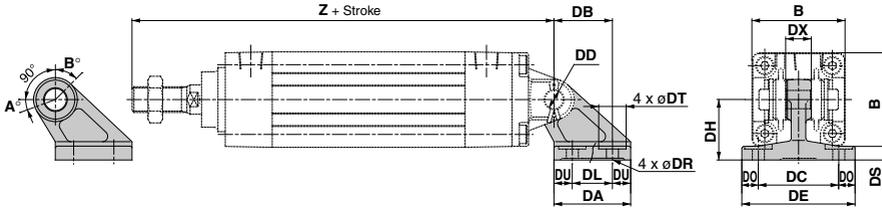
Series MB1

Pivot Bracket/Double Clevis Pivot Bracket

Type

| Description | Bore size | | | | | | | | |
|-----------------------------|-----------|-------|--------|-------|-------|--------|--------|--------|--|
| | MB□32 | MB□40 | MB□50 | MB□63 | MB□80 | MB□100 | MB□125 | | |
| Double clevis pivot bracket | MB-B03 | | MB-B05 | | | MB-B08 | | MB-B12 | |

Double clevis pivot bracket



| Part no. | Bore size (mm) | (mm) | | | | | | | | | | | | | | Without Air Cushion | | |
|----------|----------------|------|----|----|----|------|-----|----|-----|------|------|----|----|----|-----|------------------------|----------------|-----|
| | | B | DA | DB | DL | DU | DC | DX | DE | DO | DR | DT | DS | DH | Z* | DD _{H10} | Bore size (mm) | Z |
| MB-B03 | 32 | 46 | 42 | 32 | 22 | 10 | 44 | 14 | 62 | 9 | 6.6 | 15 | 7 | 33 | 154 | 10 ^{+0.058/0} | 32 | 160 |
| | 40 | 52 | 42 | 32 | 22 | 10 | 44 | 14 | 62 | 9 | 6.6 | 15 | 7 | 33 | 158 | 10 ^{+0.058/0} | 40 | 164 |
| MB-B05 | 50 | 65 | 53 | 43 | 30 | 11.5 | 60 | 20 | 81 | 10.5 | 9 | 18 | 8 | 45 | 182 | 14 ^{+0.070/0} | 50 | 190 |
| | 63 | 75 | 53 | 43 | 30 | 11.5 | 60 | 20 | 81 | 10.5 | 9 | 18 | 8 | 45 | 182 | 14 ^{+0.070/0} | 63 | 190 |
| MB-B08 | 80 | 95 | 73 | 64 | 45 | 14 | 86 | 30 | 111 | 12.5 | 11 | 22 | 10 | 65 | 228 | 22 ^{+0.084/0} | 80 | 238 |
| | 100 | 114 | 73 | 64 | 45 | 14 | 86 | 30 | 111 | 12.5 | 11 | 22 | 10 | 65 | 228 | 22 ^{+0.084/0} | 100 | 238 |
| MB-B12 | 125 | 136 | 90 | 78 | 60 | 15 | 110 | 32 | 136 | 13 | 13.5 | 24 | 14 | 75 | 267 | 25 ^{+0.084/0} | 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° |

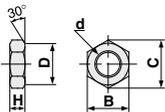
Method for longitudinal mounting of clevis pivot bracket

* In the case of w/o air cushion, it comes with rubber bumper. Besides, 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, ø125: +12 mm.

Square Tube Type Air Cylinder: Standard Type Double Acting, Single Rod **Series MB1**

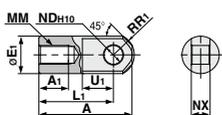
Accessory Bracket Dimensions

Rod end nut
(Standard equipment)



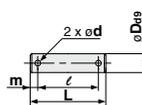
| Part no. | Bore size (mm) | d | H | B | C | D |
|----------|----------------|------------|----|----|------|------|
| NT-03 | 32 | M10 x 1.25 | 6 | 17 | 19.6 | 16.5 |
| NT-04 | 40 | M14 x 1.5 | 8 | 22 | 25.4 | 21 |
| NT-05 | 50, 63 | M18 x 1.5 | 11 | 27 | 31.2 | 26 |
| NT-08 | 80 | M22 x 1.5 | 13 | 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 ₁ | E ₁ | L ₁ | MM | R ₁ | U ₁ | NDH ₁₀ | NX |
|----------|----------------|-----|----------------|----------------|----------------|------------|----------------|----------------|--------------------------|--------------------------|
| I-03M | 32 | 40 | 14 | 20 | 30 | M10 x 1.25 | 12 | 16 | 10 ^{+0.058/0.0} | 14 ^{-0.10/0.30} |
| I-04M | 40 | 50 | 19 | 22 | 40 | M14 x 1.5 | 12.5 | 19 | 10 ^{+0.058/0.0} | 14 ^{-0.10/0.30} |
| I-05M | 50, 63 | 64 | 24 | 28 | 50 | M18 x 1.5 | 16.5 | 24 | 14 ^{+0.070/0.0} | 20 ^{-0.10/0.30} |
| I-08M | 80 | 80 | 26 | 40 | 60 | M22 x 1.5 | 23.5 | 34 | 22 ^{+0.084/0.0} | 30 ^{-0.10/0.30} |
| I-10M | 100 | 80 | 26 | 40 | 60 | M26 x 1.5 | 23.5 | 34 | 22 ^{+0.084/0.0} | 30 ^{-0.10/0.30} |
| I-12M | 125 | 119 | 36 | 46 | 92 | M27 x 2 | 28.5 | 34 | 25 ^{+0.084/0.0} | 32 ^{-0.10/0.30} |

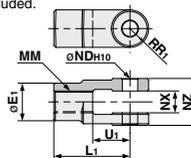
Knuckle joint pin
Clevis pin



| Part no. | Bore size (mm) | | Dø9 | L | ℓ | m | d (Drill through) | Cotter pin |
|-----------------------|----------------|----------------------------|------|------|-----|---|----------------------|------------|
| | Clevis | Knuckle | | | | | | |
| CD-M03 ⁽¹⁾ | 32, 40 | 10 ^{+0.040/0.076} | 44 | 36 | 4 | 3 | ø3 x 18ℓ | |
| CD-M05 ⁽¹⁾ | 50, 63 | 14 ^{+0.050/0.093} | 60 | 51 | 4.5 | 4 | ø4 x 25ℓ | |
| CD-M08 ⁽¹⁾ | 80, 100 | 22 ^{+0.065/0.117} | 82 | 72 | 5 | 4 | ø4 x 35ℓ | |
| IY-12 ⁽²⁾ | 125 | 25 ^{+0.085/0.117} | 79.5 | 69.5 | 5 | 4 | ø4 x 40ℓ | |

Note 1) Cotter pins and flat washers are included.
Note 2) Only pins are included.

Y type double
Knuckle joint



| Part no. | Bore size (mm) | E ₁ | L ₁ | MM | R ₁ | U ₁ | NDH ₁₀ | NX | NZ |
|----------------------|----------------|----------------|----------------|------------|----------------|----------------|--------------------------|--------------------------|--------------------------|
| Y-03M ⁽¹⁾ | 32 | 20 | 30 | M10 x 1.25 | 10 | 16 | 10 ^{+0.058/0.0} | 14 ^{-0.30/0.10} | 28 ^{-0.10/0.30} |
| Y-04M ⁽¹⁾ | 40 | 22 | 40 | M14 x 1.5 | 11 | 19 | 10 ^{+0.058/0.0} | 14 ^{-0.30/0.10} | 28 ^{-0.10/0.30} |
| Y-05M ⁽¹⁾ | 50, 63 | 28 | 50 | M18 x 1.5 | 14 | 24 | 14 ^{+0.070/0.0} | 20 ^{-0.30/0.10} | 40 ^{-0.10/0.30} |
| Y-08M ⁽¹⁾ | 80 | 40 | 65 | M22 x 1.5 | 20 | 34 | 22 ^{+0.084/0.0} | 30 ^{-0.30/0.10} | 60 ^{-0.10/0.30} |
| Y-10M ⁽¹⁾ | 100 | 40 | 65 | M26 x 1.5 | 20 | 34 | 22 ^{+0.084/0.0} | 30 ^{-0.30/0.10} | 60 ^{-0.10/0.30} |
| Y-12M ⁽¹⁾ | 125 | 46 | 100 | M27 x 2 | 27 | 42 | 25 ^{+0.084/0.0} | 32 ^{-0.30/0.10} | 64 ^{-0.10/0.30} |

Note 1) Pins, cotter pins, and flat washers are included.
Note 2) Pins and cotter pins are included.

Bracket Combinations

Bracket Combinations Available..... Refer to table together with combination drawings.

| Cylinder mounting bracket | Support bracket for side mounting side | | | | |
|---------------------------|--|---------------|----------------------|----------------------|----------------------|
| | 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
-Z

CJ2

CM2
-Z

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

CS2

D-□

-X□

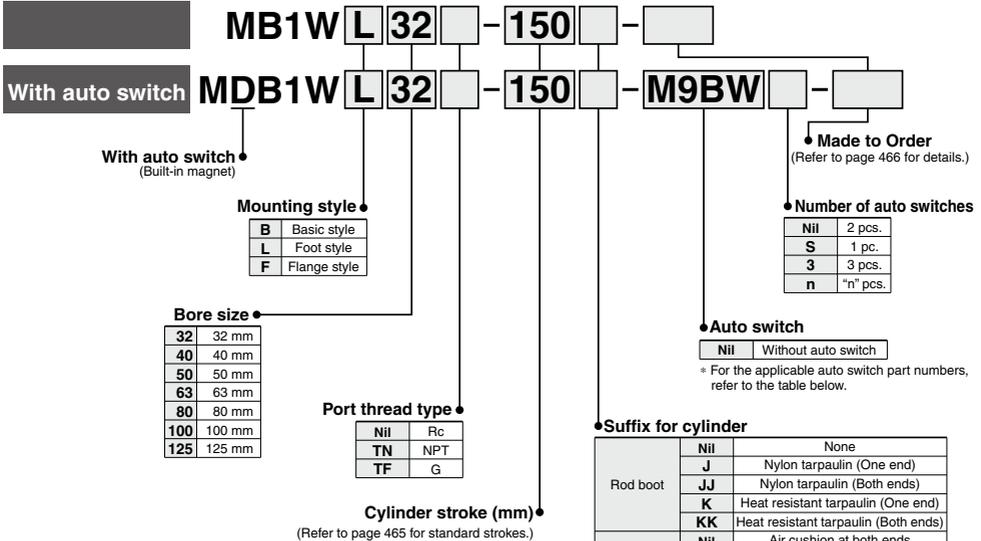
Technical data

Square Tube Type Air Cylinder: Standard Type Double Acting, Double Rod

Series **MB1W**

ø32, ø40, ø50, ø63, ø80, ø100, ø125

How to Order



Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) MDB1WB40-100

Note) In the case of w/o air cushion, it comes with rubber bumper.
Besides, 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, ø125: +12 mm.

Applicable Auto Switches/Refer to pages 1559 to 1673 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 | Perpendicular | In-line | 0.5 (Nil) | 1 (M) | 3 (L) | 5 (Z) | | | |
| Solid state auto switch | — | Grommet | Yes | 3-wire (NPN) | 24 V | 5 V, 12 V | — | M9NV | M9N | ● | ● | ● | ○ | IC circuit | Relay, PLC |
| | | | | 3-wire (PNP) | | | | M9PV | M9P | ● | ● | ○ | ○ | | |
| | | | | 2-wire | M9BV | M9B | ● | ● | ● | ○ | ○ | | | | |
| | 3-wire (NPN) | | | M9NVV | M9NV | ● | ● | ○ | ○ | IC circuit | | | | | |
| | 3-wire (PNP) | | | M9PVV | M9PV | ● | ● | ○ | ○ | | | | | | |
| | 2-wire | | | M9BVV | M9BV | ● | ● | ○ | ○ | — | | | | | |
| Reed auto switch | — | Grommet | Yes | 3-wire (NPN equivalent) | 24 V | 12 V | 100 V or less | A96V | A96 | ● | — | ● | — | IC circuit | — |
| | | | | 2-wire | | | | A93V | A93 | ● | — | ● | ● | | |
| | | | | 3-wire (NPN) | 5 V, 12 V | — | M9NAV** | M9NA** | ○ | ○ | ○ | ○ | IC circuit | | |
| | | | | 3-wire (PNP) | | | M9PAV** | M9PA** | ○ | ○ | ● | ○ | | — | |
| | | | | 2-wire | M9BAV** | M9BA** | ○ | ○ | ○ | ○ | ○ | | | | |

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

* Lead wire length symbols: 0.5 m Nil (Example) M9NV
1 m M (Example) M9NVM
3 m L (Example) M9NVL
5 m Z (Example) M9NVZ

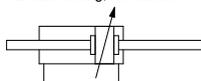
* Solid state auto switches marked with "O" are produced upon receipt of order.

* Since there are other applicable auto switches than listed above, refer to page 474 for details.
* For details about auto switches with pre-wired connector, refer to pages 1626 and 1627.
* Auto switches are shipped together (not assembled).

Square Tube Type Air Cylinder: Standard Type Double Acting, Double Rod *Series MB1W*



Symbol
Double acting, Air cushion



Standard Stroke

| Bore size (mm) | Standard stroke (mm) |
|----------------|--|
| 32 | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500 |
| 40 | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500 |
| 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 |
| 125 | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 1000 |

Intermediate strokes are available, too.
(Spacer is not used.)

Rod Boot Material

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

* Maximum ambient temperature for the rod boot itself.

Mounting Bracket Part No.

| Bore size (mm) | 32 | 40 | 50 |
|----------------|--------|--------|--------|
| Foot | MB-L03 | MB-L04 | MB-L05 |
| Flange | MB-F03 | MB-F04 | MB-F05 |

| Bore size (mm) | 63 | 80 | 100 |
|----------------|--------|--------|--------|
| Foot | MB-L06 | MB-L08 | MB-L10 |
| Flange | MB-F06 | MB-F08 | MB-F10 |

| Bore size (mm) | 125 |
|----------------|--------|
| Foot | MB-L12 |
| Flange | MB-F12 |

Note) Order two foot brackets per cylinder.

| |
|--|
| Refer to pages 473 and 474 for cylinders with auto switches. |
| · Minimum auto switch mounting stroke |
| · Proper auto switch mounting position (detection at stroke end) and mounting height |
| · Operating range |
| · Switch mounting bracket: Part no. |

Specifications

| Bore size (mm) | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
|--------------------------------------|--|-----|----|-----|----|-----|----------------|
| Action | Double acting, Double rod | | | | | | |
| Fluid | Air | | | | | | |
| Proof pressure | 1.5 MPa | | | | | | |
| Maximum operating pressure | 1.0 MPa | | | | | | |
| Minimum operating pressure | 0.05 MPa | | | | | | |
| Ambient and fluid temperature | Without auto switch -10 to 70°C (No freezing) | | | | | | |
| | With auto switch -10 to 60°C (No freezing) | | | | | | |
| Lubrication | Not required (Non-lube) | | | | | | |
| Piston speed | 50 to 1000 mm/s | | | | | | 50 to 700 mm/s |
| Stroke length tolerance | Up to 250: $\begin{smallmatrix} +1.0 \\ 0 \end{smallmatrix}$, 251 to 800: $\begin{smallmatrix} +1.4 \\ 0 \end{smallmatrix}$ | | | | | | |
| Cushion <small>(Note)</small> | Both ends (Air cushion) <small>(Note)</small> | | | | | | |
| Port size (Rc, NPT, G) | 1/8 | 1/4 | | 3/8 | | | 1/2 |
| Mounting | Basic style, Foot style, Flange style | | | | | | |

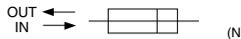
Note) In the case of w/o air cushion, it comes with rubber bumper.

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

Accessory

| Mounting | | Basic style | Foot style | Flange style |
|--------------------|---------------------------|-------------|------------|--------------|
| Standard equipment | Rod end nut | ● | ● | ● |
| Option | Single knuckle joint | ● | ● | ● |
| | Double knuckle (With pin) | ● | ● | ● |
| | Rod boot | ● | ● | ● |

Theoretical Output



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

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²)

Weight

| Bore size (mm) | | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
|--|---------------------------|------|------|------|------|------|------|-------|
| Basic weight | Basic style | 0.59 | 0.82 | 1.39 | 1.72 | 3.22 | 4.27 | 6.68 |
| | Foot style | 0.71 | 0.96 | 1.61 | 2.0 | 3.72 | 4.93 | 8.76 |
| | Flange style | 0.88 | 1.19 | 1.84 | 2.51 | 4.67 | 7.58 | 10.86 |
| Additional weight per each 50 mm of stroke | All mounting brackets | 0.20 | 0.29 | 0.41 | 0.45 | 0.75 | 1.0 | 1.25 |
| | Single knuckle | 0.15 | 0.23 | 0.26 | 0.26 | 0.60 | 0.83 | 1.10 |
| Accessory bracket | Double knuckle (With pin) | 0.22 | 0.37 | 0.43 | 0.43 | 0.87 | 1.27 | 0.91 |

Calculation:

(Example) **MB1WB32-100** (Basic style/ø32, 100 st)

- Basic weight.....0.59 kg
 - Additional weight.....0.20/50 stroke
 - Cylinder stroke.....100 stroke
- 0.59 + 0.20 x 100/50 = 0.99 kg

CJ1

CJP

CJ2-Z

CJ2

CM2-Z

CM2

CM3

CG1-Z

CG1

CG3

MB-Z

MB

MB1

CA2-Z

CA2

CS1

CS2

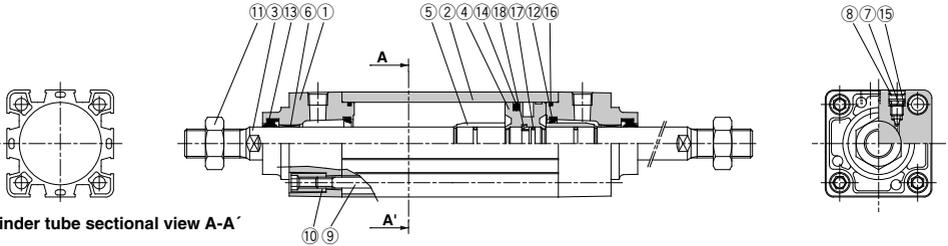
D-□

-X□

Technical data

Series MB1W

Construction



Cylinder tube sectional view A-A'

Component Parts

| No. | Description | Material | Note |
|-----|----------------|---------------------|--------------------|
| 1 | Rod cover | Aluminum die-casted | Metallic painted |
| 2 | Cylinder tube | Aluminum alloy | Hard anodized |
| 3 | Piston rod | Carbon steel | Hard chrome plated |
| 4 | Piston | Aluminum alloy | Chromated |
| 5 | Cushion ring | Aluminum alloy | Anodized |
| 6 | Bushing | Lead-bronze casted | |
| 7 | Cushion valve | Steel wire | Nickel plated |
| 8 | Retaining ring | Spring steel | φ40 to φ100 |
| 9 | Tie-rod | Carbon steel | Zinc chromated |
| 10 | Tie-rod nut | Carbon steel | Nickel plated |
| 11 | Rod end nut | Carbon steel | Nickel plated |

| No. | Description | Material | Note |
|-----|----------------------|----------|------|
| 12* | Cushion seal | Urethane | |
| 13* | Rod seal | NBR | |
| 14* | Piston seal | NBR | |
| 15 | Cushion valve seal | NBR | |
| 16 | Cylinder tube gasket | NBR | |
| 17 | Piston gasket | NBR | |
| 18 | Piston holder | Urethane | |

Replacement Parts/Seal Kit

| Bore size (mm) | Kit no. | Contents |
|----------------|-----------|---|
| 32 | MBW32-PS | Set of the above nos. (12, 13, 14, 15) |
| 40 | MBW40-PS | |
| 50 | MBW50-PS | |
| 63 | MBW63-PS | |
| 80 | MBW80-PS | |
| 100 | MBW100-PS | |

* Seal kit includes (12) to (14), (16). Order the seal kit, based on each bore size.

* Seal kit includes a grease pack (φ32 to 50: 10 g, φ63, 80: 20 g, φ100: 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)



Made to Order: Individual Specifications
(For details, refer to page 475.)

| Symbol | Specifications |
|--------|--|
| -XB46 | Fastener strips mounted on switch mounting grooves |

Made to Order Specifications

(For details, refer to pages 1675 to 1818.)

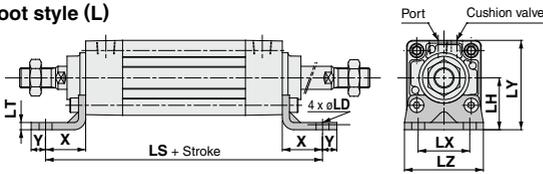
| Symbol | Specifications |
|--------|---|
| -XA□ | Change of rod end shape |
| -XB6 | Heat resistant cylinder (150°C) |
| -XC3 | Special port location |
| -XC4 | With heavy duty scraper |
| -XC5 | Heat resistant cylinder (110°C) |
| -XC6 | Piston rod and rod end nut made of stainless steel |
| -XC7 | Tie-rod, cushion valve, tie rod nut, etc. made of stainless steel |
| -XC22 | Fluororubber seals |
| -XC30 | Rod side trunnion |
| -XC35 | With coil scraper |

Series MB1W

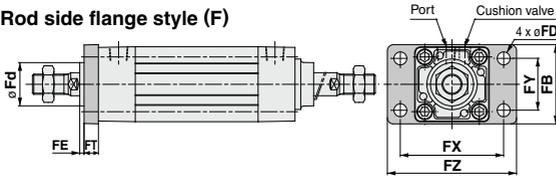
Standard Type: With Mounting Bracket

* Dimensions not indicated are the same as the standard type (page 467).

Foot style (L)



Rod side flange style (F)



Foot Style

| Bore size (mm) | Stroke range | X | Y | LD | LH | LS | LT | LX | LY | LZ |
|----------------|--------------|----|----|----|----|-----|-----|----|-------|-----|
| 32 | Up to 500 | 22 | 9 | 7 | 30 | 128 | 3.2 | 32 | 53 | 50 |
| 40 | Up to 500 | 24 | 11 | 9 | 33 | 132 | 3.2 | 38 | 59 | 55 |
| 50 | Up to 600 | 27 | 11 | 9 | 40 | 148 | 3.2 | 46 | 72.5 | 70 |
| 63 | Up to 600 | 27 | 14 | 12 | 45 | 148 | 3.6 | 56 | 82.5 | 80 |
| 80 | Up to 800 | 30 | 14 | 12 | 55 | 174 | 4.5 | 72 | 102.5 | 100 |
| 100 | Up to 800 | 32 | 16 | 14 | 65 | 178 | 4.5 | 89 | 122 | 120 |
| 125 | Up to 1000 | 45 | 20 | 14 | 81 | 210 | 8 | 90 | 149 | 136 |

Rod Side Flange Style

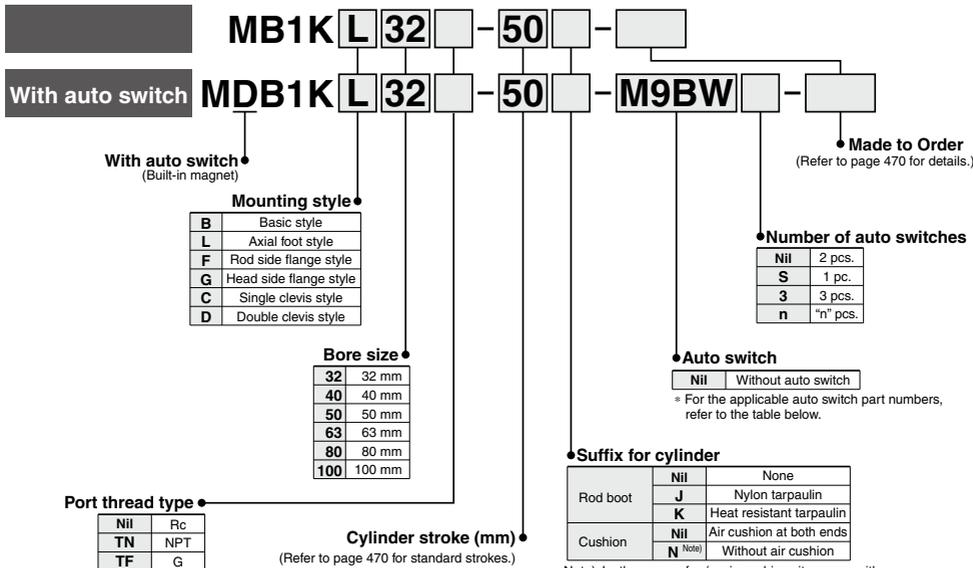
| Bore size (mm) | Stroke range | FB | FD | FT | FX | FY | FZ | Fd |
|----------------|--------------|-----|----|----|-----|-----|-----|------|
| 32 | Up to 500 | 50 | 7 | 10 | 64 | 32 | 79 | 25 |
| 40 | Up to 500 | 55 | 9 | 10 | 72 | 36 | 90 | 31 |
| 50 | Up to 600 | 70 | 9 | 12 | 90 | 45 | 110 | 38.5 |
| 63 | Up to 600 | 80 | 9 | 12 | 100 | 50 | 120 | 39.5 |
| 80 | Up to 800 | 100 | 12 | 16 | 126 | 63 | 153 | 45.5 |
| 100 | Up to 800 | 120 | 14 | 16 | 150 | 75 | 178 | 54 |
| 125 | Up to 1000 | 138 | 14 | 20 | 180 | 102 | 216 | 57.5 |

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

Series MB1K

ø32, ø40, ø50, ø63, ø80, ø100

How to Order



Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) MDB1KB40-100

Applicable Auto Switches/Refer to pages 1559 to 1673 for further information on auto switches.

| Type | Special function | Electrical entry | Indicator/light | Wiring (Output) | Load voltage | | Auto switch model | | Lead wire length (m) | | | | Pre-wired connector | Applicable load | |
|--------------------------------------|--|------------------|-----------------|-------------------------|--------------|------|-------------------|---------|----------------------|------------|-------|-------|---------------------|-----------------|------------|
| | | | | | DC | AC | Perpendicular | In-line | 0.5 (Nil) | 1 (M) | 3 (L) | 5 (Z) | | | |
| Solid state auto switch | — | Grommet | Yes | 3-wire (NPN) | 5 V, 12 V | — | M9NV | M9N | ● | ● | ● | ○ | ○ | IC circuit | |
| | | | | 3-wire (PNP) | | | M9PV | M9P | ● | ● | ● | ○ | ○ | | |
| | | | | 2-wire | M9BV | | M9B | ● | ● | ● | ○ | ○ | — | | |
| | Diagnostic indication (2-color indication) | | | 3-wire (NPN) | 5 V, 12 V | | M9NVV | M9NW | ● | ● | ● | ○ | ○ | IC circuit | Relay, PLC |
| | | | | 3-wire (PNP) | 5 V, 12 V | | M9PWW | M9PW | ● | ● | ● | ○ | ○ | | |
| | | | | 2-wire | 12 V | | M9BWW | M9BW | ● | ● | ● | ○ | ○ | | |
| Water resistant (2-color indication) | 3-wire (NPN) | 5 V, 12 V | M9NAV** | M9NA** | ○ | ○ | ● | ○ | ○ | IC circuit | | | | | |
| | 3-wire (PNP) | | M9PAV** | M9PA** | ○ | ○ | ● | ○ | ○ | | | | | | |
| | 2-wire | 12 V | M9BAV** | M9BA** | ○ | ○ | ● | ○ | ○ | | — | | | | |
| Reed auto switch | — | Grommet | No | 3-wire (NPN equivalent) | — | 5 V | A96V | A96 | ● | — | ● | — | — | IC circuit | — |
| | | | | 2-wire | 24 V | 12 V | 100 V | A93V | A93 | ● | — | ● | — | — | |
| | | | | | | | 100 V or less | A90V | A90 | ● | — | ● | — | — | IC circuit |

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

* Lead wire length symbols: 0.5 m Nil (Example) M9NV
1 m M (Example) M9NVM
3 m L (Example) M9NL
5 m Z (Example) M9NZ

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

* Since there are other applicable auto switches than listed above, refer to page 474 for details.

* For details about auto switches with pre-wired connector, refer to pages 1626 and 1627.

* Auto switches are shipped together (not assembled).

CJ1

CJP

CJ2
-Z

CJ2

CM2
-Z

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CA2

CS1

CS2

CS2

D-□

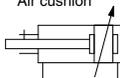
-X□

Technical data

Series MB1K



Symbol
Air cushion



Made to Order Made to Order: Individual Specifications
(For details, refer to page 475.)

| Symbol | Specifications |
|--------|--|
| -X846 | Fastener strips mounted on switch mounting grooves |

Made to Order Specifications
(For details, refer to pages 1675 to 1818.)

| Symbol | Specifications |
|--------|---|
| -XA□ | Change of rod end shape |
| -XC3 | Special port location |
| -XC6 | Piston rod and rod end nut 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 |
| -XC27 | Double clevis pin and double knuckle pin made of stainless steel |
| -XC30 | Rod side trunnion |

Mounting Bracket Part No.

| Bore size (mm) | 32 | 40 | 50 |
|---------------------|--------|--------|--------|
| Foot ⁽¹⁾ | MB-L03 | MB-L04 | MB-L05 |
| Flange | MB-F03 | MB-F04 | MB-F05 |
| Single clevis | MB-C03 | MB-C04 | MB-C05 |
| Double clevis | MB-D03 | MB-D04 | MB-D05 |

| Bore size (mm) | 63 | 80 | 100 |
|---------------------|--------|--------|--------|
| Foot ⁽¹⁾ | MB-L06 | MB-L08 | MB-L10 |
| Flange | MB-F06 | MB-F08 | MB-F10 |
| Single clevis | MB-C06 | MB-C08 | MB-C10 |
| Double clevis | MB-D06 | MB-D08 | MB-D10 |

Note 1) Order two foot brackets per cylinder.

Note 2) Accessories for each mounting bracket are as follows: Foot, flange, single clevis/body mounting bolt, double clevis/body mounting bolt, clevis pins, cotter pins and flat washer. Refer to page 463 for details.

Refer to pages 473 and 474 for cylinders with auto switches.

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

Specifications

| Bore size (mm) | 32 | 40 | 50 | 63 | 80 | 100 |
|--|--|-----|-------|------|----|------|
| Action | Double acting, Single rod | | | | | |
| Fluid | Air | | | | | |
| Proof pressure | 1.5 MPa | | | | | |
| Maximum operating pressure | 1.0 MPa | | | | | |
| Minimum operating pressure | 0.05 MPa | | | | | |
| Ambient and fluid temperature | Without auto switch -10 to 70°C (No freezing) | | | | | |
| | With auto switch -10 to 60°C (No freezing) | | | | | |
| Lubrication | Not required (Non-lube) | | | | | |
| Piston speed | 50 to 1000 mm/s | | | | | |
| Stroke length tolerance ^(Note) | Up to 250: $+1.0_0^{+1.4}$, 251 to 1000: $+1.4_0^{+1.8}$, 1001 to 1500: $+1.8_0^{+2.0}$ | | | | | |
| Cushion | Both ends (Air cushion) ^(Note) | | | | | |
| Port size (Rc, NPT, G) | 1/8 | 1/4 | 3/8 | 1/2 | | |
| Mounting | Basic style, Foot style, Rod side flange style, Head side flange style Single clevis style, Double clevis style | | | | | |
| Rod non-rotating accuracy | ø32, ø40 | | ±0.5° | | | |
| | ø50, ø63 | | ±0.5° | | | |
| | ø80, ø100 | | ±0.3° | | | |
| Allowable rotational torque (N·m or less) | ø32 | | 0.25 | ø80 | | 0.79 |
| | ø40 | | 0.45 | ø100 | | 0.93 |
| | ø50, ø63 | | 0.64 | — | | — |

Note) In the case of w/o air cushion, it comes with rubber bumper.

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

Accessory

| Mounting | | Basic style | Foot style | Rod side Flange style | Head side flange style | Single clevis style | Double clevis style |
|--------------------|---------------------------------|-------------|------------|-----------------------|------------------------|---------------------|---------------------|
| Standard equipment | Rod end nut | ● | ● | ● | ● | ● | ● |
| | Clevis pin | — | — | — | — | — | ● |
| Option | Single knuckle joint | ● | ● | ● | ● | ● | ● |
| | Double knuckle joint (With pin) | ● | ● | ● | ● | ● | ● |
| | Rod boot | ● | ● | ● | ● | ● | ● |

Standard Stroke

| Bore size (mm) | Standard stroke (mm) |
|----------------|--|
| 32 | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500 |
| 40 | 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500 |
| 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 |

Intermediate strokes are available, too. (Spacer is not used.)

Rod Boot Material

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

* Maximum ambient temperature for the rod boot itself.

Theoretical Output

OUT side is the same value as double acting, single rod. But, IN side is different. For IN side, refer to the table below.

| Bore size (mm) | Piston area (mm ²) | Bore size (mm) | Piston area (mm ²) |
|----------------|--------------------------------|----------------|--------------------------------|
| 32 | 675 | 63 | 2804 |
| 40 | 1082 | 80 | 4568 |
| 50 | 1651 | 100 | 7223 |

Theoretical output (N) = Pressure (MPa) x Piston area (mm²)

Square Tube Type Air Cylinder: Non-rotating Rod Type Double Acting, Single Rod *Series MB1K*

Weight

(kg)

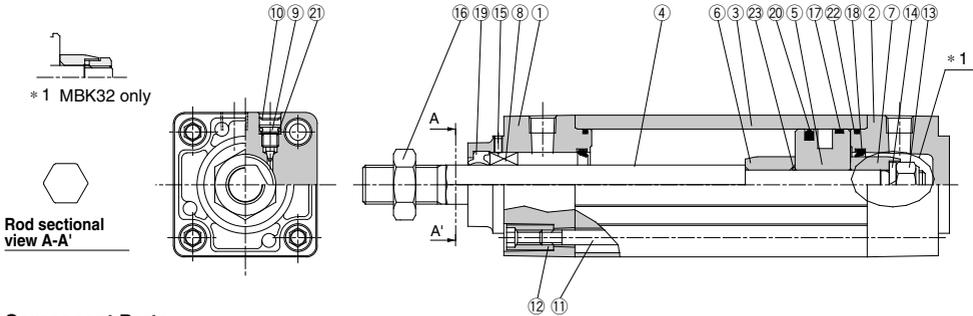
| Bore size (mm) | | 32 | 40 | 50 | 63 | 80 | 100 |
|--|---------------------------|------|------|------|------|------|------|
| Basic weight | Basic style | 0.53 | 0.69 | 1.26 | 1.58 | 2.69 | 3.86 |
| | Foot style | 0.65 | 0.83 | 1.48 | 1.86 | 3.19 | 4.52 |
| | Flange style | 0.82 | 1.06 | 1.69 | 2.37 | 4.14 | 7.17 |
| | Single clevis style | 0.78 | 0.92 | 1.60 | 2.21 | 3.8 | 7.03 |
| | Double clevis style | 0.79 | 0.96 | 1.69 | 2.37 | 4.09 | 7.55 |
| Additional weight per each 50 mm of stroke | All mounting brackets | 0.16 | 0.21 | 0.33 | 0.37 | 0.56 | 0.72 |
| | Accessory bracket | 0.15 | 0.23 | 0.26 | 0.26 | 0.60 | 0.83 |
| Accessory bracket | Single knuckle | 0.15 | 0.23 | 0.26 | 0.26 | 0.60 | 0.83 |
| | Double knuckle (With pin) | 0.22 | 0.37 | 0.43 | 0.43 | 0.87 | 1.27 |

Calculation:

(Example) **MB1K32-100** (Basic style/ø32, 100 st)

- Basic weight.....0.53 kg
 - Additional weight.....0.16/50 stroke
 - Cylinder stroke.....100 stroke
- 0.53 + 0.16 x 100/50 = 0.85 kg

Construction



Component Parts

| No. | Description | Material | Note |
|-----|--------------------|--------------------------------|------------------|
| 1 | Rod cover | Aluminum die-casted | Metallic painted |
| 2 | Head cover | Aluminum die-casted | Metallic painted |
| 3 | Cylinder tube | Aluminum alloy | Hard anodized |
| 4 | Piston rod | Stainless steel | |
| 5 | Piston | Aluminum alloy | Chromated |
| 6 | Cushion ring A | Rolled steel | |
| 7 | Cushion ring B | Rolled steel | |
| 8 | Non-rotating guide | Oil-impregnated sintered alloy | |
| 9 | Cushion valve | Steel wire | Nickel plated |
| 10 | Retaining ring | Spring steel | ø40 to ø100 |
| 11 | Tie-rod | Carbon steel | Zinc chromated |
| 12 | Tie-rod nut | Carbon steel | Nickel plated |

| No. | Description | Material | Note |
|-----|----------------------|--------------|---------------|
| 13 | Piston nut | Rolled steel | |
| 14 | Spring washer | Steel wire | |
| 15 | Set screw | Steel wire | |
| 16 | Rod end nut | Carbon steel | Nickel plated |
| 17 | Wear ring | Resin | |
| 18* | Cushion seal | Urethane | |
| 19* | Rod seal | NBR | |
| 20* | Piston seal | NBR | |
| 21 | Cushion valve seal | NBR | |
| 22* | Cylinder tube gasket | NBR | |
| 23 | Piston gasket | NBR | |

Replacement Parts/Seal Kit

| Bore size (mm) | Kit no. | Contents |
|----------------|-----------|---|
| 32 | MBK32-PS | Set of the above nos. 19, 19, 20, 22 |
| 40 | MBK40-PS | |
| 50 | MBK50-PS | |
| 63 | MBK63-PS | |
| 80 | MBK80-PS | |
| 100 | MBK100-PS | |

- * Seal kit includes 18 to 20, 22. Order the seal kit, based on 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)

* In the case of w/o air cushion, it comes with rubber bumper.
Besides, the overall length is longer than the cylinder 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.

CJ1

CJP

CJ2
-Z

CJ2

CM2
-Z

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

CS2

D-□

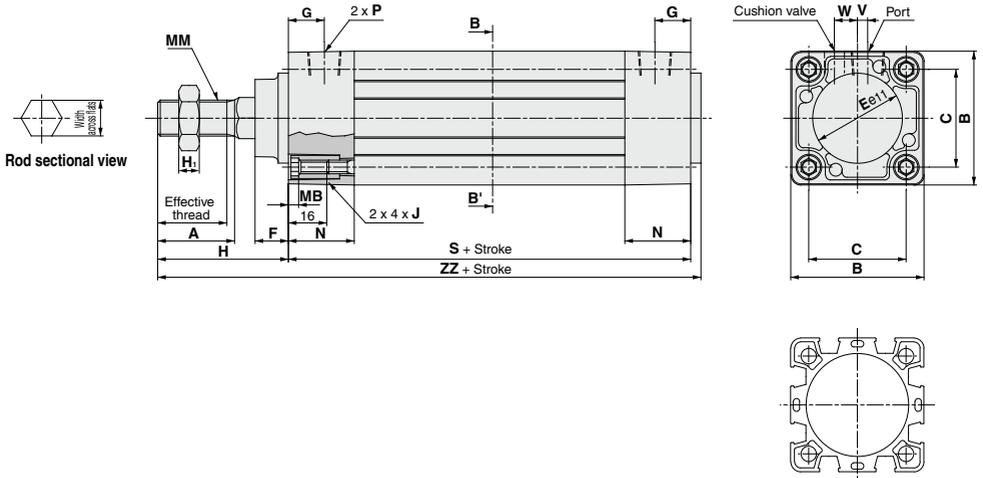
-X□

Technical data

Series MB1K

Standard Type

Basic style: (B)



Cylinder tube sectional view B-B'

| Bore size (mm) | Stroke range | Effective thread length | Width across flats | A | B | C | E | F | G | H ₁ | MB | J | MM | N | P | S | V | W | H | ZZ |
|----------------|--------------|-------------------------|--------------------|----|-----|------|----|----|------|----------------|----|-----------|------------|------|-----|-----|------|------|----|-----|
| 32 | Up to 500 | 19.5 | 12.2 | 22 | 46 | 32.5 | 30 | 13 | 13 | 6 | 4 | M6 x 1 | M10 x 1.25 | 26.5 | 1/8 | 84 | 4 | 6.5 | 47 | 135 |
| 40 | Up to 500 | 27 | 14.2 | 30 | 52 | 38 | 35 | 13 | 14 | 8 | 4 | M6 x 1 | M14 x 1.5 | 26.5 | 1/4 | 84 | 4 | 9 | 51 | 139 |
| 50 | Up to 600 | 32 | 19 | 35 | 65 | 46.5 | 40 | 14 | 15.5 | 11 | 5 | M8 x 1.25 | M18 x 1.5 | 31 | 1/4 | 94 | 5 | 10.5 | 58 | 156 |
| 63 | Up to 600 | 32 | 19 | 35 | 75 | 56.5 | 45 | 14 | 16.5 | 11 | 5 | M8 x 1.25 | M18 x 1.5 | 31 | 3/8 | 94 | 9 | 12 | 58 | 156 |
| 80 | Up to 800 | 37 | 23 | 40 | 95 | 72 | 45 | 20 | 19 | 13 | 5 | M10 x 1.5 | M22 x 1.5 | 37.5 | 3/8 | 114 | 11.5 | 14 | 72 | 190 |
| 100 | Up to 800 | 37 | 27 | 40 | 114 | 89 | 55 | 20 | 19 | 16 | 5 | M10 x 1.5 | M26 x 1.5 | 37.5 | 1/2 | 114 | 17 | 15 | 72 | 190 |

Series MB1 Auto Switch Mounting 1

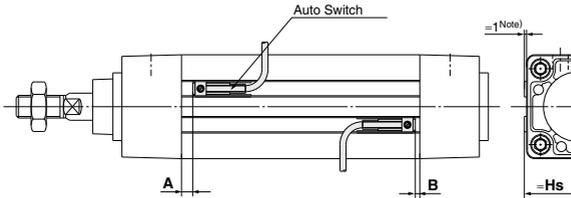
Minimum Auto Switch Mounting Stroke

| | | (mm) | | | | | | | |
|--|--------------------------------------|---------------|-----|---------------|---------------|---------------|------|------|--|
| Auto switch model | No. of auto switch mounted | ø32 | ø40 | ø50 | ø63 | ø80 | ø100 | ø125 | |
| D-A9□ D-A9□V | 2 (Different surfaces, Same surface) | 15 | | | | | | | |
| | 1 | 15 | | | 10 | | | | |
| | n | 15 + 10 (n-2) | | 15 + 15 (n-2) | | 15 + 20 (n-2) | | | |
| D-M9□ D-M9□V | 2 (Different surfaces, Same surface) | 15 | | | 10 | | | | |
| | 1 | 15 | | | 10 | | | | |
| | n | 15 + 5 (n-2) | | | 10 + 10 (n-2) | | | | |
| D-M9□W D-M9□WV D-M9□A D-M9□AV | 2 (Different surfaces, Same surface) | 15 | | | 10 | | | | |
| | 1 | 15 | | | 10 | | | | |
| | n | 15 + 10 (n-2) | | 10 + 10 (n-2) | | 10 + 15 (n-2) | | | |
| D-Z7□ D-Z80 | 2 (Different surfaces, Same surface) | 25 | | | 15 | | | | |
| | 1 | 25 | | | 15 | | | | |
| | n | 25 + 15 (n-2) | | 15 + 15 (n-2) | | 15 + 20 (n-2) | | | |
| D-Y59□/Y69□ D-Y7P/Y7PV | 2 (Different surfaces, Same surface) | 25 | | | 15 | | | | |
| | 1 | 25 | | | 15 | | | | |
| | n | 25 + 10 (n-2) | | 15 + 10 (n-2) | | 15 + 15 (n-2) | | | |
| D-Y7□W D-Y7□WV | 2 (Different surfaces, Same surface) | 25 | | | 20 | | | | |
| | 1 | 25 | | | 20 | | | | |
| | n | 25 + 10 (n-2) | | 20 + 10 (n-2) | | 20 + 15 (n-2) | | | |
| D-Y7BA | 2 (Different surfaces, Same surface) | 30 | | | 20 | | | | |
| | 1 | 30 | | | 20 | | | | |
| | n | 30 + 10 (n-2) | | 20 + 10 (n-2) | | 20 + 15 (n-2) | | | |

Note 1) n = 3, 4, 5 ...

Note 2) Center trunnion type is not included.

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



Proper Auto Switch Mounting Position

| Auto switch model | (mm) | | | | | |
|-------------------|---|------|-----------------|------|--|-----|
| | D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV | | D-A9□ D-A9□V | | D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BA | |
| Bore size | A | B | A | B | A | B |
| 32 | 9 | 6 | 5 | 2 | 4 | 1 |
| 40 | 9 | 6 | 5 | 2 | 4 | 1 |
| 50 | 9 | 7 | 5 | 3 | 4 | 2 |
| 63 | 9 | 7 | 5 | 3 | 4 | 2 |
| 80 | 12.5 | 10.5 | 8.5 | 6.5 | 7.5 | 5.5 |
| 100 | 12.5 | 10.5 | 8.5 | 6.5 | 7.5 | 5.5 |
| 125 | 14.5 | 14.5 | 10.5 | 10.5 | 9.5 | 9.5 |

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

Auto Switch Mounting Height

| Auto switch model | (mm) | |
|-------------------|---------------------------------------|------|
| | D-A9□V D-Y69□ D-Y7PV D-Y7□WV | |
| Bore size | Hs | Hs |
| 32 | 27 | 30 |
| 40 | 30 | 33 |
| 50 | 36 | 39 |
| 63 | 41 | 44 |
| 80 | 51 | 54 |
| 100 | 60.5 | 63.5 |
| 125 | 71.5 | 74.5 |

Note) The above figures are for when the electrical entry perpendicular types D-A9□V/M9□V/M9□WV/M9□AV/Y69□/Y7PV/Y7□WV are mounted.

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

- D-□
- X□
- Technical data

Series MB1 Auto Switch Mounting 2

Operating Range

| Auto switch model | Bore size (mm) | | | | | | |
|---|----------------|-----|----|----|-----|------|------|
| | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
| D-A9□/A9□V | 7 | 7.5 | 8 | 9 | 9.5 | 10.5 | 12.5 |
| D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV | 4 | 4.5 | 5 | 6 | 6 | 6 | 7 |
| D-Z7□Z80 | 10 | 10 | 10 | 11 | 11 | 12 | 14 |
| D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BA | 6.5 | 6.5 | 6 | 7 | 7 | 8 | 7 |

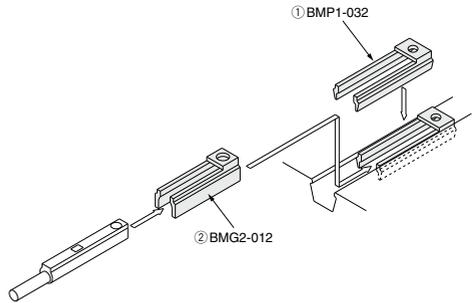
* Since this is a guideline including hysteresis, not meant to be guaranteed.
(Assuming approximately ±30% dispersion.) There may be the case it will vary substantially depending on an ambient environment.

Switch Mounting Bracket: Part No.

| Auto switch model | Bore size (mm) |
|---|-----------------------------------|
| | ø32 to ø125 |
| D-A9□/A9□V D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV | Note) ① BMP1-032 ② BMG2-012 |
| D-Z7□/Z80 D-Y5□/Y7P D-Y7□W D-Y6□/Y7PV D-Y7□WV D-Y7BA | ① BMP1-032 |

Note) Two kinds of auto switch brackets are used as a set.

D-A9□ (V)/M9□ (V)/M9□W (V)/M9□A (V)



Besides the models listed in How to Order, the following auto switches are applicable.
Refer to pages 1559 to 1673 for the detailed specifications.

| Auto switch type | Part no. | Electrical entry (Entry direction) | Features |
|------------------|-----------------------|------------------------------------|--------------------------------------|
| Reed | D-Z73, Z76 | Grommet (in-line) | — |
| | D-Z80 | | With indicator light |
| Solid state | D-Y69A, Y69B, Y7PV | Grommet (perpendicular) | — |
| | D-Y7NWV, Y7PWV, Y7BWV | | Diagnosis indication (2 colors) |
| | D-Y59A, Y59B, Y7P | Grommet (in-line) | — |
| | D-Y7NW, Y7PW, Y7BW | | Diagnosis indication (2 colors) |
| | D-Y7BA | | Water resistant (2-color indication) |

* For solid state switches, auto switches with a pre-wired connector are also available. Refer to pages 1626 and 1627 for details.

* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H/Y7G/Y7H types) are also available. Refer to pages 1577 and 1579 for details.

Series MB1

Made to Order : Individual Specifications

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



1 Fastener Strips Mounted on Switch Mounting Grooves

Symbol

-X846

It prevents splashing water or windblown dust to the cylinder body from making an ingress into the auto switch mounting groove and accumulating.

MB1
MDB1 Standard model no. — X846

● With fasteners

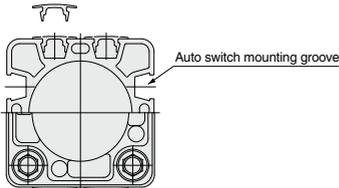
Dimensions



Fastener Specifications

| | |
|----------|---|
| Quantity | 8 pcs. (6 pcs. when auto switches are mounted) <small>Note)</small> |
| Material | Vinyl chloride |
| Color | Urban white |

Note) These cannot be installed on switch mounting grooves where auto switches have been mounted.



Sectional view

CJ1

CJP

CJ2
-Z

CJ2

CM2
-Z

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

CS2

D-□

-X□

Technical
data



Series MB1

Specific Product Precautions

Be sure to read before handling.

Refer to front matter 57 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 (ø32) or a snap ring (ø40 to ø100) is provided to prevent the accidental removal of the cushion valve. Do not open the valve beyond the mechanism.
If not operated in accordance with the above precautions, the cushion valve may be ejected from the cover when air pressure is supplied.

| Bore size (mm) | Cushion valve width across flats | Hexagon wrench |
|----------------|----------------------------------|---------------------------------|
| 32, 40 | 2.5 | JIS 4648 Hexagon wrench key 2.5 |
| 50, 63 | 3 | JIS 4648 Hexagon wrench key 3 |
| 80, 100 | 4 | JIS 4648 Hexagon wrench key 4 |
| 125 | 4 | JIS 4648 Hexagon wrench key 4 |

2. **Use the air cushion at the end of cylinder stroke.**
When it is intended to use the cushion valve in the fully open position, select the type with damper. If this is not done, the tie-rods or piston rod assembly will be damaged.
3. **When replacing mounting bracket, use a hexagon wrench.**

| Bore size (mm) | | Bolt no. | Width across flats | Tightening torque (N·m) |
|----------------|----------------|--|--------------------|-------------------------|
| 32, 40 | | MB-32-48-C1247 | 4 | 5.1 |
| 50, 63 | | MB-50-48-C1249 | 5 | 11 |
| 80, 100 | Foot | MB-80-48AC1251 | 6 | 25 |
| | Others | MB-80-48BC1251 | | |
| 125 | Foot Others | CE00008 | 8 | 30.1 |
| | | (M12 x 1.75 x 25, Hexagon thin socket head bolt) | | |
| | | CE00032 | | |
| | | (M12 x 1.75 x 28, Hexagon thin socket head bolt) | | |

4. **When replacing a bracket, tie-rod nuts on the cylinder body may become loosened.**
After retightening the tie-rod nuts with the proper tightening torque (Refer to Adjustment 3.), mount a mounting bracket.

Non-rotating rod type (Double acting, Single rod)

Operating Precautions

⚠ Caution

1. **Avoid using the air cylinder in such a way that more than allowable rotational torque would be applied to the piston rod.**

If rotational torque is applied, the non-rotating guide will deform, thus affecting the non-rotating accuracy. This may cause damage to machinery.

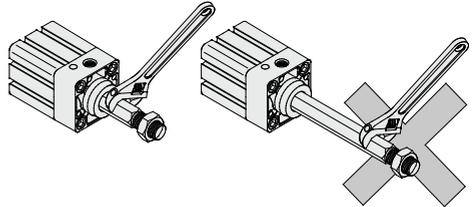
Mounting/Piping

⚠ Caution

1. **Mounting a workpiece on rod end**

To screw a bracket or a nut onto the threaded portion at the tip of the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes.

Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.



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.**

