







## Series MB1

# Specific Product Precautions

Be sure to read before handling.

### Adjustment

#### ⚠ Warning

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

Crimping ( $\phi 32$ ) or a snap 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 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, 50	MB-32-10-C1247	2.5	JIS 4648 Hexagon wrench key 2.5
63, 80, 100	MB-63-10-C1250	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	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	Foot	MB-80-48AC1251	6	25
100	Others	MB-80-48BC1251		

### 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.

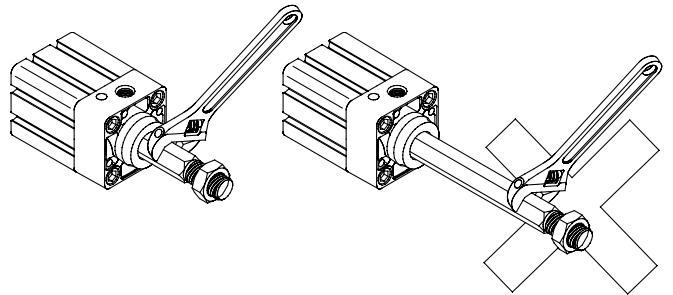
#### Mounting/Piping

#### ⚠ 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.



CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

20-

Data



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

## Series MB1

ø32, ø40, ø50, ø63, ø80, ø100

### How to Order

**Without auto switch** MB1 **L** **32** — **50** [ ]

**With auto switch** MDB1 **L** **32** — **50** [ ] — **Y7BW** [ ]

**Number of auto switches**

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

**Auto switch**

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

**Mounting style**

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
C	Single clevis style
D	Double clevis style

**Bore size**

32	32 mm
40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm

**Stroke (mm)**  
Refer to "Standard Stroke" on page 6-7-5.

**Suffix for cylinder**

Rod boot	Nil	None
	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	Nil	Air cushion at both ends
	N <sup>Note)</sup>	Without air cushion

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.

### Applicable Auto Switch/Refer to page 6-16-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage			Auto switch model		Lead wire length (m) <sup>*</sup>			Pre-wire connector	Applicable load	
					DC	AC	Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)	IC circuit		Relay, PLC	
															5 V
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	<b>Z76</b>	●	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	—	<b>Z73</b>	●	●	●	—	—	Relay, PLC
Solid state switch	Diagnostic indication (2-color indication)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	<b>Y69A</b>	<b>Y59A</b>	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				<b>Y7PV</b>	<b>Y7P</b>	●	●	○	○	IC circuit	
				2-wire				<b>Y69B</b>	<b>Y59B</b>	●	●	○	○	—	
				3-wire (NPN)				<b>Y7NWV</b>	<b>Y7NW</b>	●	●	○	○	IC circuit	
				3-wire (PNP)				<b>Y7PWV</b>	<b>Y7PW</b>	●	●	○	○	IC circuit	
				3-wire (PNP)				<b>Y7BWV</b>	<b>Y7BW</b>	●	●	○	○	IC circuit	
	Water resistant (2-color indication)	2-wire	—	<b>Y7BA</b>	—	●	○	○	—						

\* Lead wire length symbols: 0.5 m.....Nil (Example) Y59A  
 3 m.....L (Example) Y59AL  
 5 m.....Z (Example) Y59AZ

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

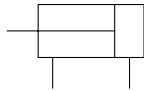
- Since there are other applicable auto switches than listed, refer to page 6-7-12 for details.
- For details about auto switches with pre-wire connector, refer to page 6-16-60.



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



**JIS Symbol**  
Double acting



**Made to Order**  
**Made to Order Specifications**  
(For details, refer to page 6-17-1.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB5	Oversized rod cylinder
-XB6	Heat resistant cylinder (150 °C)
-XB13	Low speed cylinder (5 to 50 mm/s)
-XC3	Special port location
-XC4	With heavy duty scraper
-XC5	Heat resistant cylinder (110 °C)
-XC6	Piston rod and rod end nut made of stainless steel
-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
-XC14	Change of trunnion bracket mounting position
-XC18	NPT finish piping port
-XC22	Fluoro rubber seals
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC29	Double knuckle joint with spring pin
-XC30	Front trunnion
-XC35	With coil scraper
-X846	Fastener strips mounted on switch mounting grooves

## Specifications

Bore size (mm)	32	40	50	63	80	100
Type	Non-lube					
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	Up to 250: $^{+1.0}_0$ , 251 to 1000: $^{+1.4}_0$ , 1001 to 1500: $^{+1.8}_0$					
Cushion	Both ends (Air cushion) <sup>Note)</sup>					
Thread tolerance	JIS Class 2					
Port size	Rc 1/8	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8	Rc 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	1200
63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600	1200
80	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800	1400
100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800	1500

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
Foot <sup>(1)</sup>	MB-L03	MB-L04	MB-L05	MB-L06	MB-L08	MB-L10
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 foot brackets per cylinder.

Note 2) Accessories for each mounting bracket are as follows. Foot, Flange, Single clevis: Body mounting bolt, Double clevis: Clevis pin, Cotter pin → For details, refer to page 6-7-11.

## Switch Spacer Part No.

Applicable bore size (mm)	32, 40	50, 63	80, 100
Part no.	BMP1-032		

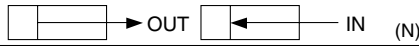
## Rod Boot Material

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 <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

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

## Weight

Bore size (mm)		32	40	50	63	80	100
Basic weight	Basic style	0.53	0.72	1.24	1.54	2.84	3.83
	Foot style	0.65	0.86	1.46	1.82	3.34	4.49
	Flange style	0.82	1.09	1.69	2.33	4.29	7.14
	Single clevis style	0.78	0.95	1.58	2.17	3.95	7.0
	Double clevis style	0.79	0.99	1.67	2.33	4.24	7.52
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	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) 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 x 100/50 = 0.85 kg

## Consideration of the Cushion

For details about the kinetic energy absorbable by the cushion mechanism and w/ air cushion, refer to page 6-19-5.

## 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

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.

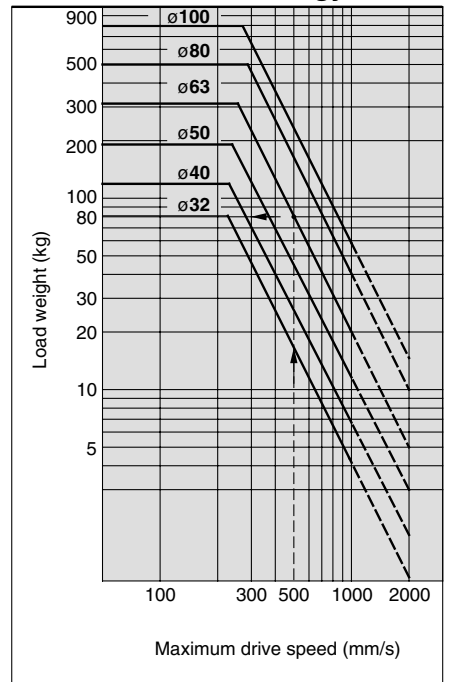


$$E_k = \frac{M}{2} V^2$$

- Ek: Kinetic energy (J)
- M: Weight 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

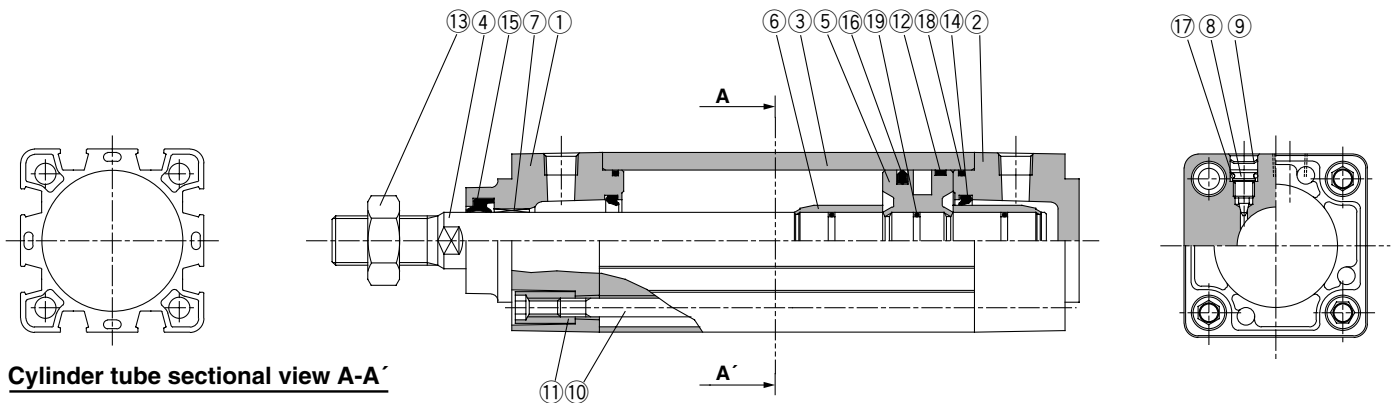


Example) Load limit at rod end when air cylinder ø63 is actuated with max. actuating speed 500 mm/s. at a maximum drive speed of 500 mm/s.

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	Brass	
⑦	Bushing	Lead-bronze casted	
⑧	Cushion valve	Steel wire	Nickel plated
⑨	Snap ring	Spring steel	ø40 to ø100
⑩	Tie-rod	Carbon steel	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	

## Copper-free

20-MB1 **Mounting style** **Bore size** **Stroke** **Suffix**

- Copper-free

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

## Specifications

Action	Double acting, Single rod
Bore size (mm)	32, 40, 50, 63, 80, 100
Max. operating pressure	1 MPa
Min. operating pressure	0.05 MPa
Cushion	Air cushion *
Piping	Screw-in type
Piston speed	50 to 1000 mm/s
Mounting	Basic style, Axial foot style, Rod side flange style Head side flange style, Single clevis style, Double clevis style, Center trunnion style

\* Auto switch can be mounted.

\* Use within the energy absorption. (Refer to page 6-7-6.)

\* When there is no air cushion, the unit is equipped with rubber bumpers.

## Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
32	MB32-PS	Set of the above nos. ⑭ (2 pcs.), ⑮, ⑯, ⑱
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.

## 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. Please consult with SMC for details.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

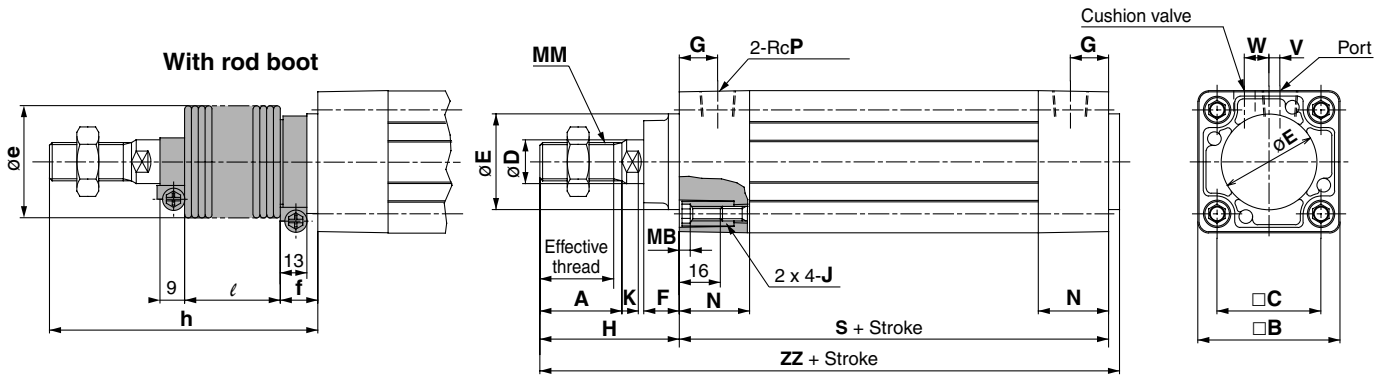
20-

Data

# Series MB1

## Standard Type

### Basic style: (B)



### Without Air Cushion

Bore size (mm)	S	ZZ	Bore size (mm)	S	ZZ
32	90	141	63	102	164
40	90	145	80	124	200
50	102	164	100	124	200

\* 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:  $\phi 32, \phi 40$ : +6 mm,  $\phi 50, \phi 63$ : +8 mm,  $\phi 80, \phi 100$ : +10 mm.

Bore size (mm)	Stroke range	Effective thread length	Width across flats	A	B	C	D	Ee11	F	G	H	MB	J	K	MM	N	P	S*	V	W	ZZ*
32	Up to 500	19.5	10	22	46	32.5	12	30	13	13	47	4	M6 x 1	6	M10 x 1.25	26.5	1/8	84	4	6.5	135
40	Up to 500	27	14	30	52	38	16	35	13	14	51	4	M6 x 1	6	M14 x 1.5	26.5	1/4	84	4	9	139
50	Up to 600	32	18	35	65	46.5	20	40	14	15.5	58	5	M8 x 1.25	7	M18 x 1.5	31	1/4	94	5	10.5	156
63	Up to 600	32	18	35	75	56.5	20	45	14	16.5	58	5	M8 x 1.25	7	M18 x 1.5	31	3/8	94	9	12	156
80	Up to 800	37	22	40	95	72	25	45	20	19	72	5	M10 x 1.5	10	M22 x 1.5	37.5	3/8	114	11.5	14	190
100	Up to 800	37	26	40	114	89	30	55	20	19	72	5	M10 x 1.5	10	M26 x 1.5	37.5	1/2	114	17	15	190

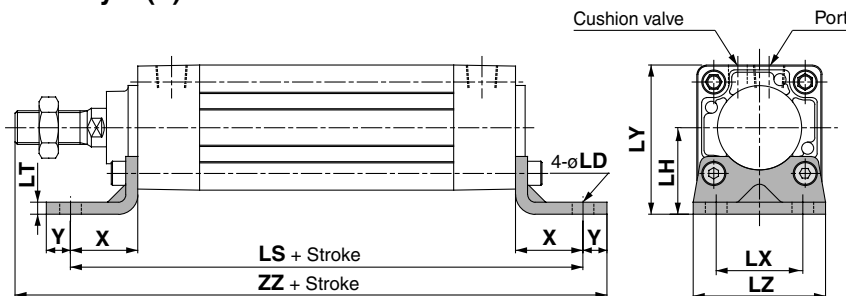
### With Rod Boot

Bore size (mm)	e	f	$\ell$										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	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
32	36	23	12.5	25	37.5	50	75	100	125	—	—	—	73	86	98	111	136	161	186	—	—	—
40	41	23	12.5	25	37.5	50	75	100	125	—	—	—	81	94	106	119	144	169	194	—	—	—
50	51	25	12.5	25	37.5	50	75	100	125	150	—	—	89	102	114	127	152	177	202	227	—	—
63	51	25	12.5	25	37.5	50	75	100	125	150	—	—	89	102	114	127	152	177	202	227	—	—
80	56	29	12.5	25	37.5	50	75	100	125	150	175	200	101	114	126	139	164	189	214	239	264	289
100	61	29	12.5	25	37.5	50	75	100	125	150	175	200	101	114	126	139	164	189	214	239	264	289

## Standard Type: With Mounting Bracket

\* Dimensions not shown are the same as basic style. (drawing above)

### Foot style (L)



### Without Air Cushion

Bore size (mm)	LS	ZZ
32	134	168
40	138	176
50	156	198
63	156	201
80	184	240
100	188	244

### Foot Style

Bore size (mm)	Stroke range	X	Y	LD	LH	LS*	LT	LX	LY	LZ	ZZ*
32	Up to 700	22	9	7	30	128	3.2	32	53	50	162
40	Up to 800	24	11	9	33	132	3.2	38	59	55	170
50	Up to 1000	27	11	9	40	148	3.2	46	72.5	70	190
63	Up to 1000	27	14	12	45	148	3.6	56	82.5	80	193
80	Up to 1000	30	14	12	55	174	4.5	72	102.5	100	230
100	Up to 1000	32	16	14	65	178	4.5	89	122	120	234

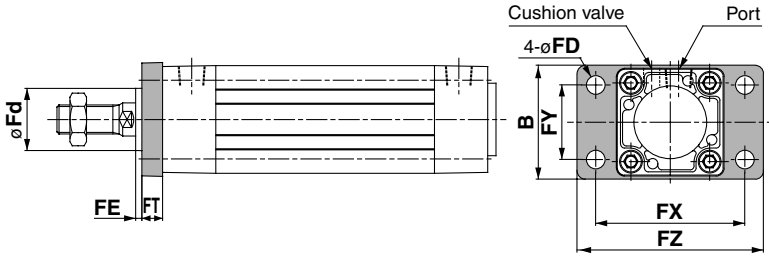
\* In the case of w/o air cushion, it comes with rubber bumper. Besides, the overall length is longer than the cylinder with air cushion as follows, because the bumpers are attached to the both sides of the piston:  $\phi 32, \phi 40$ : +6 mm,  $\phi 50, \phi 63$ : +8 mm,  $\phi 80, \phi 100$ : +10 mm



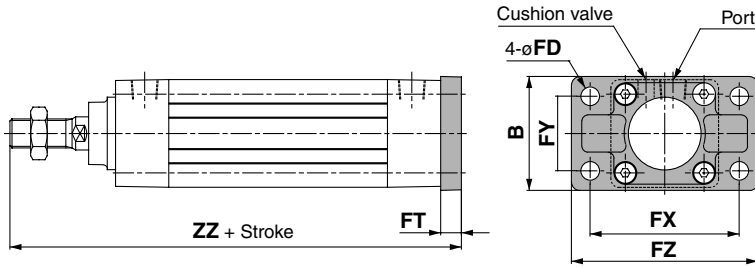
# Square Tube Type Air Cylinder: Standard Type Double Acting, Single Rod **Series MB1**

## Standard Type: With Mounting Bracket

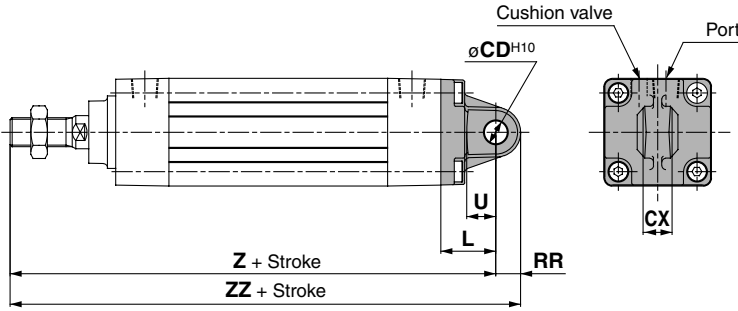
### Rod side flange style (F)



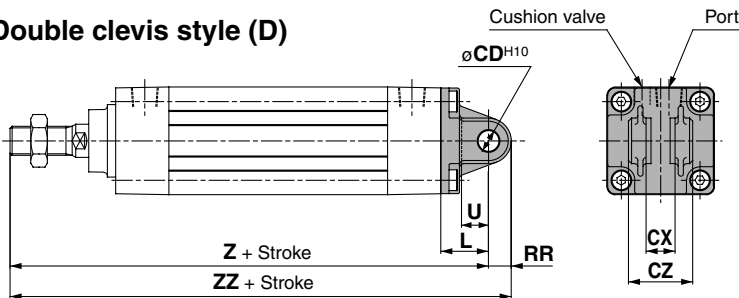
### Head side flange style (G)



### Single clevis style (C)



### Double clevis style (D)



### Rod Side Flange Style

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

### Without Air Cushion

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

### Head Side Flange Style

Bore size (mm)	Stroke range	B	FD	FT	FX	FY	FZ	ZZ*
32	Up to 500	50	7	10	64	32	79	141
40	Up to 500	55	9	10	72	36	90	145
50	Up to 600	70	9	12	90	45	110	164
63	Up to 600	80	9	12	100	50	120	164
80	Up to 800	100	12	16	126	63	153	202
100	Up to 800	120	14	16	150	75	178	202

### Without Air Cushion

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

### Single Clevis Style

Bore size (mm)	Stroke range	L	RR	U	CDH10	CX <sup>-0.1/-0.3</sup>	Z*	ZZ*
32	Up to 500	23	10.5	13	10	14	154	164.5
40	Up to 500	23	11	13	10	14	158	169
50	Up to 600	30	15	17	14	20	182	197
63	Up to 600	30	15	17	14	20	182	197
80	Up to 800	42	23	26	22	30	228	251
100	Up to 800	42	23	26	22	30	228	251

### Without Air Cushion

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

### Double Clevis Style

Bore size (mm)	Stroke range	L	RR	U	CDH10	CX <sup>+0.3/+0.1</sup>	CZ	Z*	ZZ*
32	Up to 500	23	10.5	13	10	14	28	154	164.5
40	Up to 500	23	11	13	10	14	28	158	169
50	Up to 600	30	15	17	14	20	40	182	197
63	Up to 600	30	15	17	14	20	40	182	197
80	Up to 800	42	23	26	22	30	60	228	251
100	Up to 800	42	23	26	22	30	60	228	251

CJ1

CJP

CJ2

CM2

CG1

MB

**MB1**

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

20-

Data

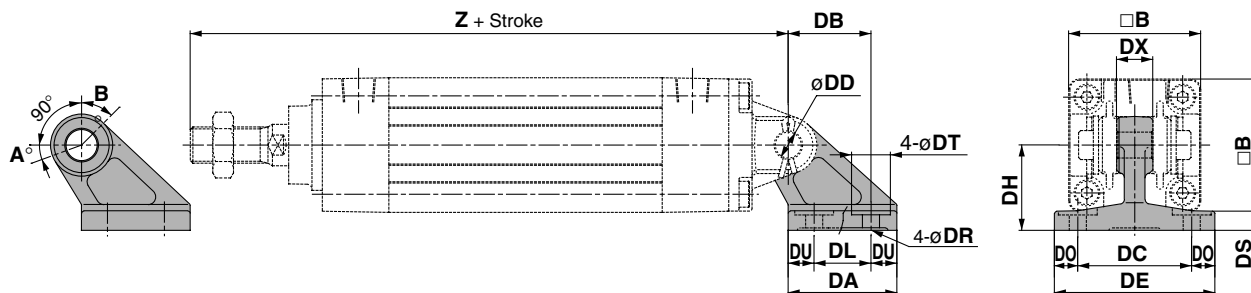
# Series MB1

## Pivot Bracket/Double Clevis Pivot Bracket

### Type

Description	Bore size (mm)					
	MB□32	MB□40	MB□50	MB□63	MB□80	MB□100
Double clevis pivot bracket	MB-B03		MB-B05		MB-B08	

### Double clevis pivot bracket



### Without Air Cushion

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>

Bore size (mm)	Z
32	160
40	164
50	190
63	190
80	238
100	238

### 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°

#### Method for longitudinal mounting of clevis pivot bracket

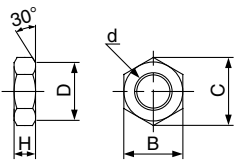
\* When there is no air cushion, the unit is equipped with rubber bumpers.

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.

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

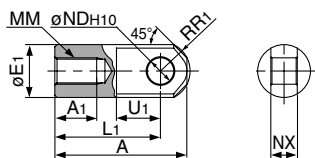
## Accessory Bracket Dimensions

Rod end nut  
(Standard equipment)



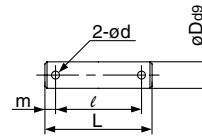
Part no.	Bore size (mm)	d	H	B	C	D
NT-03	32	M10 x 1.25	6	17	19.6	16.5
NT-04	40	M14 x 1.5	8	22	25.4	21
NT-05	50, 63	M18 x 1.5	11	27	31.2	26
NT-08	80	M22 x 1.5	13	32	37.0	31
NT-10	100	M26 x 1.5	16	41	47.3	39

I type single  
Knuckle joint



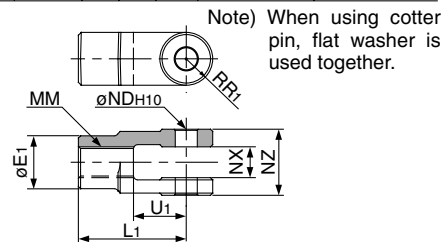
Part no.	Bore size (mm)	A	A <sub>1</sub>	E <sub>1</sub>	L <sub>1</sub>	MM	R <sub>1</sub>	U <sub>1</sub>	ND <sub>H10</sub>	NX
I-03M	32	40	14	20	30	M10 x 1.25	12	16	10 <sup>+0.058/0</sup>	14 <sup>-0.10/-0.30</sup>
I-04M	40	50	19	22	40	M14 x 1.5	12.5	19	10 <sup>+0.058/0</sup>	14 <sup>-0.10/-0.30</sup>
I-05M	50, 63	64	24	28	50	M18 x 1.5	16.5	24	14 <sup>+0.070/0</sup>	20 <sup>-0.10/-0.30</sup>
I-08M	80	80	26	40	60	M22 x 1.5	23.5	34	22 <sup>+0.084/0</sup>	30 <sup>-0.10/-0.30</sup>
I-10M	100	80	26	40	60	M26 x 1.5	23.5	34	22 <sup>+0.084/0</sup>	30 <sup>-0.10/-0.30</sup>

Knuckle joint pin  
Clevis pin



Part no.	Bore size (mm)		D <sub>d9</sub>	L	I	m	d (Drill through)	Note)
	Clevis	Knuckle						
CD-M03	32, 40		10 <sup>-0.040/-0.076</sup>	44	36	4	3	ø3 x 18ℓ
CD-M05	50, 63		14 <sup>-0.050/-0.093</sup>	60	51	4.5	4	ø4 x 25ℓ
CD-M08	80, 100		22 <sup>-0.065/-0.117</sup>	82	72	5	4	ø4 x 35ℓ

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>	ND <sub>H10</sub>	NX	NZ
Y-03M	32	20	30	M10 x 1.25	10	16	10 <sup>+0.058/0</sup>	14 <sup>+0.30/0.10</sup>	28 <sup>-0.10/-0.30</sup>
Y-04M	40	22	40	M14 x 1.5	11	19	10 <sup>+0.058/0</sup>	14 <sup>+0.30/0.10</sup>	28 <sup>-0.10/-0.30</sup>
Y-05M	50, 63	28	50	M18 x 1.5	14	24	14 <sup>+0.070/0</sup>	20 <sup>+0.30/0.10</sup>	40 <sup>-0.10/-0.30</sup>
Y-08M	80	40	65	M22 x 1.5	20	34	22 <sup>+0.084/0</sup>	30 <sup>+0.30/0.10</sup>	60 <sup>-0.10/-0.30</sup>
Y-10M	100	40	65	M26 x 1.5	20	34	22 <sup>+0.084/0</sup>	30 <sup>+0.30/0.10</sup>	60 <sup>-0.10/-0.30</sup>

Note) Pin, cotter pin and plain washer are attached with double knuckle joint.

## Bracket Combinations

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

Cylinder mounting bracket	Support bracket for work 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

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

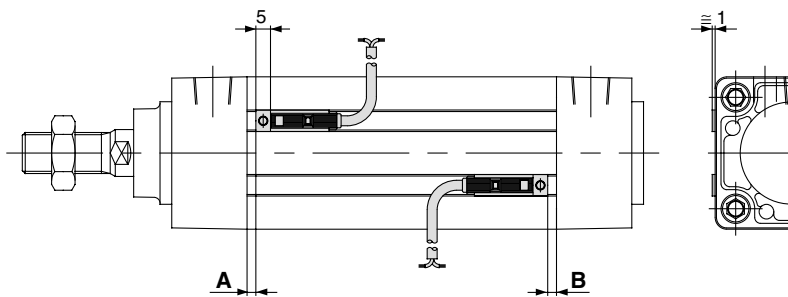
-X

20-

Data

# Series MB1

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



Bore size (mm)	D-Z7□/Z80 D-Y59□/Y69□/Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BAL	
	A	B
32	4	1
40	4	1
50	4	2
63	4	2
80	5.5	7.5
100	5.5	7.5

### Minimum Stroke for Auto Switch Mounting

Type	Auto switch model	No. of auto switches mounted	ø32	ø40	ø50	ø63	ø80	ø100
Reed switch	D-Z7□/Z80	2 (Different sides, Same side)	25			15		
		1	25			15		
Solid state switch	D-Y59□/Y69□ D-Y7P/Y7PV	2 (Different sides, Same side)	25			15		
		1	25			15		
	D-Y7□W/Y7□WV	2 (Different sides, Same side)	25			20		
		1	25			20		
D-Y7BAL	2 (Different sides, Same side)	30			20			
	1	30			20			

### Operating Range

Auto switch model	Applicable bore size (mm)					
	32	40	50	63	80	100
D-Z7□/Z80	10	10	10	11	11	12
D-Y59□/Y69□/ D-Y7P/Y7PV	6.5	6.5	6	7	7	8
D-Y7□W/Y7□WV	6.5	6.5	6	7	7	8
D-Y7BAL	5	5	5	5	5	6

Center trunnion is not included.

Other than the applicable auto switches listed in "How to Order", the following auto switches can be mounted. For detailed specifications, refer to page 6-16-1.

Type	Model	Electrical entry	Features
Reed switch	D-Z80	Grommet (In-line)	Without indicator light

\* Normally closed (NC = b contact), solid state switch (D-Y7G/Y7H type) are also available. For details, refer to page 6-16-39.



# Square Tube Type Air Cylinder: Standard Type Double Acting, Double Rod Series **MB1W** ø32, ø40, ø50, ø63, ø80, ø100

## How to Order

Without auto switch

MB1W **L** **32** — **150** **□**

With auto switch

MDB1W **L** **32** — **150** **□** — **Y7BW** **□**

Built-in magnet

Mounting style

<b>B</b>	Basic style
<b>L</b>	Foot style
<b>F</b>	Flange style

Bore size

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

Stroke (mm)

Refer to "Standard Stroke" on page 6-7-14.

Number of auto switches

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

Auto switch

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

\* For the applicable auto switch model, refer to the table below.  
\* Auto switches are shipped together, (but not assembled).

Suffix for cylinder

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)
Cushion	<b>KK</b>	Heat resistant tarpaulin (Both ends)
	<b>Nil</b>	Air cushion at both ends
	<b>N</b> <sup>(Note)</sup>	Without air cushion

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.

### Applicable Auto Switch/Refer to page 6-16-1 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-wire connector	Applicable load	
					DC	AC	Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)	IC circuit		Relay, PLC	
															24 V
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	<b>Z76</b>	●	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	—	<b>Z73</b>	●	●	●	—	—	Relay, PLC
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	<b>Y69A</b>	<b>Y59A</b>	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				<b>Y7PV</b>	<b>Y7P</b>	●	●	○	○		
				2-wire	5 V, 12 V	<b>Y69B</b>	<b>Y59B</b>	●	●	○	○	—			
				3-wire (NPN)		<b>Y7NWV</b>	<b>Y7NW</b>	●	●	○	○	IC circuit			
				3-wire (PNP)		<b>Y7PWV</b>	<b>Y7PW</b>	●	●	○	○				
				Water resistant (2-color indication)	12 V	<b>Y7BWV</b>	<b>Y7BW</b>	●	●	○	○	—			
				2-wire		—	<b>Y7BA</b>	—	●	○	○	—			

\* Lead wire length symbols: 0.5 m.....Nil  
3 m.....L  
5 m.....Z

(Example) Y59A  
(Example) Y59AL  
(Example) Y59AZ

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

- Since there are other applicable auto switches than listed, refer to page 6-7-12 for details.
- For details about auto switches with pre-wire connector, refer to page 6-16-60.

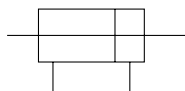
- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1**
- CA2
- CS1
- C76
- C85
- C95
- CP95
- NCM
- NCA
- D-
- X
- 20-
- Data

# Series MB1W



## JIS Symbol

Double acting



## 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.

## Switch Spacer Part No.

Applicable bore size (mm)	32, 40	50, 63	80, 100
Part no.	BMP1-032		

## 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

Note) Order two foot brackets per cylinder.

## Specifications

Bore size (mm)	32	40	50	63	80	100
Type	Non-lube					
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					
Stroke length tolerance	Up to 250: $^{+1.0}_0$ , 251 to 800: $^{+1.4}_0$					
Cushion <sup>Note)</sup>	Both ends (Air cushion) <sup>Note)</sup>					
Thread tolerance	JIS Class 2					
Port size	Rc 1/8	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8	Rc 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	●	●	●
	Single knuckle joint	●	●	●
Option	Double knuckle (With pin)	●	●	●
	Rod boot	●	●	●

## Theoretical Output

Bore size (mm)	Rod size (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	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	

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

## Weight

Bore size (mm)		32	40	50	63	80	100
Basic weight	Basic style	0.59	0.82	1.39	1.72	3.22	4.27
	Foot style	0.71	0.96	1.61	2.0	3.72	4.93
	Flange style	0.88	1.19	1.84	2.51	4.67	7.58
Additional weight per each 50 mm of stroke	All mounting brackets	0.20	0.29	0.41	0.45	0.75	1.0
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:

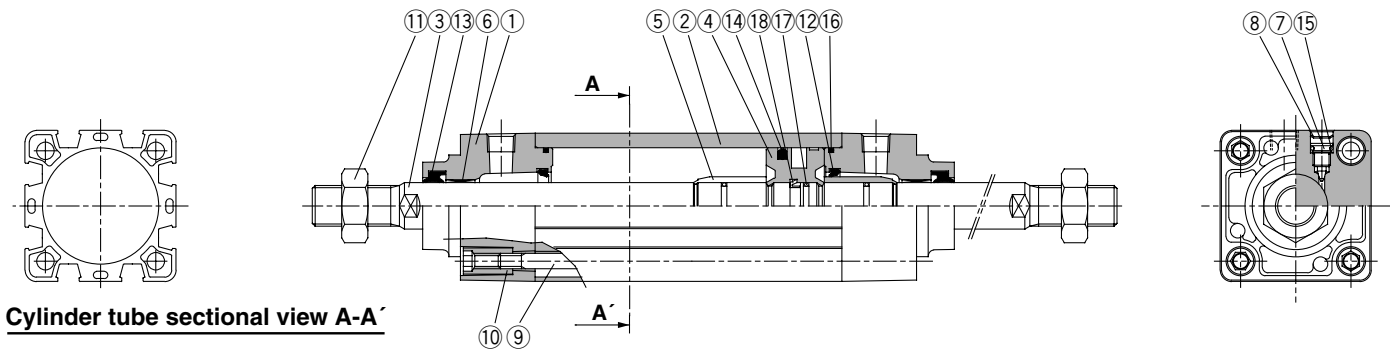
(Example) MB1WB32-100 (Basic style/ø32, 100 st)

- Basic weight.....0.59 kg
- Additional weight.....0.20/50 stroke
- Cylinder stroke.....100 stroke

$$0.59 + 0.20 \times 100/50 = 0.99 \text{ kg}$$

# Square Tube Type Air Cylinder: Standard Type Double Acting, Double Rod 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	Brass	
⑥	Bushing	Lead-bronze casted	
⑦	Cushion valve	Steel wire	Nickel plated
⑧	Snap ring	Spring steel	ø40 to ø100
⑨	Tie-rod	Carbon steel	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 (2 pcs.), ⑬, ⑭, ⑯
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.

## Made to Order Specifications (For details, refer to page 6-17-1.)

Symbol	Specifications
-XB6	Heat resistant cylinder (150 °C)
-XB13	Low speed cylinder (5 to 50 mm/s)
-XC3	Special port location
-XC4	With heavy duty scraper
-XC5	Heat resistant cylinder (110 °C)
-XC6	Piston rod and rod end nut made of stainless steel
-XC7	Tie-rod, cushion valve, tie rod nut, etc. made of stainless steel
-XC14	Change of trunnion bracket mounting position
-XC18	NPT finish piping port
-XC22	Fluoro rubber seals
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC29	Double knuckle joint with spring pin
-XC30	Front trunnion
-XC35	With coil scraper

## Copper-free

20-MB1W **Mounting style** **Bore size** **Stroke** **Suffix**

### • Copper-free

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

## Specifications

Action	Double acting, Single rod
Bore size (mm)	32, 40, 50, 63, 80, 100
Max. operating pressure	1 MPa
Min. operating pressure	0.05 MPa
Cushion	Air cushion *
Piping	Screw-in type
Piston speed	50 to 1000 mm/s
Mounting	Basic style, Axial foot style, Rod side flange style Head side flange style, Single clevis style Double clevis style, Center trunnion style

\* Auto switch can be mounted.

\* Use within the energy absorption. (Refer to page 6-7-6.)

\* When there is no air cushion, the unit is equipped with rubber bumpers.

## 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. Please consult with SMC for details.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

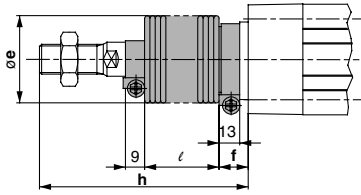
20-

Data

# Series MB1W

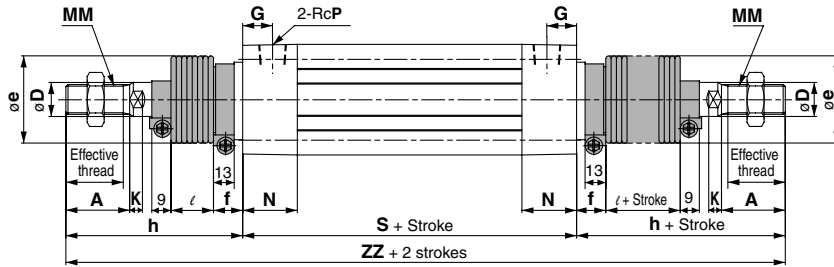
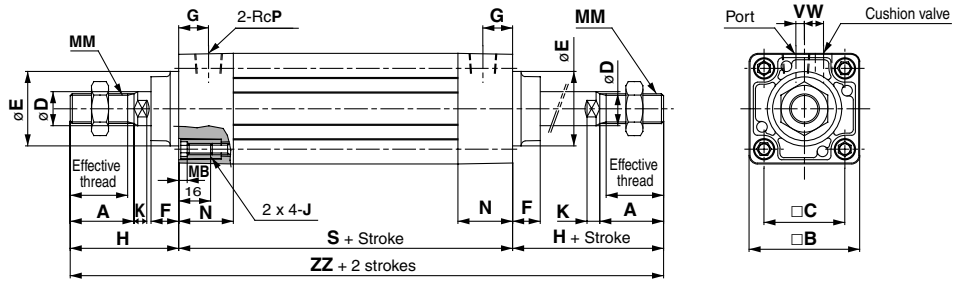
## Standard Type

### Basic style: (B)



With rod boot

\* 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.  
 \*\* 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: +3 mm, ø50, ø63: +4 mm, ø80, ø100: +5 mm (In the case of trunnion style and trunnion pivot bracket).



Without Air Cushion

Bore size (mm)	Stroke range	Effective thread length	Width across flats	A	B	C	D	Ee11	F	G	H	MB	J	K	MM	N	P	S*	V	W	ZZ*	S	ZZ
32	Up to 500	19.5	10	22	46	32.5	12	30	13	13	47	4	M6 x 1	6	M10 x 1.25	26.5	1/8	84	4	6.5	178	90	184
40	Up to 500	27	14	30	52	38	16	35	13	14	51	4	M6 x 1	6	M14 x 1.5	26.5	1/4	84	4	9	186	90	192
50	Up to 600	32	18	35	65	46.5	20	40	14	15.5	58	5	M8 x 1.25	7	M18 x 1.5	31	1/4	94	5	10.5	210	102	218
63	Up to 600	32	18	35	75	56.5	20	45	14	16.5	58	5	M8 x 1.25	7	M18 x 1.5	31	3/8	94	9	12	210	102	218
80	Up to 800	37	22	40	95	72	25	45	20	19	72	5	M10 x 1.5	10	M22 x 1.5	37.5	3/8	114	11.5	14	258	124	268
100	Up to 800	37	26	40	114	89	30	55	20	19	72	5	M10 x 1.5	10	M26 x 1.5	37.5	1/2	114	17	15	258	124	268

### With Rod Boot

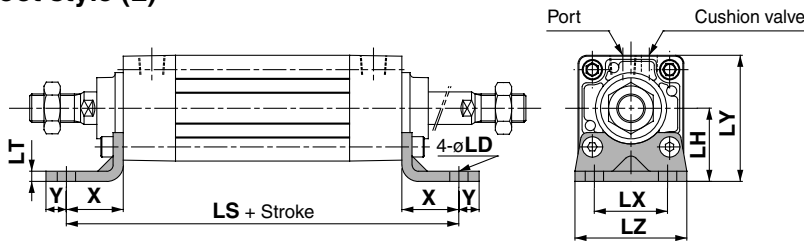
Note) ZZ indicates dimensions for double side rod boot.

Bore size (mm)	e	f	l								h								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	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	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
32	36	23	12.5	25	37.5	50	75	100	125	—	—	—	73	86	98	111	136	161	186	—	—	—	230	256	280	306	356	406	456	—	—	—
40	41	23	12.5	25	37.5	50	75	100	125	—	—	—	81	94	106	119	144	169	194	—	—	—	246	272	296	322	372	422	472	—	—	—
50	51	25	12.5	25	37.5	50	75	100	125	150	—	—	89	102	114	127	152	177	202	227	—	—	272	298	322	348	398	448	498	548	—	—
63	51	25	12.5	25	37.5	50	75	100	125	150	—	—	89	102	114	127	152	177	202	227	—	—	272	298	322	348	398	448	498	548	—	—
80	56	29	12.5	25	37.5	50	75	100	125	150	175	200	101	114	126	139	164	189	214	239	264	276	316	342	366	392	442	492	542	592	642	692
100	61	29	12.5	25	37.5	50	75	100	125	150	175	200	101	114	126	139	164	189	214	239	264	276	316	342	366	392	442	492	542	592	642	692

## Standard Type: With Mounting Bracket

\* Dimensions not shown are the same as basic style. (drawing above)

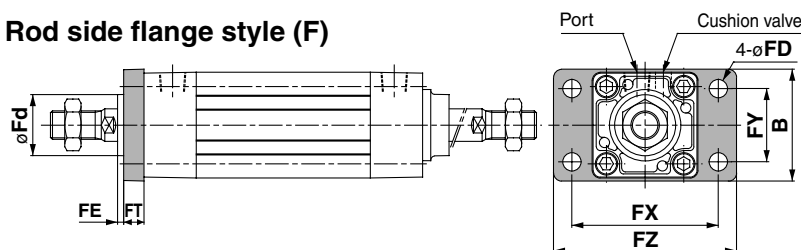
### Foot style (L)



### Foot Style

Bore size (mm)	Stroke range	Effective thread length	X	Y	LD	LH	LS*	LT	LX	LY	LZ
32	Up to 500	19.5	22	9	7	30	128	3.2	32	53	50
40	Up to 500	27	24	11	9	33	132	3.2	38	59	55
50	Up to 600	32	27	11	9	40	148	3.2	46	72.5	70
63	Up to 600	32	27	14	12	45	148	3.6	56	82.5	80
80	Up to 800	37	30	14	12	55	174	4.5	72	102.5	100
100	Up to 800	37	32	16	14	65	178	4.5	89	122	120

### Rod side flange style (F)



### Rod Side Flange Style

Bore size (mm)	Stroke range	Effective thread length	B	FD	FT	FX	FY	FZ	Fd
32	Up to 500	19.5	50	7	10	64	32	79	25
40	Up to 500	27	55	9	10	72	36	90	31
50	Up to 600	32	70	9	12	90	45	110	38.5
63	Up to 600	32	80	9	12	100	50	120	39.5
80	Up to 800	37	100	12	16	126	63	153	45.5
100	Up to 800	37	120	14	16	150	75	178	54





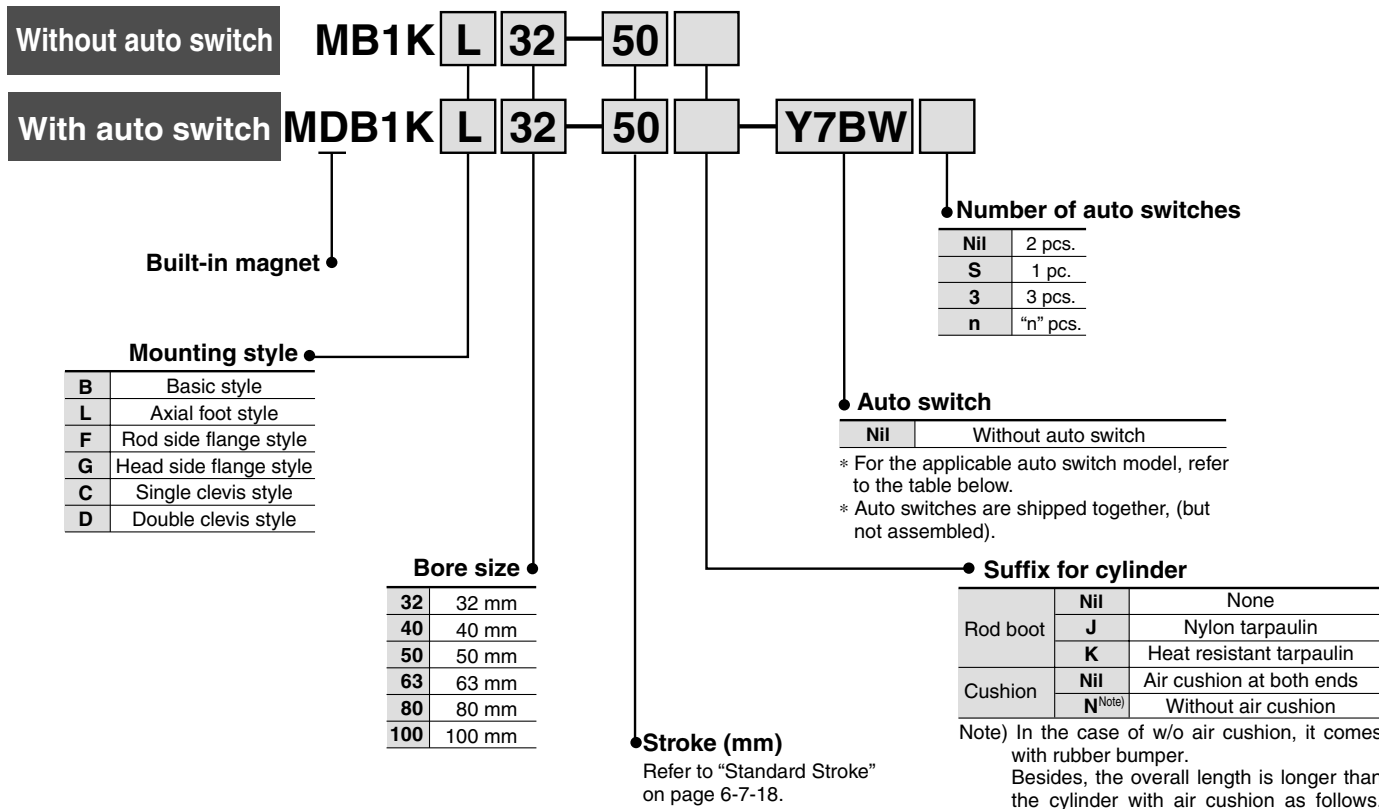
# Square Tube Type Cylinder: Non-rotating Rod

## Double acting, Single Rod

# Series MB1K

ø32, ø40, ø50, ø63, ø80, ø100

### How to Order



- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- C76
- C85
- C95
- CP95
- NCM
- NCA
- D-
- X
- 20-
- Data

### Applicable Auto Switch / Refer to page 6-16-1 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-wire connector	Applicable load	
					DC	AC		Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)		IC circuit	Relay, PLC
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	Z76	●	●	—	—		
				2-wire	24 V	12 V	100 V	—	Z73	●	●	●	—	—	Relay, PLC
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	Y69A	Y59A	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				Y7PV	Y7P	●	●	○	○		
				2-wire				Y69B	Y59B	●	●	○	○		
				3-wire (NPN)				Y7NWV	Y7NW	●	●	○	○		
				3-wire (PNP)				Y7PWV	Y7PW	●	●	○	○		
				2-wire				Y7BWV	Y7BW	●	●	○	○		
Water resistant (2-color indication)	—	Y7BA	—	●	○	○	—								

\* Lead wire length symbols: 0.5 m.....Nil (Example) Y59A  
 3 m.....L (Example) Y59AL  
 5 m.....Z (Example) Y59AZ

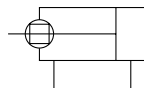
\* Solid state switches marked with "○" are produced upon receipt of order.

- Since there are other applicable auto switches than listed, refer to page 6-7-12 for details.
- For details about auto switches with pre-wire connector, refer to page 6-16-60.

# Series MB1K



JIS Symbol



## Made to Order Specifications (For details, refer to page 6-17-1.)

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
-XC10	Dual stroke cylinder/Double rod type
-XC14	Change of trunnion bracket mounting position
-XC18	NPT finish piping port
-XC30	Front trunnion

## Switch Spacer Part No.

Applicable bore size (mm)	32, 40	50, 63	80, 100
Part no.	BMP1-032		

## Mounting Bracket Part No.

Bore size (mm)	32	40	50
Foot <sup>(1)</sup>	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 <sup>(1)</sup>	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: Clevis pin & Cotter pin → Refer to page 6-7-11.

## Specifications

Bore size (mm)	32	40	50	63	80	100
Type	Non-lube					
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					
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: $^{+1.8}_0$					
Cushion <sup>Note)</sup>	Both ends (Air cushion) <sup>Note)</sup>					
Thread tolerance	JIS Class 2					
Port size	Rc 1/8	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8	Rc 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 <sup>2</sup> )	Bore size (mm)	Piston area (mm <sup>2</sup> )
32	675	63	2804
40	1082	80	4568
50	1651	100	7223

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

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

## Weight

(kg)

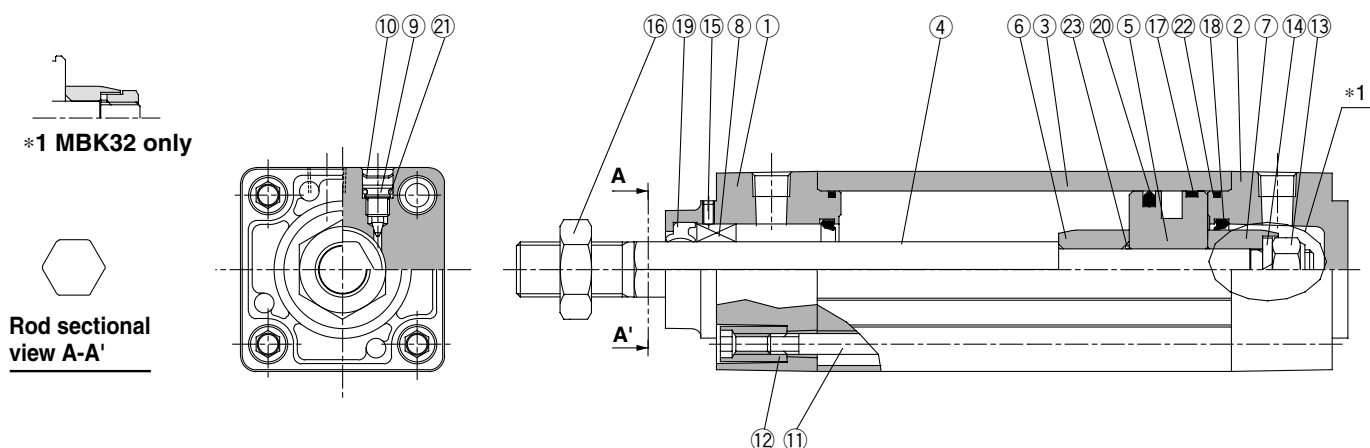
Bore size (mm)		32	40	50	63	80	100
Basic weight	Basic style	0.53	0.69	1.26	1.58	2.69	3.86
	Foot style	0.65	0.83	1.48	1.86	3.19	4.52
	Flange style	0.82	1.06	1.69	2.37	4.14	7.17
	Single clevis style	0.78	0.92	1.60	2.21	3.8	7.03
	Double clevis style	0.79	0.96	1.69	2.37	4.09	7.55
Additional weight per each 50 mm of stroke	All mounting brackets	0.16	0.21	0.33	0.37	0.56	0.72
	Accessory bracket						
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
- $$0.53 + 0.16 \times 100/50 = 0.85 \text{ kg}$$

## 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	Snap ring	Spring steel	ø40 to ø100
⑪	Tie-rod	Carbon steel	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 nos. above ⑱ (2 pcs.), ⑲, ⑳, ㉑.
40	MBK40-PS	
50	MBK50-PS	
63	MBK63-PS	
80	MBK80-PS	
100	MBK100-PS	

\* Seal kit includes ⑱ to ㉑. Order the seal kit, based on each bore size.

\* 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.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

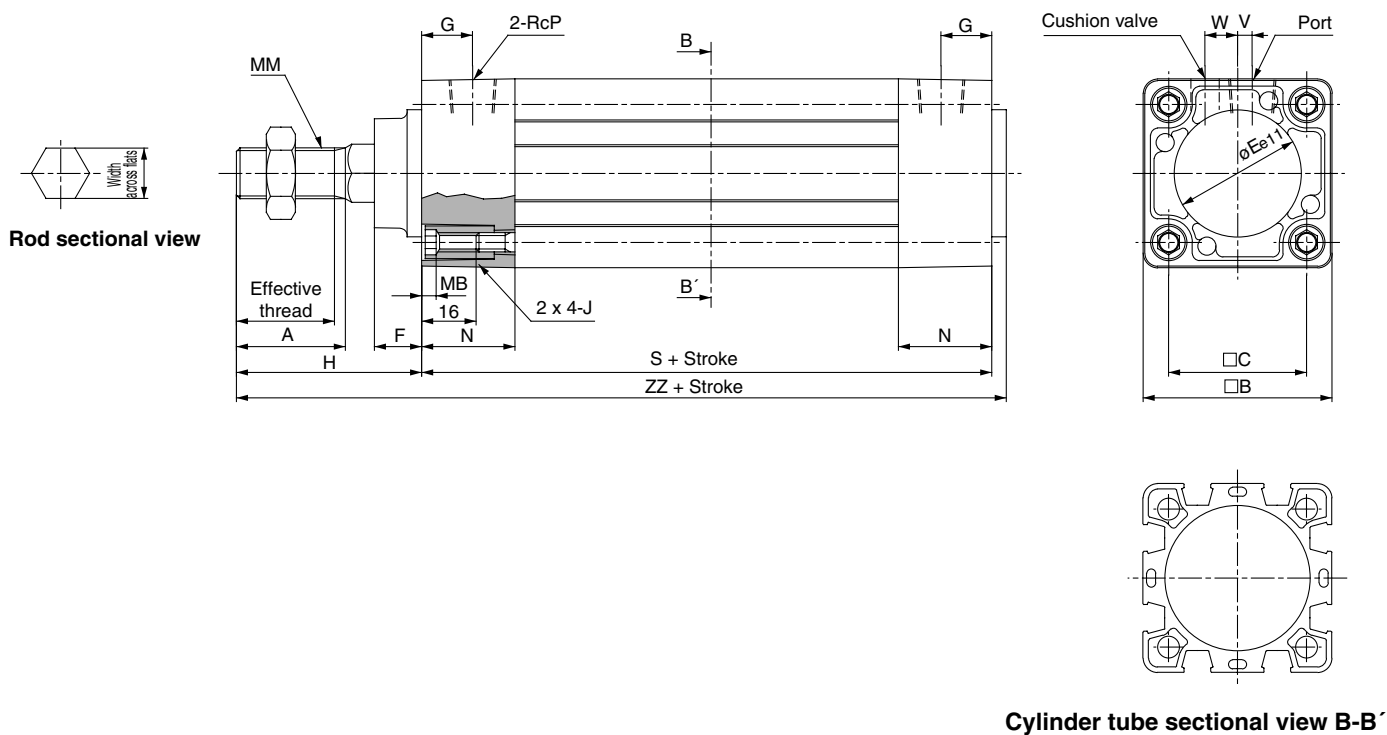
20-

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	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	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	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	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	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	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	5	M10 x 1.5	M26 x 1.5	37.5	1/2	114	17	15	72	190