



# Air Cylinder *Series MB*

ø32, ø40, ø50, ø63, ø80, ø100



**Improved energy absorption capacity cylinder with high tech appearance.**

CJ1

CJP

CJ2

CM2

C85

C76

CG1

**MB**

MB1

CP95

C95

C92

CA1

CS1

# Series *MB, MBW, MBK,*

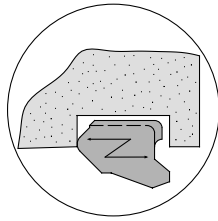
Double acting single rod

Double acting double rod

Double acting non-rotating rod

## Improved cushion capacity

"Floating" cushion seal design eliminates piston rod "bouncing" due to cracking pressure at beginning of stroke.

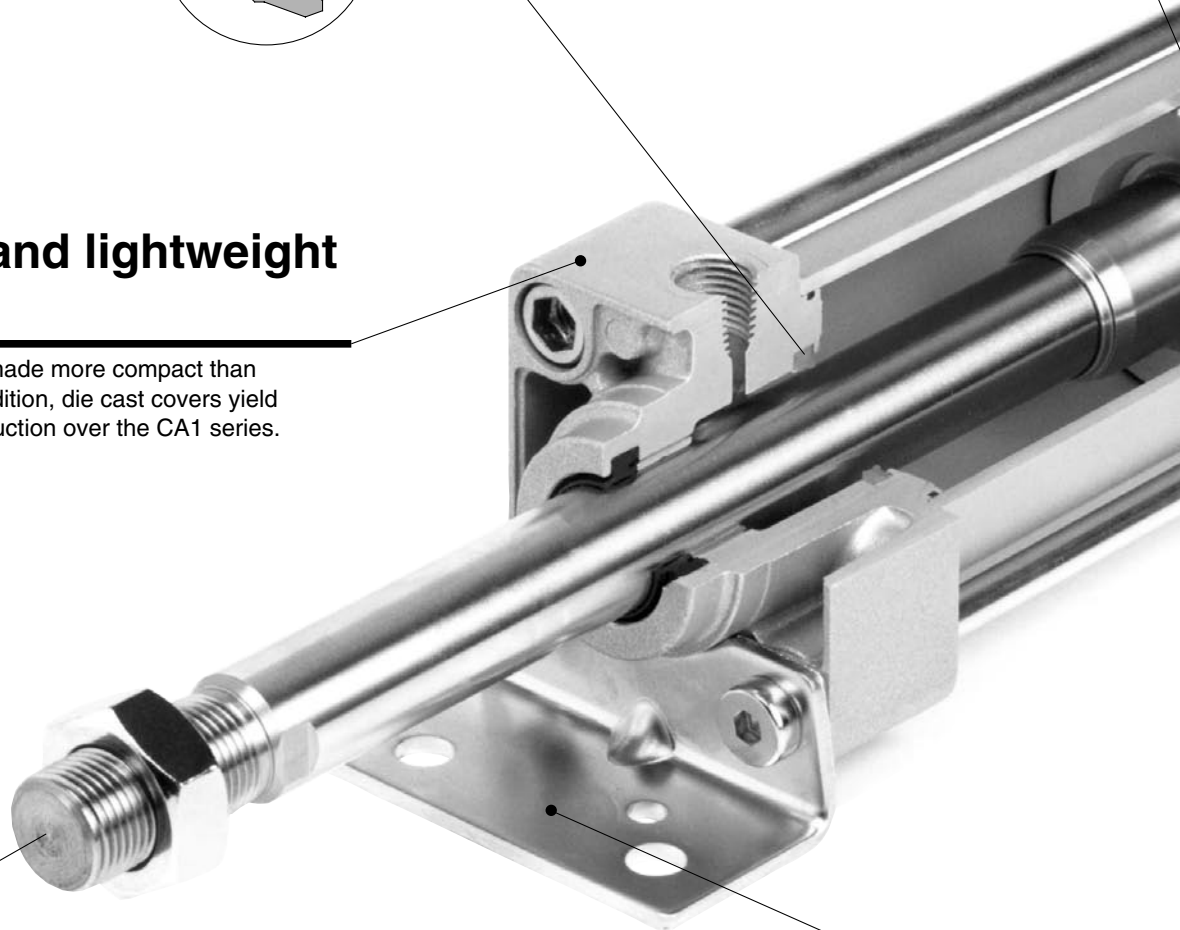


## Increased kinetic energy absorption

Elevated cushion volume and the adoption of a new cushion seal design permit about 30% more allowable kinetic energy over the CA1 series. In addition, service life of cushion seal is about 5 times greater.

## Compact and lightweight design

The square cover is made more compact than the CA1 series. In addition, die cast covers yield 10 to 25% weight reduction over the CA1 series.



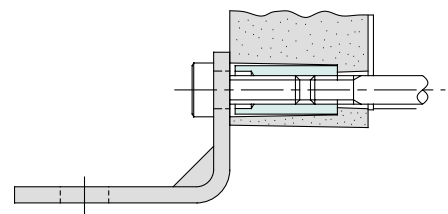
## Minimal rod deflection

Improved bushing and piston rod dimensional accuracy achieves tighter clearances and reduced piston rod deflection.



## Accurate mounting

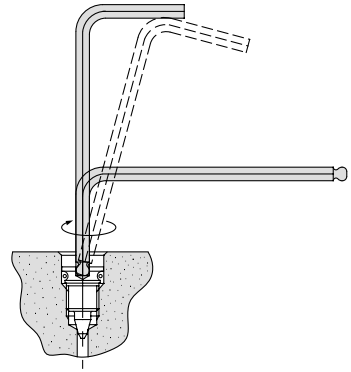
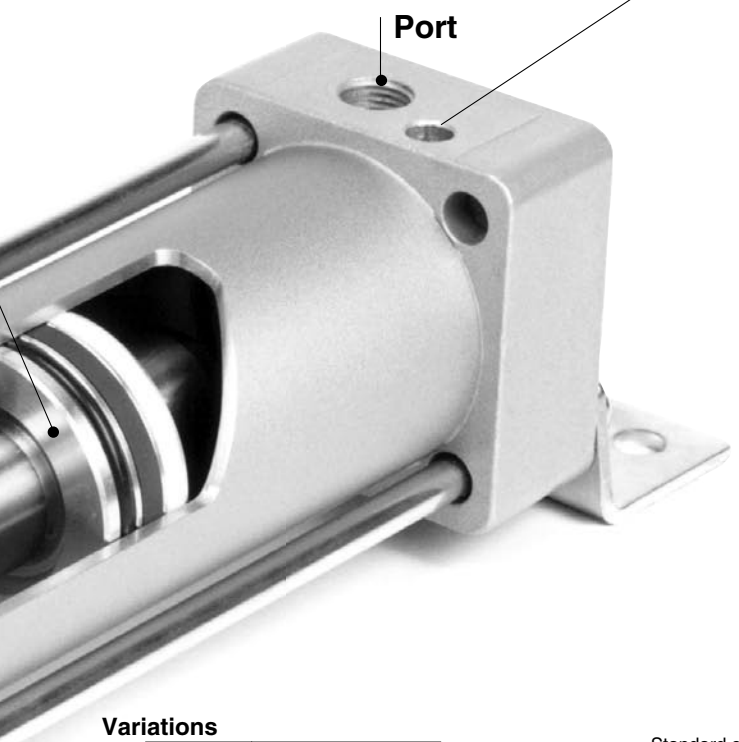
The cylinder cover and mounting bracket with high dimensional accuracy simplifies installation and extends service life.



Low friction **MB□Q**, End lock style **MBB** ø32, ø40, ø50, ø63, ø80, ø100

### Easy adjustment of cushion valve

Adjustment of the cushion valve is made with a hex. wrench allowing for easy fine adjustment. The cushion valve is recessed in the cover.



### Applicable auto switch

Mounting	Style	Reed switch		Solid state switch	
		Grommet		Grommet	
Tie rod mounting	<b>D-A53</b>	3 wire	3 wire	2 wire	
	<b>D-A54</b>	D-F59	D-F59W	D-J59W	
	<b>D-A56</b>	D-F5P	D-F5PW	D-F5BA	(2 colour indication)
	<b>D-A64</b>				(2 colour indication)
	<b>D-A67</b>				
	<b>D-A59W</b> (2 colour indication)	2 wire	4 wire	3 wire	
		D J59	D F59F	D F5NT	
			D F5LF		(2 colour indication)

- CJ1
- CJP
- CJ2
- CM2
- C85
- C76
- CG1
- MB**
- MB1
- CP95
- C95
- C92
- CA1
- CS1

### Variations

Standard/Double acting	JIS Symbol	Series	Standard stroke (mm)																	
			(Bore)	25	50	75	100	125	150	175	200	250	300	350	400	450	500	600	700	800
Standard/Double acting		Single rod	Series MB	32	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		Double rod	Series MBW	40	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		Non-rotating rod	Series MBK	50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		Low friction	Series MB□Q	80	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		End lock	Series MBB	100	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Note 1) Standard stroke for MBK series is below 700.

Built-in-magnet	Rod boot	Mounting	Accessories
•	•	Basic Axial foot Front flange Rear flange Single clevis Double clevis Centre trunnion	<b>Standard</b> Rod end nut <b>Option</b> Knuckle joint pin Clevis pin Single knuckle joint Double knuckle joint Trunnion pivot bracket Double clevis pivot bracket
•	•	Basic Foot Flange Centre trunnion	<b>Standard</b> Rod end nut <b>Option</b> Knuckle joint pin Single knuckle joint Double knuckle joint Trunnion pivot bracket
•	•	Basic Axial foot Front flange Rear flange Single clevis Double clevis Centre trunnion	<b>Standard</b> Rod end nut <b>Option</b> Knuckle joint pin Clevis pin Single knuckle joint Double knuckle joint Trunnion pivot bracket Double clevis pivot bracket
•		Basic Axial foot Front flange Rear flange Single clevis Double clevis Centre trunnion	<b>Standard</b> Rod end nut <b>Option</b> Knuckle joint pin Clevis pin Single knuckle joint Double knuckle joint Trunnion pivot bracket Double clevis pivot bracket
•	•	Basic Axial foot Front flange Rear flange Single clevis Double clevis Centre trunnion	<b>Standard</b> Rod end nut Locking release bolt (N only) <b>Option</b> Knuckle joint pin Clevis pin Single knuckle joint Double knuckle joint Trunnion pivot bracket Double clevis pivot bracket



# Series MB/Precautions



Be sure to read before handling.

Refer to p.0-39 to 0-46 for Safety Instructions, actuator precautions 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 air is supplied, the cushion valve may shoot out from the cover.

Bore (mm)	Cushion valve	Width across flats	Socket wrench
32, 40, 50	MB-32-10-C1247	2.5	JIS 4648 Hexagonal spanner wrench 2.5
63, 80, 100	MB-63-10-C1250	4	JIS 4648 Hexagonal spanner wrench 4

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

Select the cylinder with bumper "N" if cushion valve is to be fully opened.

Tie rods or piston assembly may be damaged if neither air cushion nor bumper is utilized.

③ **When replacing mounting bracket, use a socket wrench.**

Bore (mm)	Bolt	Width across flats	Tightening torque (Nm)
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
	Other MB-80-48BC1251		

④ **There is no mounting interchangeability with CA1 series.**

## Non-rotating rod (Double acting Single rod)

### Handling

### Caution

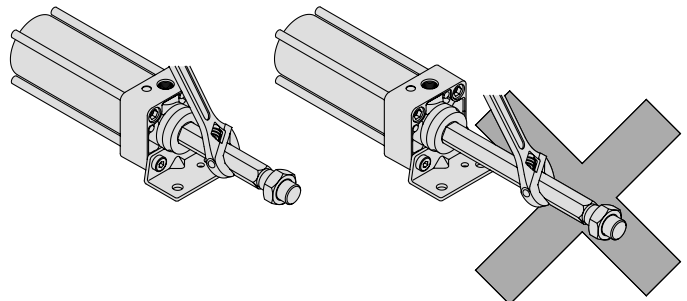
① **Avoid using the air cylinder in such a way that more than allowable rotational torque would be applied to the piston rod.**

If rotational torque is applied, the non-rotating guide will deform, thus affecting the non-rotating accuracy.

### Mounting/Piping

### Caution

① 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. To tighten, take precautions to prevent the tightening torque from being applied to the non-rotating guide.



CJ1

CJP

CJ2

CM2

C85

C76

CG1

**MB**

MB1

CP95

C95

C92

CA1

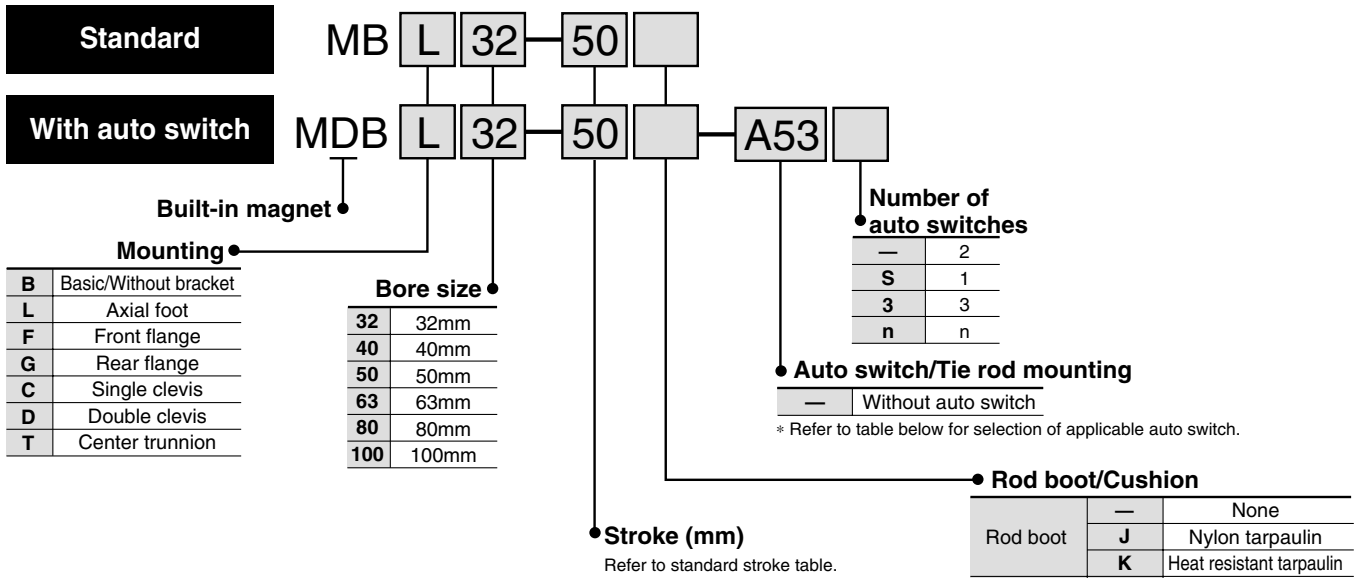
CS1

# Air Cylinder/Standard: Double Acting Single Rod

# Series MB

ø32, ø40, ø50, ø63, ø80, ø100

## How to Order



## Applicable Auto Switches/Tie Rod Mounting

\*Refer to p.5.3-2 for further information on auto switch.

Style	Special function	Electrical entry	Indicator	Wiring (Output)	Load voltage		Auto switch model	Lead wire length*(m)			Applicable load		
					DC	AC		0.5 (-)	3 (L)	5 (Z)			
Reed switch	—	Grommet	Yes	3 wire (Equiv. to NPN)	—	5V	—	A56	●	●	—	IC circuit	
						12V	—	A53	●	●	●	—	
				2 wire	24V	5V, 12V	—	A67	●	●	—	IC circuit	
						12V	≤ 200V	A64	●	●	—	IC circuit	
Diagnostic indication (2 colour)	—	—	—	—	—	—	A59W	●	●	—	—		
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	F59	●	●	○	IC circuit	
				3 wire (PNP)				F5P	●	●	○	—	
				2 wire	—	100V, 200V	J51	●	●	○	—		
				12V			J59	●	●	○	—		
				Diagnostic indication (2 colour)	—	5V, 12V	—	F59W	●	●	○	IC circuit	
								F5PW	●	●	○	—	
				Water resist (2 colour)	—	24V	12V	—	J59W	●	●	○	—
									F5BA	—	●	○	—
				With timer	—	5V, 12V	—	—	F5NT	—	●	○	IC circuit
									F59F	●	●	○	—
Diagnostic output (2 colour)	—	—	—	—	—	—	F5LF	●	●	○	—		
Latch diagnostic output (2 colour)	—	—	—	—	—	—	—	—	—	—	—		



Note 1) Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushions because the bumpers are attached to the both sides of the piston as follows.  
ø32, ø40: +6mm,  
ø50, ø63: +8mm,  
ø80, ø100: +10mm

\* Lead wire length 0.5m..... — (Example): A53  
3m..... L (Example): A53L  
5m..... Z (Example): A53Z

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

## Auto Switch Mounting Bracket Part No.

Bore size (mm)	32, 40	50, 63	80, 100
Mounting bracket	BT-03	BT-05	BT-06

A set of following stainless steel mounting screws is attached. (A mounting bracket itself is not attached. Please order it separately.)

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

\*"D-F5BA" switch is set on the cylinder with the screws above when shipped. When a switch only is shipped, "BBA1" screws are attached.

## Mounting Bracket Part No.

Bore size (mm)	32	40	50	63	80	100
Foot (1)	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) Two foot brackets required for one cylinder.

\* Accessories for each mounting bracket are as follows.

Foot, Flange, Single clevis: Mounting bolts

Double clevis: Clevis pin, Cotter pin

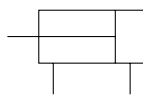
Refer to p.1.8-13 for details.

# Standard: Double Acting Single Rod *Series MB*

## Specifications



**JIS Symbol**  
Double acting



Bore size (mm)	32	40	50	63	80	100
Action	Double acting single rod					
Fluid	Air					
Proof pressure	1.5MPa					
Max. operating pressure	1.0MPa					
Min. operating pressure	0.05MPa					
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)					
Operating piston speed	50 to 1000mm/s					
Allowable stroke 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>(1)</sup>					
Thread tolerance	JIS class 2					
Port size	Rc(PT)1/8	Rc(PT)1/4	Rc(PT)1/4	Rc(PT)3/8	Rc(PT)3/8	Rc(PT)1/2
Mounting	Basic, Foot, Front flange, Rear flange, Single clevis, Double clevis, Center trunnion					

Note 1) When requesting a cylinder without air cushion, cylinder utilizes rubber bumpers which increases cylinders overall length.

## Standard Stroke

Bore (mm)	Standard stroke (mm)	Max. 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

Intermediate strokes are available.

## Accessories

Mounting		Basic	Foot	Front flange	Rear flange	Single clevis	Double clevis	Center trunnion
Standard	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●	●

## Material of Rod Boot

Symbol	Material	Max. ambient temp.
J	Nylon tarpaulin	60°C
K	Heat resistant tarpaulin	110°C*

\* Max. ambient temperature for rod boot itself.

## Minimum Cylinder Stroke for Mounting Auto Switches

Refer to p.1.8-14 for "Minimum Cylinder Stroke for Mounting Auto Switches".

**Order Made** Made to Order

Refer to p.5.4-1 for made to order products of series MB.

CJ1

CJP

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CM2

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**MB**

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CS1

# Series MB

## Theoretical Force

(Unit: N)  OUT IN

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

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

## Weight/Aluminum Tube

Bore size (mm)		32	40	50	63	80	100
Basic weight	Basic	0.50	0.69	1.19	1.47	2.73	3.70
	Foot	0.62	0.83	1.41	1.75	3.23	4.36
	Flange	0.79	1.06	1.64	2.26	4.18	7.01
	Single clevis	0.75	0.92	1.53	2.10	3.84	6.87
	Double clevis	0.76	0.96	1.62	2.26	4.13	7.39
	Trunnion	0.79	1.05	1.67	2.27	4.28	7.37
Additional weight per 50 stroke	All mounting bracket	0.11	0.16	0.26	0.27	0.42	0.56
Accessories	Single knuckle joint	0.15	0.23	0.26	0.26	0.60	0.83
	Double knuckle joint (with pin)	0.22	0.37	0.43	0.43	0.87	1.27
Square tube	Additional weight to the basic weight*	0.03	0.03	0.05	0.07	0.11	0.13
	Additional weight per 50 stroke	0.16	0.21	0.33	0.37	0.56	0.72

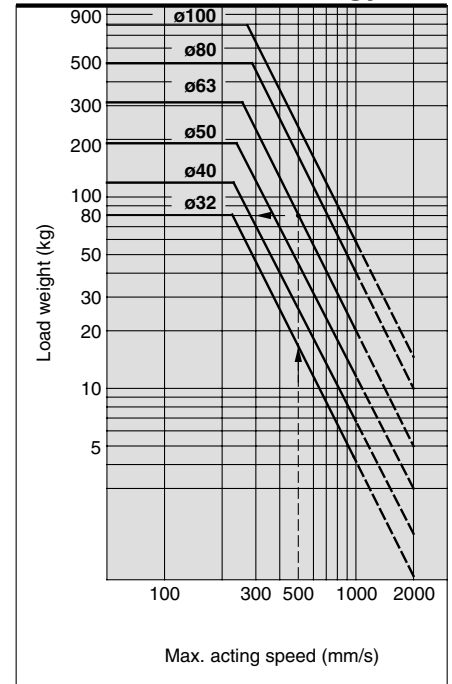
Calculation example: **MBB32-100** (Basic, ø32, 100st)

- Basic weight ..... 0.50 (Basic, ø32)
  - Additional weight ... 0.11/50 stroke
  - Cylinder stroke ..... 100 stroke
- 0.50+0.11X100/50=0.72kg

## Cushion Mechanism

Refer to p.5.6-5 for details of maximum kinetic energy absorption and air cushions.

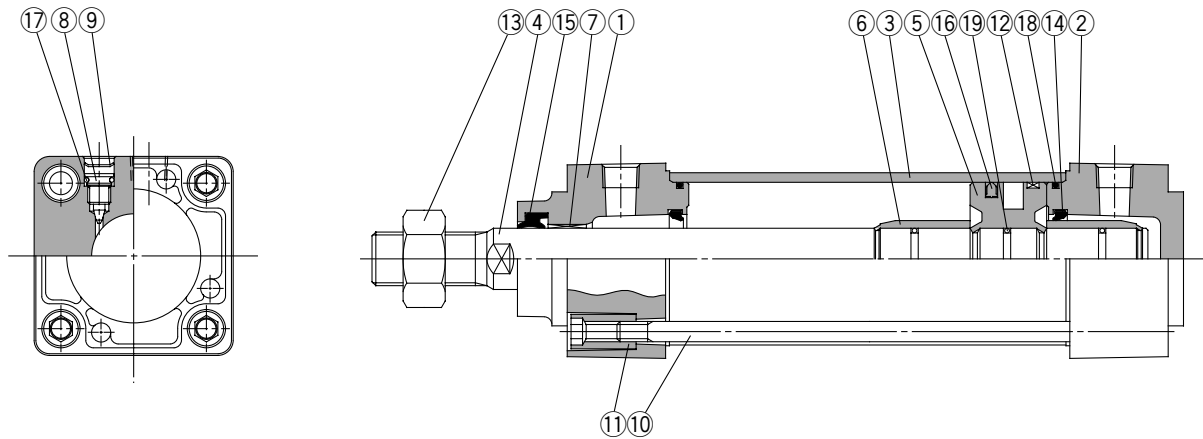
## Allowable Kinetic Energy



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



## Construction



CJ1

CJP

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CG1

**MB**

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### Component Parts

No.	Description	Material	Note
①	<b>Rod cover</b>	Aluminum die-cast	Metallic painted
②	<b>Head cover</b>	Aluminum die-cast	Metallic painted
③	<b>Cylinder tube</b>	Aluminum alloy	Hard anodized
④	<b>Piston rod</b>	Carbon steel	Hard chrome plated
⑤	<b>Piston</b>	Aluminum alloy	Chromated
⑥	<b>Cushion ring</b>	Brass	
⑦	<b>Bushing</b>	Lead bronze cast	
⑧	<b>Cushion ring</b>	Steel wire	Nickel plated
⑨	<b>Snap ring</b>	Steel for spring	ø40 to ø100
⑩	<b>Tie rod</b>	Carbon steel	Uni-chromated
⑪	<b>Tie rod nut</b>	Carbon steel	Nickel plated
⑫	<b>Wear ring</b>	Resin	
⑬	<b>Rod end nut</b>	Carbon steel	Nickel plated

No.	Description	Material	Note
⑭*	<b>Cushion seal</b>	Urethane	
⑮*	<b>Rod seal</b>	NBR	
⑯*	<b>Piston seal</b>	NBR	
⑰	<b>Cushion valve seal</b>	NBR	
⑱*	<b>Cylinder tube gasket</b>	NBR	
⑲	<b>Piston gasket</b>	NBR	

### Replacement Parts: Seal Kit

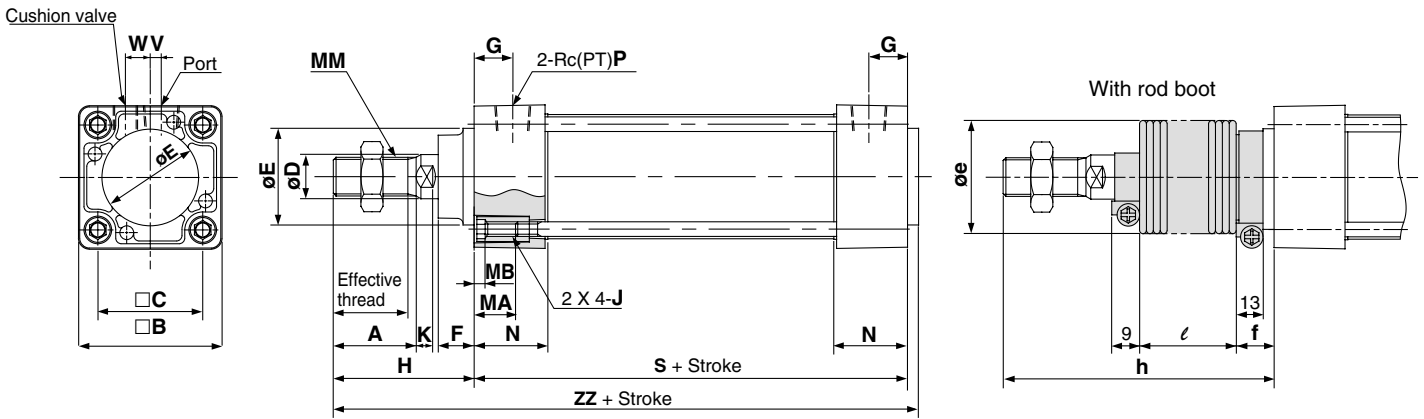
Bore size (mm)	Kit No.	Contents
32	MB32-PS	Set of the No. ⑭, ⑮, ⑯ and ⑱.
40	MB40-PS	
50	MB50-PS	
63	MB63-PS	
80	MB80-PS	
100	MB100-PS	

\* The seal kit includes 2 cushion seals, 1 rod seal, 1 piston seal and 2 tube gaskets.

# Series MB

## Without Mounting Bracket

### Basic/(B)



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

### 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

Bore size (mm)	Stroke range (mm)	Effective thread length	Width across flats	A	□B	□C	D	Ee11	F	G	H	MA	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	16	4	M6	6	M10 X 1.25	27	1/8	84	4	6.5	135
40	up to 500	27	14	30	52	38	16	35	13	14	51	16	4	M6	6	M14 X 1.5	27	1/4	84	4	9	139
50	up to 600	32	18	35	65	46.5	20	40	14	15.5	58	16	5	M8	7	M18 X 1.5	31.5	1/4	94	5	10.5	156
63	up to 600	32	18	35	75	56.5	20	45	14	16.5	58	16	5	M8	7	M18 X 1.5	31.5	3/8	94	9	12	156
80	up to 750	37	22	40	95	72	25	45	20	19	72	16	5	M10	10	M22 X 1.5	38	3/8	114	11.5	14	190
100	up to 750	37	26	40	114	89	30	55	20	19	72	16	5	M10	10	M26 X 1.5	38	1/2	114	17	15	190

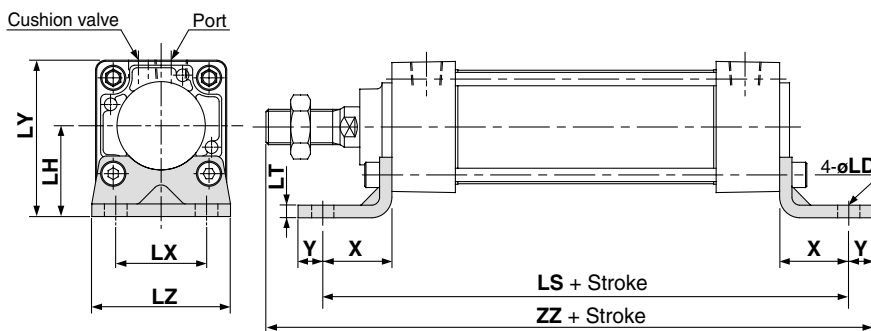
### With rod boot

Bore size (mm)	e	f	ℓ										h									
			1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	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

## With Mounting Bracket

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

### Foot/(L)



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

### Without air cushion

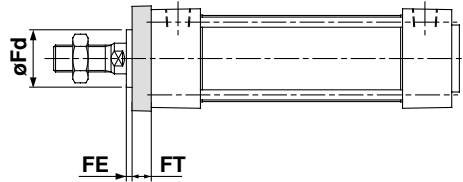
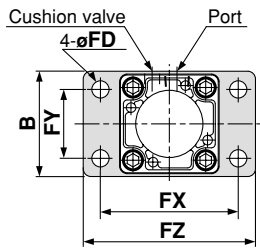
Bore size (mm)	LS	ZZ
32	134	168
40	138	176
50	156	198
63	156	201
80	184	240
100	188	244

### Foot

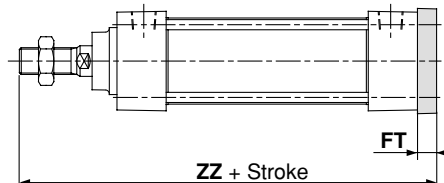
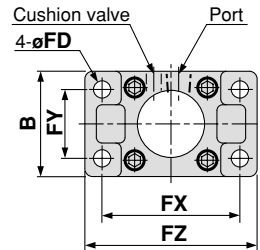
Bore size (mm)	Stroke range	X	Y	LD	LH	LS*	LT	LX	LY	LZ	ZZ*
32	700	22	9	7	30	128	3.2	32	53	50	162
40	800	24	11	9	33	132	3.2	38	59	55	170
50	1000	27	11	9	40	148	3.2	46	72.5	70	190
63	1000	27	14	12	45	148	3.6	56	82.5	80	193
80	1000	30	14	12	55	174	4.5	72	102.5	100	230
100	1000	32	16	14	65	178	4.5	89	122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

## With Mounting Bracket

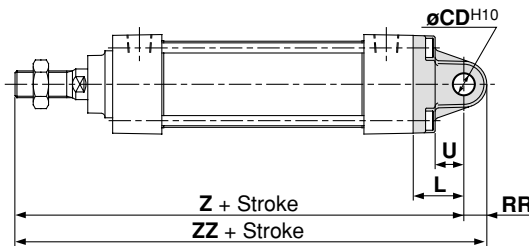
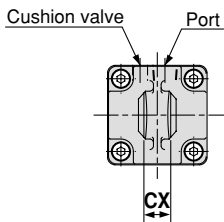
### Front flange/(F)



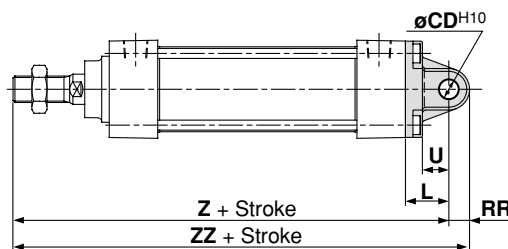
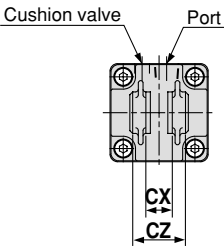
### Rear flange/(G)



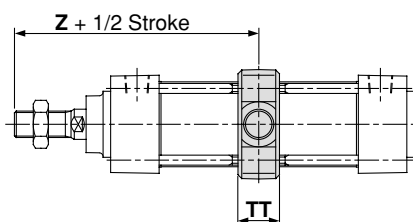
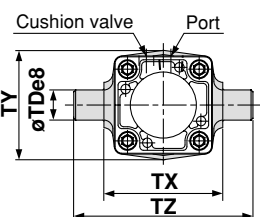
### Single clevis/(C)



### Double clevis/(D)



### Centre trunnion/(T)



### Front flange

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

### Rear flange

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 750	100	12	16	126	63	153	202
100	up to 750	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

Bore size (mm)	Stroke range	L	RR	U	CD <sup>H10</sup>	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 750	42	23	26	22	30	228	251
100	up to 750	42	23	26	22	30	228	251

\* Front/Rear flange, Single/Double clevis Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston;  $\phi 32, \phi 40$ : +6mm,  $\phi 50, \phi 63$ : +8mm,  $\phi 80, \phi 100$ : +10mm

### Without air cushion

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

### Double clevis

Bore size (mm)	Stroke range	L	RR	U	CD <sup>H10</sup>	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 750	42	23	26	22	30	60	228	251
100	up to 750	42	23	26	22	30	60	228	251

### \*\*Centre trunnion

\*\*Centre trunnion Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston;  $\phi 32, \phi 40$ : +3mm,  $\phi 50, \phi 63$ : +4mm,  $\phi 80, \phi 100$ : +5mm

### Without air cushion

Bore size (mm)	Z
32	92
40	96
50/63	109
80/100	134

### Centre trunnion

Bore size (mm)	Stroke range	TDe8	TT	TX	TY	TZ	Z**
32	up to 500	12	17	50	49	74	89
40	up to 500	16	22	63	58	95	93
50	up to 600	16	22	75	71	107	105
63	up to 600	20	28	90	87	130	105
80	up to 750	20	34	110	110	150	129
100	up to 750	25	40	132	136	182	129

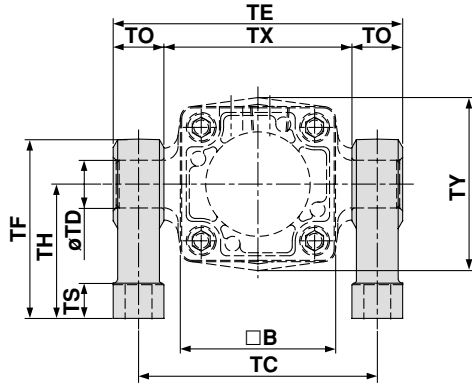
# Series MB

## Trunnion/Double Clevis Pivot Bracket

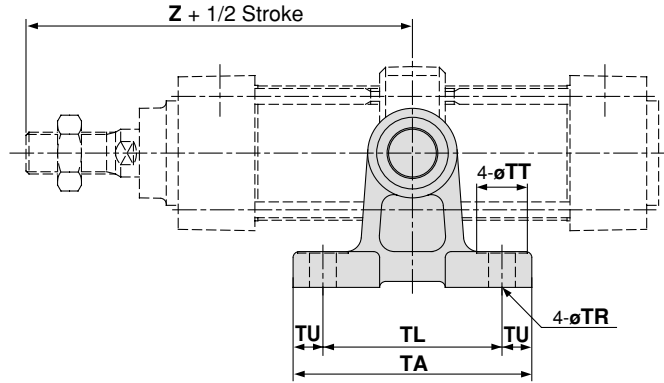
### Part No.

Cylinder model	MB□32	MB□40	MB□50	MB□63	MB□80	MB□100
Description						
Trunnion pivot bracket (1)	MB-S03	MB-S04		MB-S06		MB-S10
Double clevis pivot bracket	MB-B03		MB-B05		MB-B08	

Note 1) When ordering a trunnion pivot bracket, order 2 pcs. for 1 cylinder.



### Trunnion pivot bracket

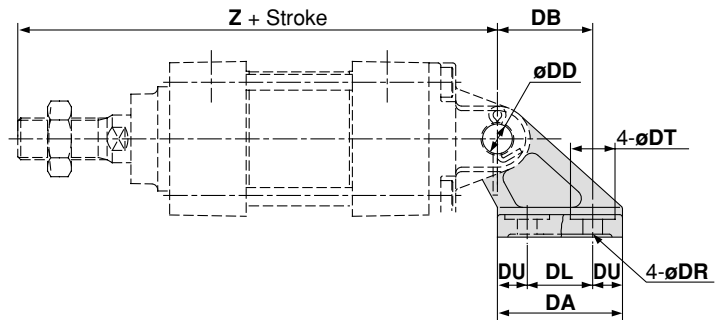
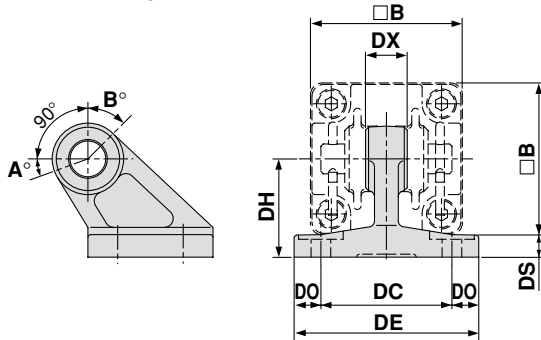


Part No.	Bore size (mm)	□B	TA	TL	TU	TC	TX	TE	TO	TR	TT	TS	TH	TF	Z**	TD <sub>H10</sub>
MB-S03	32	46	62	45	8.5	62	50	74	12	7	13	10	35	47	89	12 <sup>+0.070</sup> <sub>0</sub>
MB-S04	40	52	80	60	10	80	63	97	17	9	17	12	45	60	93	16 <sup>+0.070</sup> <sub>0</sub>
	50	65	80	60	10	92	75	109	17	9	17	12	45	60	105	16 <sup>+0.070</sup> <sub>0</sub>
MB-S06	63	75	100	70	15	110	90	130	20	11	22	14	60	80	105	20 <sup>+0.084</sup> <sub>0</sub>
	80	95	100	70	15	130	110	150	20	11	22	14	60	80	129	20 <sup>+0.084</sup> <sub>0</sub>
MB-S10	100	114	120	90	15	158	132	184	26	13.5	24	17	75	100	129	25 <sup>+0.084</sup> <sub>0</sub>

### Without air cushion

Bore size (mm)	Z
32	92
40	96
50	109
63	109
80	134
100	134

### Double clevis pivot bracket



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

### Without air cushion

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°

#### \* Mounting plate

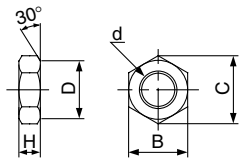
Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston; ø32, ø40: +6mm, ø50, ø63: +8mm, ø80, ø100: +10mm

#### \*\* Trunnion pivot bracket

Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston; ø32, ø40: +3mm, ø50, ø63: +4mm, ø80, ø100: +5mm

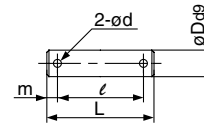
## Dimensions for Accessories

Rod end nut (Standard)



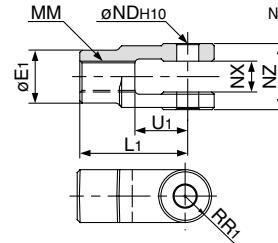
Part No.	Bore size (mm)	d	H	B	C	D
NT-03	32	M10 X 1.25	6	17	19.6	16.5
NT-04	40	M14 X 1.5	8	22	25.4	21
NT-05	50/63	M18 X 1.5	11	27	31.2	26
NT-08	80	M22 X 1.5	13	32	37.0	31
NT-10	100	M26 X 1.5	16	41	47.3	39

Knuckle joint pin Clevis pin



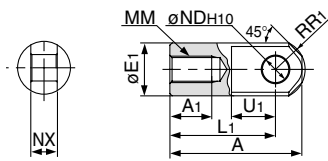
Part No.	Bore size (mm)		Dø9	L	l	m	d (Through hole diameter)	Applicable cotter pin (1)
	Clevis	Knuckle						
CD-M03	32/40	10	$10_{-0.040}^{+0.076}$	44	36	4	3	ø3 X 18 ℓ
CD-M05	50/63	14	$14_{-0.050}^{+0.093}$	60	51	4.5	4	ø4 X 25 ℓ
CD-M08	80/100	22	$22_{-0.065}^{+0.117}$	82	72	5	4	ø4 X 35 ℓ

Double knuckle joint



Note 1) When using cotter pin, flat washer is used together.

Single knuckle joint



Part No.	Bore size (mm)	A	A1	E1	L1	MM	R1	U1	NDH10	NX
I-03M	32	40	14	20	30	M10 X 1.25	12	16	$10_{-0}^{+0.058}$	$14_{-0.10}^{+0.30}$
I-04M	40	50	19	22	40	M14 X 1.5	12.5	19	$10_{-0}^{+0.058}$	$14_{-0.10}^{+0.30}$
I-05M	50/63	64	24	28	50	M18 X 1.5	16.5	24	$14_{-0}^{+0.070}$	$20_{-0.10}^{+0.30}$
I-08M	80	80	26	40	60	M22 X 1.5	23.5	34	$22_{-0}^{+0.084}$	$30_{-0.10}^{+0.30}$
I-10M	100	80	26	40	60	M26 X 1.5	23.5	34	$22_{-0}^{+0.084}$	$30_{-0.10}^{+0.30}$

Part No.	Bore size (mm)	E1	L1	MM	R1	U1	NDH10	NX	NZ
Y-03M	32	20	30	M10 X 1.25	10	16	$10_{-0}^{+0.058}$	$14_{-0.10}^{+0.30}$	$28_{-0.10}^{+0.30}$
Y-04M	40	22	40	M14 X 1.5	11	19	$10_{-0}^{+0.058}$	$14_{-0.10}^{+0.30}$	$28_{-0.10}^{+0.30}$
Y-05M	50/63	28	50	M18 X 1.5	14	24	$14_{-0}^{+0.070}$	$20_{-0.10}^{+0.30}$	$40_{-0.10}^{+0.30}$
Y-08M	80	40	65	M22 X 1.5	20	34	$22_{-0}^{+0.084}$	$30_{-0.10}^{+0.30}$	$60_{-0.10}^{+0.30}$
Y-10M	100	40	65	M26 X 1.5	20	34	$22_{-0}^{+0.084}$	$30_{-0.10}^{+0.30}$	$60_{-0.10}^{+0.30}$

Note) For a double clevis, a clevis pin (with a retaining ring) is equipped as standard.

## Combinations of Support Brackets

Available combinations ..... Refer to below picture together.

Bracket for cylinder	Single clevis	Double clevis	Single knuckle joint	Double knuckle joint	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 + Pivot bracket
⑤	Single knuckle joint + Double clevis	⑩	Double knuckle joint + Pivot bracket

- CJ1
- CJP
- CJ2
- CM2
- C85
- C76
- CG1
- MB**
- MB1
- CP95
- C95
- C92
- CA1
- CS1

# Series MDB

# Auto Switch Specifications



Refer to p.5.3-2 for details of the auto switch.

## Tie Rod Mounting



## Applicable Auto Switch

Style	Auto switch model	Electrical entry (Function)	Page
Reed	D-A5/A6I	Grommet	5.3-17
	D-A59W	Grommet (2 colour)	5.3-27
Solid state	D-F5I/J5I	Grommet	5.3-37
	D-F5IW/J59W	Grommet (2 colour)	5.3-46
	F5BAL	Grommet (2 colour, Water resistant)	5.3-58
	D-F5IF	Grommet (2 colour, diagnostic output)	5.3-54
	D-F5NTL	Grommet (Timer)	5.3-61

## ⚠ Precautions

Be sure to read before handling.  
Refer to p.0-44 to 0-46 for precautions on the auto switch.

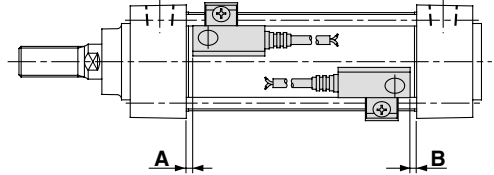
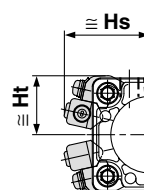
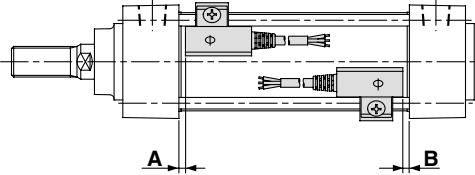
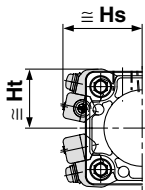
## Minimum Cylinder Stroke for Mounting Auto Switches (mm)

Style	Auto switch model	Number of auto switches	Support bracket except center trunnion					Center trunnion				
			ø32	ø40	ø50	ø63	ø80	ø100	ø32	ø40	ø50	ø63
Reed switch	D-A5, D-A6	2 pcs. (On different face or same face)	15					20				
		1 pc.	20					60				
Reed switch	D-A59W	2 pcs. (On different face or same face)	15					25				
		1 pc.	25					60				
Solid state switch	D-F5/ J5	2 pcs. (On different face or same face)	15					25				
		1 pc.	10					60				
	D-F5NTL	2 pcs. (On different face or same face)	15					25				
		1 pc.	10					70				
D-F5□W D-J59W D-F5BAL D-F5□F D-F5LF	2 pcs. (On different face or same face)	15					25					
	1 pc.	10					70					

## Auto Switch Mounting Position/Mounting Height

Reed switch

Solid state switch



## Auto Switch Mounting Position (mm)

Bore size (mm)	D-A5/D-A6		D-A59W		D-F5□ D-J5□		D-F5□W D-J59W D-F5BA		D-F5NTL	
	A	B	A	B	A	B	A	B	A	B
32	0.5	0	4.5	2	7	4.5	11	8.5	12	9.5
40	0.5	0	4.5	2	7	4.5	11	8.5	12	9.5
50	1	0	5	2.5	7.5	5	11.5	9	12.5	10
63	1	0	5	2.5	7.5	5	11.5	9	12.5	10
80	4	2.5	8	6.5	10.5	9	14.5	13	15.5	14
100	4	2.5	8	6.5	10.5	9	14.5	13	15.5	14

## Auto Switch Mounting Height (mm)

Bore size (mm)	D-A5 D-A6 D-A59W		D-F5, D-J5□ D-F5□W, D-J59W D-F5BAL, D-F5NTL	
	Ht	Hs	Ht	Hs
32	24.5	35	25	32.5
40	27.5	38.5	27.5	36.5
50	34.5	43.5	34	41
63	39.5	48.5	39	46
80	46.5	55	46.5	52.5
100	55	62	55	59.5

CJ1
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CJP
-----

CJ2
-----

CM2
-----

C85
-----

C76
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CG1
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<b>MB</b>
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MB1
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CP95
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C95
-----

C92
-----

CA1
-----

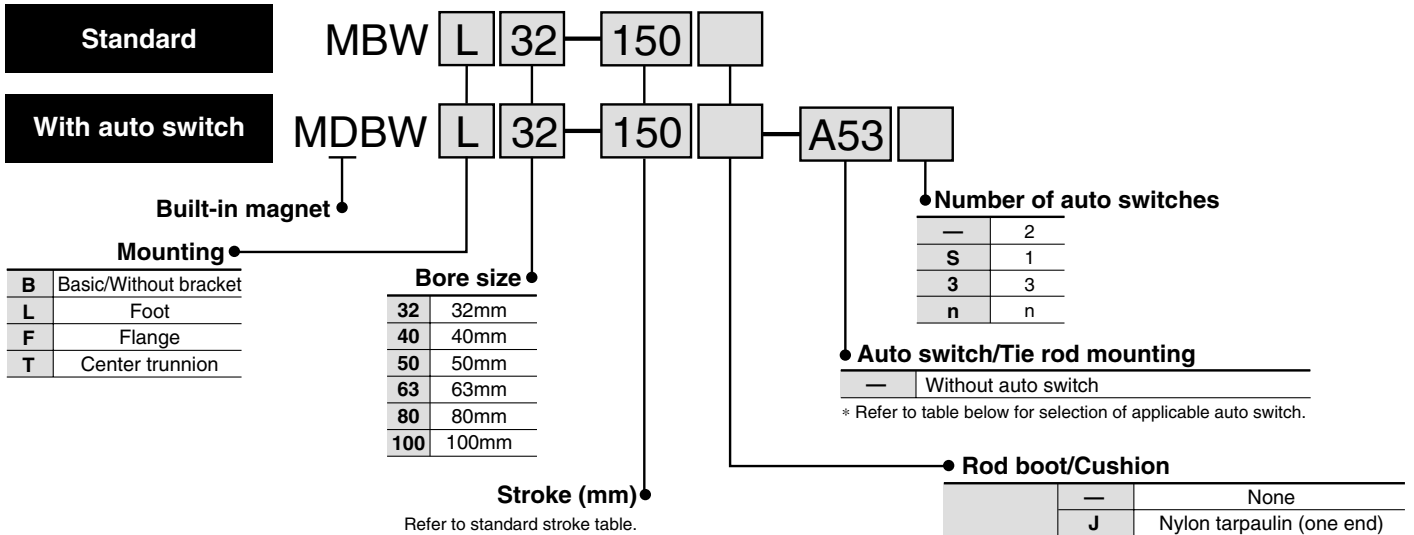
CS1
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# Air Cylinder/Standard: Double Acting Double Rod

# Series **MBW**

ø32, ø40, ø50, ø63, ø80, ø100

## How to Order



### Applicable Auto Switches/Tie Rod Mounting \*Refer to p.5.3-2 for further information on the auto switch.

Style	Special function	Electrical entry	Indicator	Wiring (Output)	Load voltage		Auto switch model	Lead wire* (m)			Applicable load				
					DC	AC		0.5 (-)	3 (L)	5 (Z)					
Reed switch	—	Grommet	Yes	3 wire (NPN) (Equiv. to NPN)	24V	5V	—	A56	●	●	—	IC circuit			
				2 wire	12V	—	A53	●	●	●	—	Relay PLC			
					12V	100V, 200V	A54	●	●	●	—				
					5V, 12V	—	A67	●	●	—	IC circuit				
Diagnostic indication (2 colour)	Yes	—	—	12V	≤ 200V	—	A64	●	●	—	—				
				—	—	A59W	●	●	—	—					
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	F59	●	●	○	IC circuit			
				3 wire (PNP)				F5P	●	●	○	—			
				Diagnostic indication (2 colour)	—	100V, 200V	2 wire	12V	J51	●	●	○	—		
								5V, 12V	J59	●	●	○	—		
				Water resistant (2 colour)	—	—	2 wire	12V	F59W	●	●	○	IC circuit		
									F5PW	●	●	○	—		
				With timer	—	—	3 wire (NPN)	24V	5V, 12V	—	J59W	●	●	○	—
											F5BA	—	●	○	—
				Diagnostic output (2 colour)	—	—	4 wire (NPN)	5V, 12V	—	—	F5NT	—	●	○	IC circuit
											F59F	●	●	○	—
Latch diagnostic output (2 colour)	—	—	—	—	—	—	F5LF	●	●	○	—				

Note1) Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushions because the bumpers are attached to the both sides of the piston as follows.  
 ø32, ø40: +6mm,  
 ø50, ø63: +8mm,  
 ø80, ø100: +10mm

\* Lead wire length 0.5m ..... — (Example): A53  
 3m ..... L (Example): A53L  
 5m ..... Z (Example): A53Z

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

### Auto Switch Mounting Bracket Part No.

Bore size (mm)	32, 40	50, 63	80, 100
Mounting bracket	BT-03	BT-05	BT-06

A set of following stainless steel mounting screws is attached. (A mounting bracket itself is not attached. Please order it separately.)  
 BBA1: D-A5/A6/F5/J5 types

\*"D-F5BA" switch is set on the cylinder with the screws above when shipped. When a switch only is shipped, "BBA1" screws are attached.

### Mounting Bracket Part No.

Bore size (mm)	32	40	50	63	80	100
Foot	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

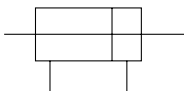
\* Two foot brackets required for one cylinder.



# Standard: Double Acting Double Rod *Series MBW*



**JIS Symbol**  
Double acting



**Order Made** Made to Order

Refer to p.5.4-1 for made to order products of series MBW.

## 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.

## Minimum Cylinder Stroke for Mounting Auto Switches

Refer to p.1.8-14 for "Minimum Cylinder Stroke for Mounting Auto Switches".

## Material of Rod Boot

Symbol	Material	Max. ambient temp.
J	Nylon tarpaulin	60°C
K	Heat resistant tarpaulin	110°C*

\* Max. ambient temperature for rod boot itself.

## Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting double rod					
Fluid	Air					
Proof pressure	1.5MPa					
Max. operating pressure	1.0MPa					
Min. operating pressure	0.05MPa					
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)					
Operating piston speed	50 to 1000mm/s					
Allowable stroke tolerance	up to 250: $^{+1.0}_0$ , 251 to 750: $^{+1.4}_0$					
Cushion (1)	Both ends (Air cushion) (1)					
Thread tolerance	JIS class 2					
Port size	Rc(PT)1/8	Rc(PT)1/4	Rc(PT)1/4	Rc(PT)3/8	Rc(PT)3/8	Rc(PT)1/2
Mounting	Basic, Foot, Flange, Centre trunnion					

Note 1) Absorbable kinetic energy by cushion mechanism is identical to double acting single rod.

When requesting a cylinder without air cushion, cylinder utilizes rubber bumpers which increases cylinder overall length.

## Accessories

Mounting		Basic	Foot	Flange	Centre trunnion
Standard	Rod end nut	●	●	●	●
Option	Single knuckle joint	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●
	Rod boot	●	●	●	●

## Theoretical Force

(Unit: N) OUT ← IN →

Bore (mm)	Rod dia. (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 force (N)=Pressure (MPa) X Piston area (mm<sup>2</sup>)

## Weight/Aluminum Tube

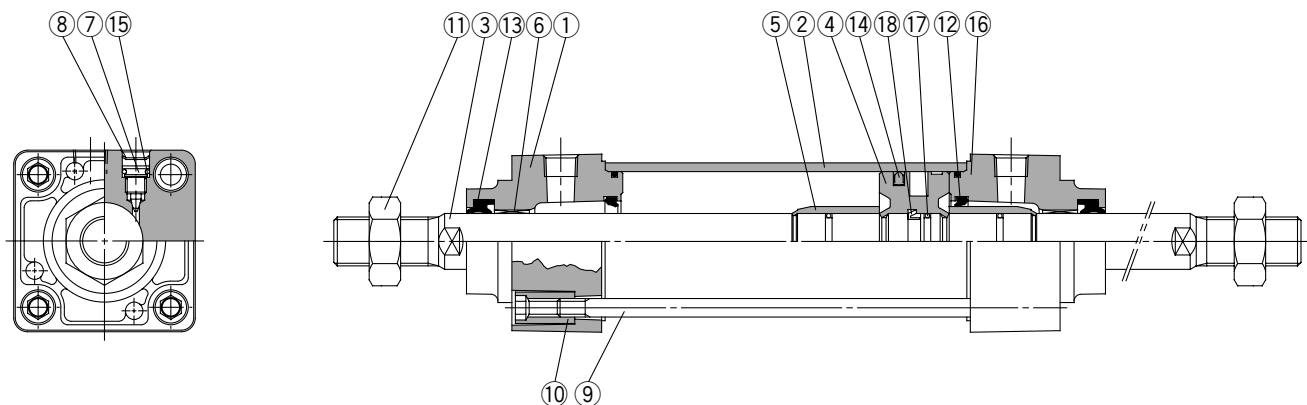
Bore size (mm)		32	40	50	63	80	100
Basic weight	Basic	0.56	0.79	1.34	1.65	3.11	4.14
	Foot	0.68	0.93	1.56	1.93	3.61	4.8
	Flange	0.85	1.16	1.79	2.44	4.56	7.45
	Trunnion	0.85	1.15	1.82	2.45	4.66	7.81
Additional weight per 50 stroke	All mounting bracket	0.15	0.24	0.34	0.35	0.61	0.84
Accessories	Single knuckle	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
Square tube	Additional weight to the basic weight*	0.03	0.03	0.05	0.07	0.11	0.13
	Additional weight per 50 stroke	0.20	0.29	0.41	0.45	0.75	1.0

Calculation example: **MBWB32-100** (Basic, ø32, 100st)

- Basic weight ..... 0.56 (Basic, ø32)
  - Additional weight .... 0.15/50 stroke
  - Cylinder stroke ..... 100 stroke
- 0.56+0.15X100/50=0.86kg

# Series MBW

## Construction



### Component Parts

No.	Description	Material	Note
①	<b>Rod cover</b>	Aluminum die cast	Metallic painted
②	<b>Cylinder tube</b>	Aluminum alloy	Hard anodized
③	<b>Piston rod</b>	Carbon steel	Hard chrome plated
④	<b>Piston</b>	Aluminum alloy	Chromated
⑤	<b>Cushion ring</b>	Resin	
⑥	<b>Bushing</b>	Lead bronze cast	
⑦	<b>Cushion valve</b>	Steel wire	Nickel plated
⑧	<b>Snap ring</b>	Steel for spring	ø40 to ø100
⑨	<b>Tie rod</b>	Carbon steel	Uni-chromated
⑩	<b>Tie rod nut</b>	Carbon steel	Nickel plated
⑪	<b>Rod end nut</b>	Carbon steel	Nickel plated

No.	Description	Material	Note
⑫*	<b>Cushion seal</b>	Urethane	
⑬*	<b>Rod seal</b>	NBR	
⑭*	<b>Piston seal</b>	NBR	
⑮	<b>Cushion valve seal</b>	NBR	
⑯*	<b>Cylinder tube gasket</b>	NBR	
⑰	<b>Piston gasket</b>	NBR	
⑱	<b>Piston retainer</b>	Urethane	

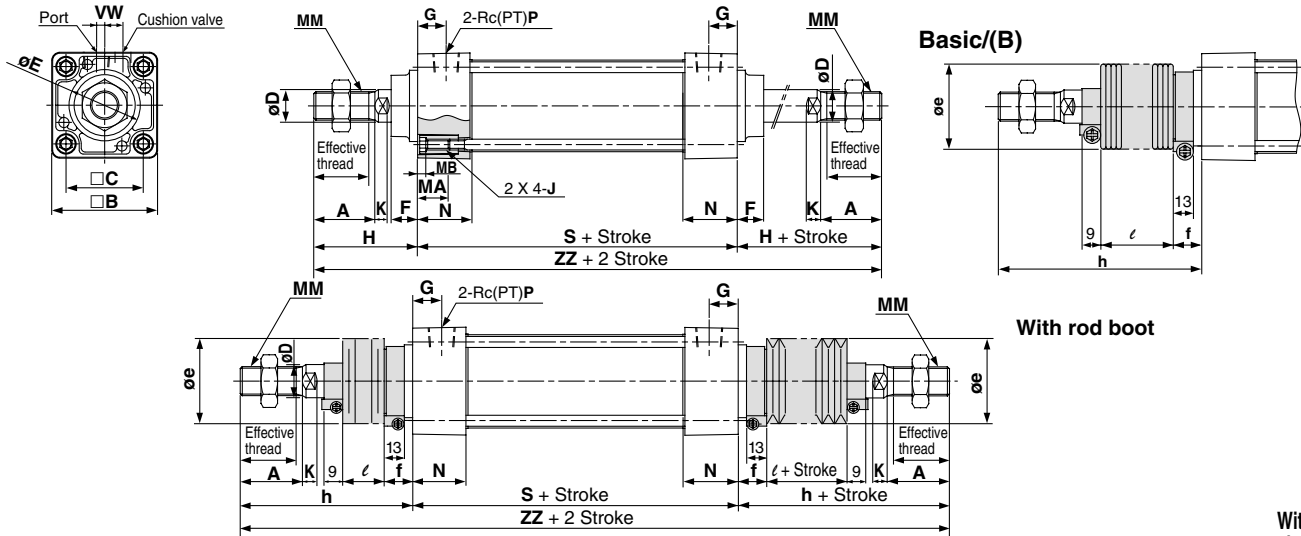
### Replacement Parts: Seal Kits

Bore size (mm)	Kit No.	Contents
32	MBW32-PS	Set of the No. ⑫, ⑬, ⑭ and ⑯.
40	MBW40-PS	
50	MBW50-PS	
63	MBW63-PS	
80	MBW80-PS	
100	MBW100-PS	

\* The seal kit includes 2 cushion seals, 1 rod seal, 1 piston seal, and 2 tube gaskets.

\* Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston;  
 ø32, ø40: +6mm, ø50, ø63: +8mm, ø80, ø100: +10mm  
 \*\* Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston;  
 ø32, ø40: +3mm, ø50, ø63: +4mm, ø80, ø100: +5mm

## With Mounting Bracket



Bore (mm)	Stroke range	Eff. thread length	Width across flats	A	B	C	D	Ee11	F	G	H	MA	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	16	4	M6	6	M10 X 1.25	27	1/8	84	4	6.5	178	90	184
40	up to 500	27	14	30	52	38	16	35	13	14	51	16	4	M6	6	M14 X 1.5	27	1/4	84	4	9	186	90	192
50	up to 600	32	18	35	65	46.5	20	40	14	15.5	58	16	5	M8	7	M18 X 1.5	31.5	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	16	5	M8	7	M18 X 1.5	31.5	3/8	94	9	12	210	102	218
80	up to 750	37	22	40	95	72	25	45	20	19	72	16	5	M10	10	M22 X 1.5	38	3/8	114	11.5	14	258	124	268
100	up to 750	37	26	40	114	89	30	55	20	19	72	16	5	M10	10	M26 X 1.5	38	1/2	114	17	15	258	124	268

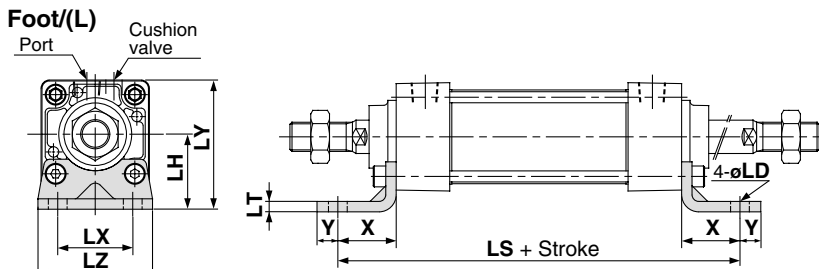
## With rod boot

Note) Dimension ZZ is with rod boot. (mm)

Bore (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	289	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	289	316	342	366	392	442	492	542	592	642	692																		

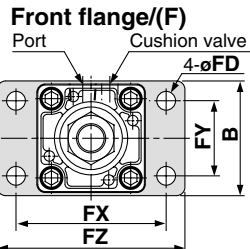
## With Mounting Bracket

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



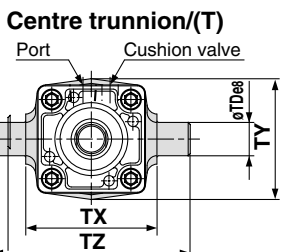
## Foot

Bore (mm)	Stroke range	Eff. 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 750	37	30	14	12	55	174	4.5	72	102.5	100
100	up to 750	37	32	16	14	65	178	4.5	89	122	120



## Front flange

Bore (mm)	Stroke range	Eff. 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 750	37	100	12	16	126	63	153	45.5
100	up to 750	37	120	14	16	150	75	178	54



## Centre trunnion

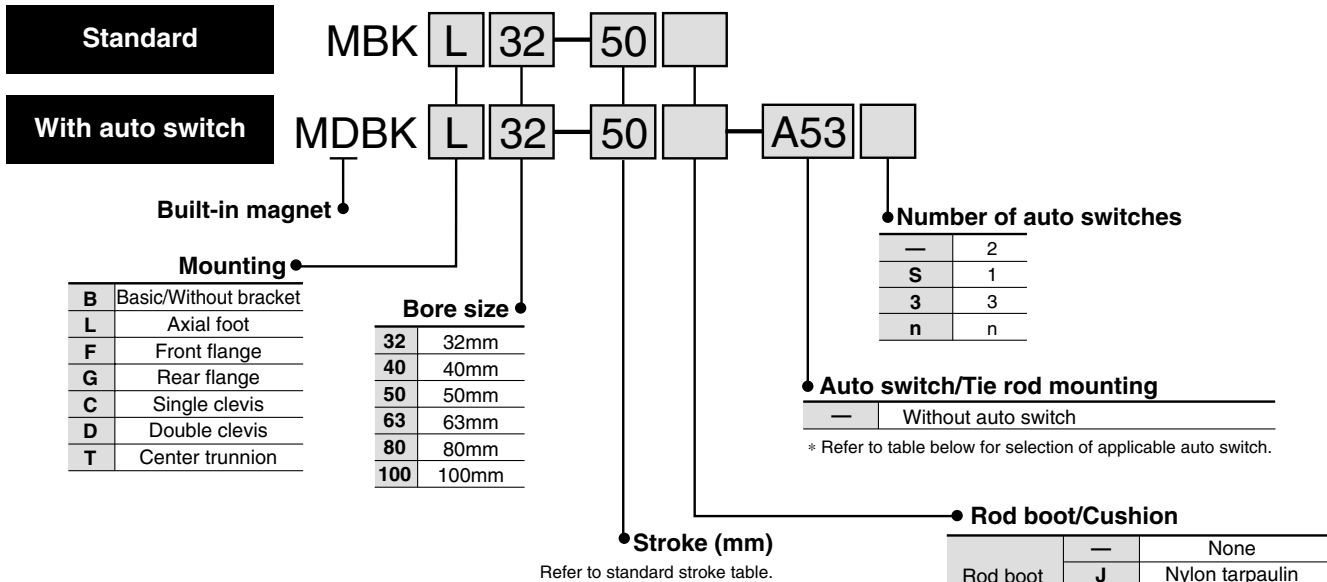
Bore (mm)	Stroke range	Eff. thread length	TDeø8	TT	TX	TY	TZ	Z**
32	up to 500	19.5	12	17	50	49	74	89
40	up to 500	27	16	22	63	58	95	93
50	up to 600	32	16	22	75	71	107	105
63	up to 600	32	20	28	90	87	130	105
80	up to 750	37	20	34	110	110	150	129
100	up to 750	37	25	40	132	136	182	129

# Air Cylinder/Non-rotating Rod: Double Acting Single Rod

# Series MBK

ø32, ø40, ø50, ø63, ø80, ø100

## How to Order



### Applicable Auto Switches/Tie Rod Mounting

\*Refer to p.5.3-2 for further information on the auto switch.

Style	Special function	Electrical entry	Indicator	Wiring (Output)	Load voltage		Auto switch model	Lead wire* (m)			Applicable load	
					DC	AC		0.5 (-)	3 (L)	5 (Z)		
Reed switch	—	Grommet	Yes	3 wire (Equiv. to NPN)	—	5V	—	A56	●	●	—	IC circuit
						12V	—	A53	●	●	●	—
						12V	100V, 200V	A54	●	●	●	—
						5V, 12V	—	A67	●	●	—	IC circuit
						12V	≤200V	A64	●	●	—	—
Diagnostic indication (2 colour)	—	—	—	—	—	—	A59W	●	●	—	—	
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	F59	●	●	○	IC circuit
								F5P	●	●	○	—
				3 wire (PNP)	—	100V, 200V	—	J51	●	●	○	—
								J59	●	●	○	—
				2 wire	24V	12V	—	F59W	●	●	○	IC circuit
								F5PW	●	●	○	—
				3 wire (NPN)	5V, 12V	—	—	J59W	●	●	○	—
								F5BA	—	●	○	—
				3 wire (PNP)	24V	12V	—	J59W	●	●	○	IC circuit
								F5PW	●	●	○	—
Water resistant (2 colour)	—	—	—	—	—	—	F5BA	—	●	○	—	
With timer	—	—	—	—	—	—	F5NT	—	●	○	IC circuit	
Diagnostic output (2 colour)	—	—	—	—	—	—	F59F	●	●	○	—	
Latch diagnostic output (2 colour)	—	—	—	—	—	—	F5LF	●	●	○	—	

Note 1) Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushions because the bumpers are attached to the both sides of the piston as follows.  
 ø32, ø40: +6mm,  
 ø50, ø63: +8mm  
 ø80, ø100: +10mm

\* Lead wire length 0.5m..... — (Example): A53  
 3m..... L (Example): A53L  
 5m..... Z (Example): A53Z

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

### Auto Switch Mounting Bracket Part No.

Bore size	30, 40	50, 63	80, 100
Mounting bracket	BT-03	BT-05	BT-06

A set of following stainless steel mounting screws is attached. (A mounting bracket itself is not attached. Please order it separately.)

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

\*"D-F5BA" switch is set on the cylinder with the screws above when shipped. When a switch only is shipped, "BBA1" screws are attached.

### 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) Two foot brackets required for one cylinder.

\* Accessories for each mounting bracket are as follows.

Foot, Flange, Single clevis: Mounting bolts

Double clevis: Clevis pin, Cotter pin

Refer to p.1.8-13 for details.

# Non-rotating Rod: Double Acting Single Rod *Series MBK*

## Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting single rod					
Fluid	Air					
Proof pressure	1.5MPa					
Max. operating pressure	1.0MPa					
Min. operating pressure	0.05MPa					
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)					
Operating piston speed	50 to 1000mm/s					
Allowable stroke tolerance	up to 250: $^{+1.0}_0$ , 251 to 1000: $^{+1.4}_0$ , 1001 to 1500: $^{+1.8}_0$					
Cushion (1)	Both ends (Air cushion)					
Thread tolerance	JIS class 2					
Port size	Rc(PT)1/8	Rc(PT)1/4	Rc(PT)1/4	Rc(PT)3/8	Rc(PT)3/8	Rc(PT)1/2
Mounting	Basic, Foot, Front flange, Rear flange, Single clevis, Double clevis, Centre trunnion					
Non-rotating accuracy	ø32, ø40					±0.5°
	ø50, ø63					±0.5°
	ø80, ø100					±0.3°
Allowable rotating torque Nm max.	ø32	0.25			ø80	0.79
	ø40	0.45			ø100	0.93
	ø50, ø63	0.64			—	—

Note 1) Absorbable kinetic energy by cushion mechanism is identical to double acting single rod.  
When requesting a cylinder without air cushion, cylinder utilizes rubber bumpers which increases cylinders overall length.

## Accessories

Mounting		Basic	Foot	Front flange	Rear flange	Single clevis	Double clevis	Centre trunnion
Standard	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●	●

## Weight/Aluminum Tube

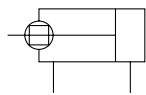
Bore size (mm)		32	40	50	63	80	100
Basic weight	Basic	0.50	0.66	1.21	1.51	2.58	3.73
	Foot	0.62	0.83	1.41	1.75	3.23	4.36
	Flange	0.79	1.03	1.64	2.30	4.03	7.04
	Single clevis	0.75	0.89	1.55	2.14	3.69	6.90
	Double clevis	0.76	0.93	1.64	2.30	3.98	7.42
	Trunnion	0.79	1.02	1.69	2.31	4.13	7.40
Additional weight per 50 stroke	All mounting bracket	0.11	0.15	0.26	0.27	0.40	0.52
Accessories	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
Square tube	Additional weight to the basic weight*	0.03	0.03	0.05	0.07	0.11	0.13
	Additional weight per 50 stroke	0.16	0.21	0.33	0.37	0.56	0.72

Calculation example: **MBKB32-100** (Basic, ø32, 100st)

- Basic weight ..... 0.50 (Basic ø32)
  - Additional weight ... 0.11/50 stroke
  - Cylinder stroke ..... 100 stroke
- 0.50+0.11X100/50=0.72kg



JIS Symbol  
Double acting



**Order Made** Made to Order

Refer to p.5.4-1 for made to order products of series MBK.

CJ1

CJP

CJ2

CM2

C85

C76

CG1

**MB**

MB1

CP95

C95

C92

CA1

CS1

# Series MBK

## Standard Stroke

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

Intermediate strokes are available.

## Minimum Cylinder Stroke for Mounting Auto Switches

Refer to p.1.8-14 for "Minimum Cylinder Stroke for Mounting Auto Switches".

## Material of Rod Boot

Symbol	Material	Max. ambient temp.
<b>J</b>	Nylon tarpaulin	60°C
<b>K</b>	Heat resistant tarpaulin	110°C*

\* Max. ambient temperature for rod boot itself.

## Theoretical Force

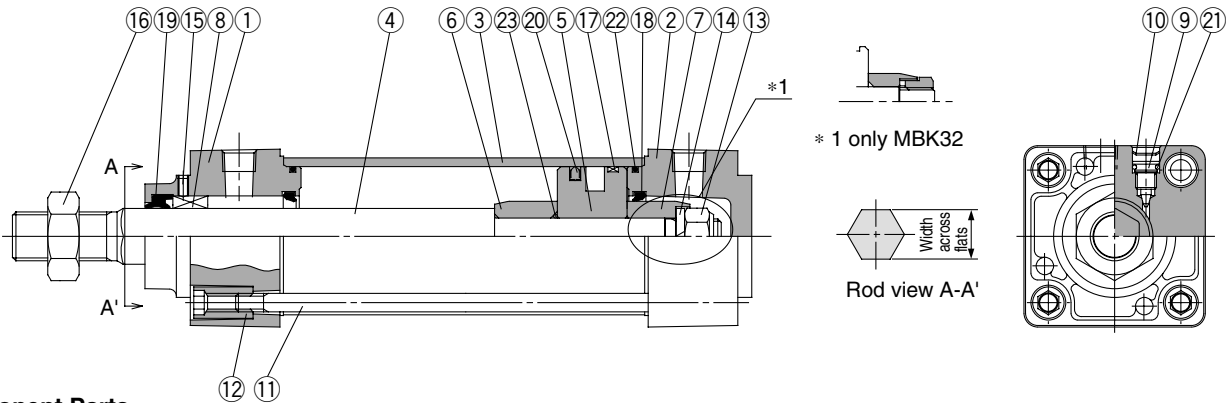
OUT side is identical to double acting single rod. Refer to table below for IN side.

Bore size (mm)	Rod diameter (mm <sup>2</sup> )	Bore size (mm)	Rod diameter (mm <sup>2</sup> )
<b>32</b>	675	<b>63</b>	2804
<b>40</b>	1082	<b>80</b>	4568
<b>50</b>	1651	<b>100</b>	7223

Theoretical force (N) =  
Pressure (MPa) X Piston area (mm<sup>2</sup>)

# Non-rotating Rod: Double Acting Single Rod *Series MBK*

## Construction



## Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum die-cast	Metallic painted
②	Head cover	Aluminum die-cast	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 bearing	Oil-impregnated sintered alloy	
⑨	Cushion valve	Steel wire	Nickel plated
⑩	Snap ring	Steel for spring	ø40 to ø100
⑪	Tie rod	Carbon steel	Uni-chromated
⑫	Tie rod nut	Carbon steel	Nickel plated

No.	Description	Material	Note
⑬	Piston nut	Rolled steel	
⑭	Washer	Steel wire	
⑮	Lock nut	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 Kits

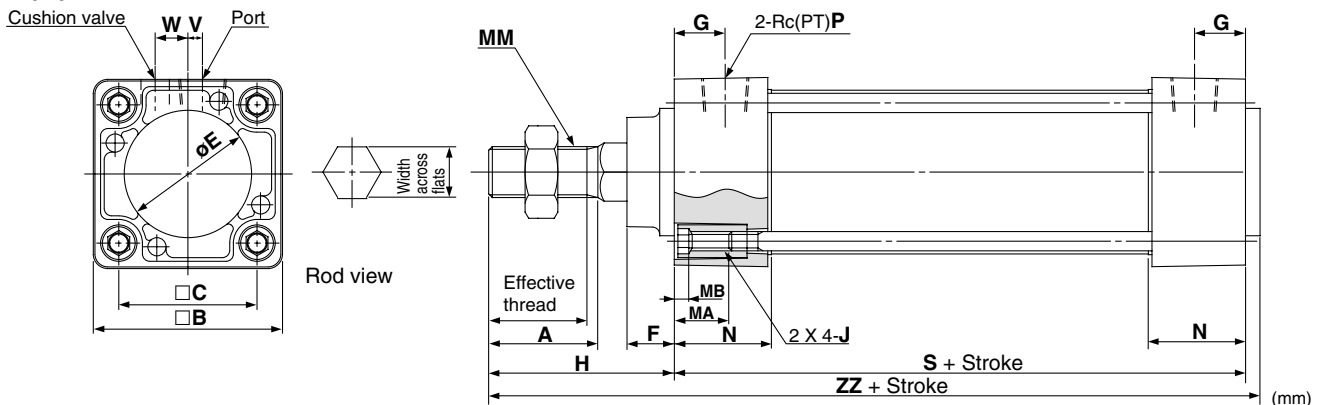
Bore size (mm)	Kit No.	Contents
32	MBK32-PS	Set of the No. ⑱, ⑲, ⑳ and ㉒.
40	MBK40-PS	
50	MBK50-PS	
63	MBK63-PS	
80	MBK80-PS	
100	MBK100-PS	

\* The seal kit includes 2 cushion seals, 1 rod seal, 1 piston seal, and 2 tube gaskets.

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

## Without Mounting Bracket

### Basic/(B)



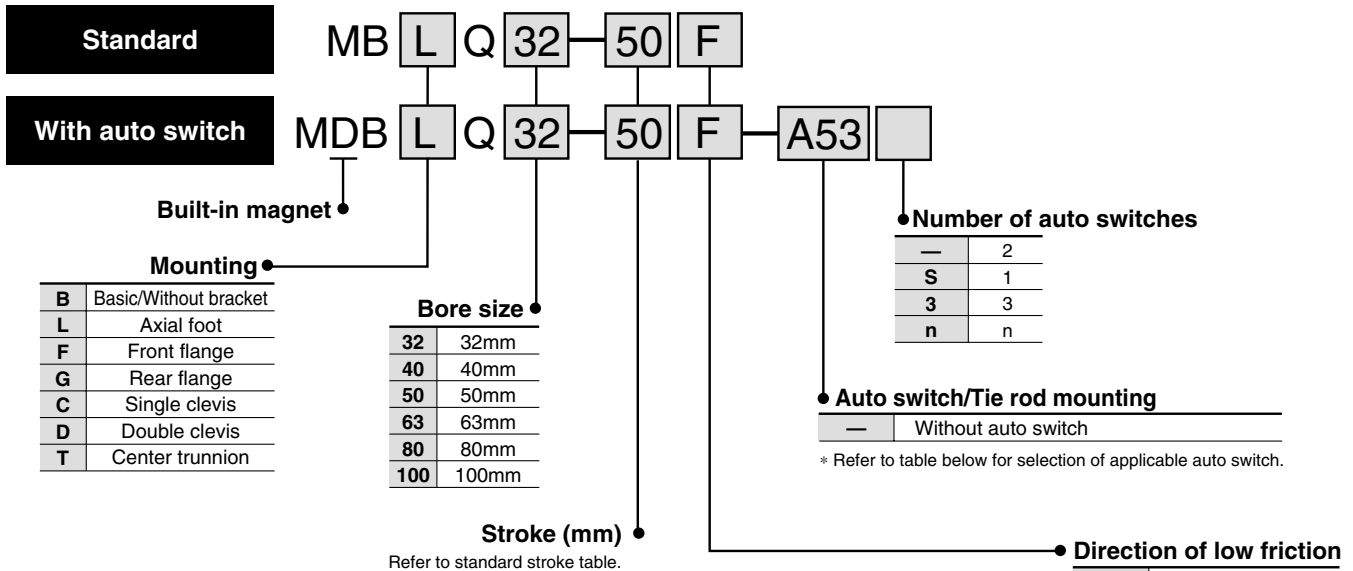
Bore (mm)	Stroke range	Effective thread length	Width across flats	A	□B	□C	E	F	G	H	MA	MB	J	MM	N	P	S*	V	W	ZZ*
32	up to 500	19.5	12.2	22	46	32.5	30	13	13	47	16	4	M6	M10 X 1.25	27	1/8	84	4	6.5	135
40	up to 500	27	14.2	30	52	38	35	13	14	51	16	4	M6	M14 X 1.5	27	1/4	84	4	9	139
50	up to 600	32	19	35	65	46.5	40	14	15.5	58	16	5	M8	M18 X 1.5	31.5	1/4	94	5	10.5	156
63	up to 600	32	19	35	75	56.5	45	14	16.5	58	16	5	M8	M18 X 1.5	31.5	3/8	94	9	12	156
80	up to 750	37	23	40	95	72	45	20	19	72	16	5	M10	M22 X 1.5	38	3/8	114	11.5	14	190
100	up to 750	37	27	40	114	89	55	20	19	72	16	5	M10	M26 X 1.5	38	1/2	114	17	15	190

Dimensions with mounting support is same as the basic style (Double acting single rod). Also dimensions with boot is same as the basic style (Double acting single rod).

# Air Cylinder/Low Friction Series MB□Q

ø32, ø40, ø50, ø63, ø80, ø100

## How to Order



### Applicable Auto Switches/Tie Rod Mounting

\*Refer to p.5.3-2 for further information on the auto switch.

Style	Special function	Electrical entry	Indicator	Wiring (Output)	Load voltage		Auto switch model	Lead wire*(m)			Applicable load	
					DC	AC		0.5 (-)	3 (L)	5 (Z)		
Reed switch	—	Grommet	Yes	3 wire (Equiv. to NPN)	—	5V	—	A56	●	●	—	IC circuit
				2 wire	12V	—	A53	●	●	●	—	
					12V	100V, 200V	A54	●	●	●	—	
					5V, 12V	—	A67	●	●	—	IC circuit	
					12V	≤ 200V	A64	●	●	—	—	
Diagnostic indication (2 colour)	Yes	—	—	A59W	●	●	—	—				
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	F59	●	●	○	IC circuit
				3 wire (PNP)	—	—	100V, 200V	F5P	●	●	○	—
				2 wire	12V	—	J51	●	●	○	—	
					12V	—	J59	●	●	○	—	
				Diagnostic indication (2 colour)	5V, 12V	—	F59W	●	●	○	IC circuit	
						—	F5PW	●	●	○	—	
				Water resistant (2 colour)	24V	12V	—	J59W	●	●	○	—
						—	F5BA	—	●	○	—	
				With timer	5V, 12V	—	F5NT	—	●	○	IC circuit	
						—	F59F	●	●	○	—	
Diagnostic output (2 colour)	—	—	—	F5LF	●	●	○	—				
Latch diagnostic output (2 colour)	—	—	—	—	—	—	—	—				

\* Lead wire length 0.5m ..... — (Example): A53  
3m ..... L (Example): A53L  
5m ..... Z (Example): A53Z

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

### Mounting Bracket Part No.

Bore size (mm)	32	40	50	63	80	100
<b>Foot</b> <sup>(1)</sup>	MB-L03	MB-L04	MB-L05	MB-L06	MB-L08	MB-L10
<b>Flange</b>	MB-F03	MB-F04	MB-F05	MB-F06	MB-F08	MB-F10
<b>Single clevis</b>	MB-C03	MB-C04	MB-C05	MB-C06	MB-C08	MB-C10
<b>Double clevis</b>	MB-D03	MB-D04	MB-D05	MB-D06	MB-D08	MB-D10

Note 1) Two foot brackets required for one cylinder.  
\* Accessories for each mounting bracket are as follows.  
Foot, Flange, Single clevis: Mounting bolts  
Double clevis: Clevis pin, Cotter pin  
Refer to p.1.8-13 for details.

### Auto Switch Mounting Bracket Part No.

Bore size (mm)	32, 40	50, 63	80, 100
Mounting bracket	BT-03	BT-05	BT-06

A set of following stainless steel mounting screws is attached. (A mounting bracket itself is not attached. Please order it separately.)  
BBA1: D-A5/A6/F5/J5 types  
\* "D-F5BAL" switch is set on the cylinder with the screws above when shipped.  
When a switch only is shipped, "BBA1" screws are attached.



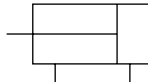


## Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting single rod					
Direction of low friction	One direction					
Fluid	Air					
Proof pressure	1.05MPa					
Max. operating pressure	0.7MPa					
Min. operating pressure	0.01MPa					
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)					
Cushion	None					
Thread tolerance	JIS class 2					
Port size	Rc(PT) <sup>1</sup> / <sub>8</sub>	Rc(PT) <sup>1</sup> / <sub>4</sub>	Rc(PT) <sup>1</sup> / <sub>4</sub>	Rc(PT) <sup>3</sup> / <sub>8</sub>	Rc(PT) <sup>3</sup> / <sub>8</sub>	Rc(PT) <sup>1</sup> / <sub>2</sub>
Mounting	Basic, Foot, Front flange, Rear flange, Single clevis, Double clevis, Centre trunnion					

### 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



### Made to Order

Refer to p.5.4-1 for made to order products of series MB□Q.

## Accessories

Mounting		Basic	Foot	Front flange	Rear flange	Single clevis	Double clevis	Centre trunnion
Standard	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●	●	●	●

## Minimum Cylinder Stroke for Mounting Auto Switches

Refer to p.1.8-14 "Minimum Cylinder Stroke for Mounting Auto Switches".

CJ1

CJP

CJ2

CM2

C85

C76

CG1

**MB**

MB1

CP95

C95

C92

CA1

CS1

# Series MB□Q

## Weight/Aluminum Tube

(kg)

Bore size (mm)		32	40	50	63	80	100
Basic weight	Basic	0.50	0.69	1.19	1.47	2.73	3.70
	Foot	0.68	0.93	1.56	1.93	3.61	4.8
	Flange	0.79	1.06	1.64	2.26	4.18	7.01
	Single clevis	0.75	0.92	1.53	2.1	3.84	6.87
	Double clevis	0.76	0.96	1.62	2.26	4.13	7.39
	Trunnion	0.79	1.05	1.67	2.27	4.28	7.37
Additional weight per 50 stroke	All mounting bracket	0.11	0.16	0.26	0.27	0.42	0.56
Accessories	Single rod clevis	0.15	0.23	0.26	0.26	0.60	0.83
	Double rod clevis (with pin)	0.22	0.37	0.43	0.43	0.87	1.27

Calculation example: **MBBQ32-100** (Basic, ø32, 100st)

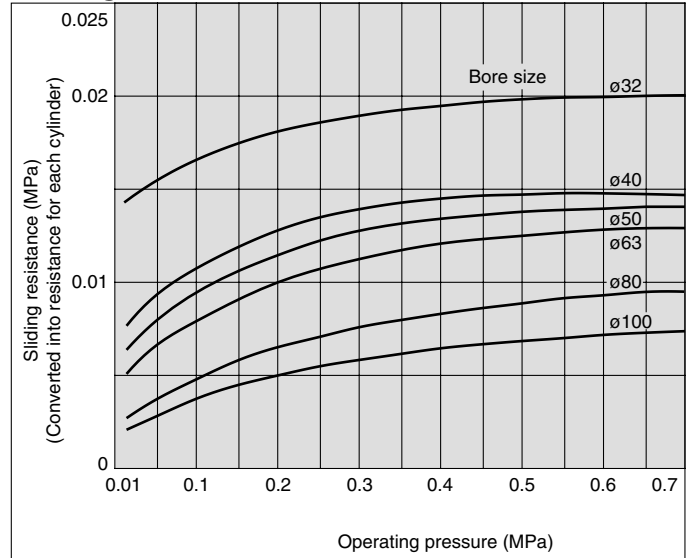
- Basic weight ..... 0.50 (Basic, ø32)
  - Additional weight ... 0.11/50 stroke
  - Cylinder stroke ..... 100 stroke
- $0.50 + 0.11 \times 100 / 50 = 0.72 \text{kg}$

## Selection Guide for the Low Friction Side

- ① When used as a balancer etc., follow the example of the application mentioned earlier applying pressure at one port while leaving the other port open to atmosphere.
  - With pressure at rod cover port ..... Low friction side B (Example of application ①)
  - With pressure at head cover port ..... Low friction side F (Example of application ②)

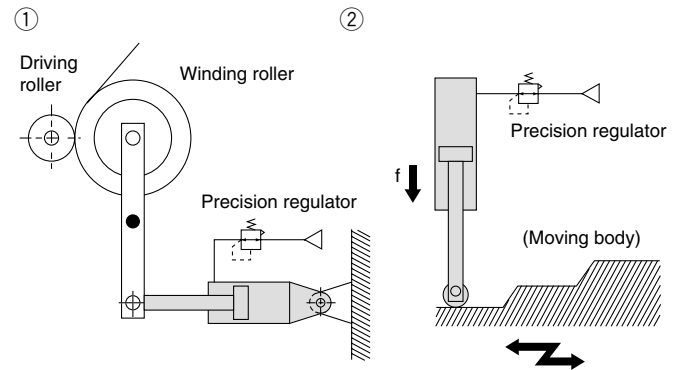
In both cases, as long as the outside pressure moves the piston rod, low friction can result in the direction of extension and retraction.
- ② When used applying pressure to both ports the same time, follow the above mentioned guide and as in the following.
  - With relatively higher pressure on rod cover port ..... Use Low friction side B
  - With relatively higher pressure on head cover port ..... Use Low friction side F

## Sliding Resistance on Low Friction Side

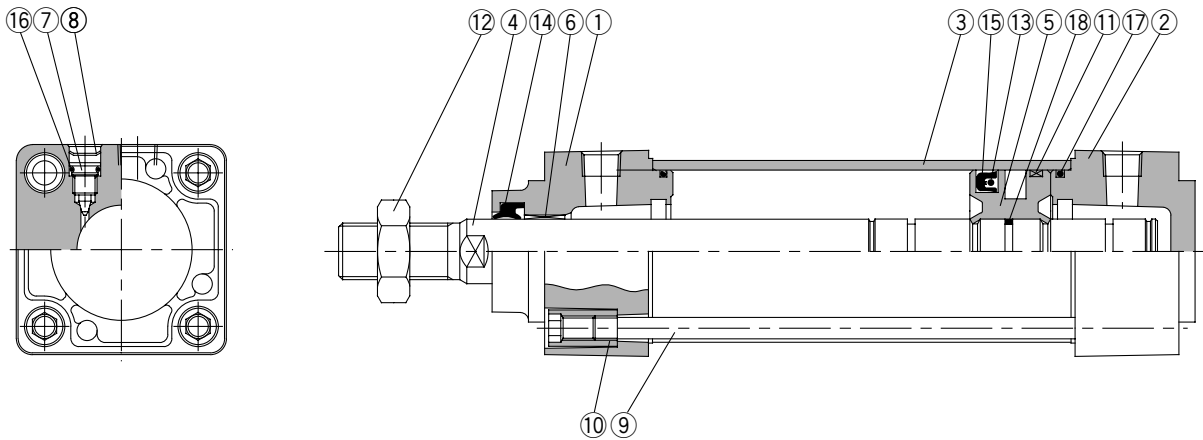


## Application Example

Low friction cylinder used in combination with precision regulator (Series IR)



**Construction**



- CJ1
- CJP
- CJ2
- CM2
- C85
- C76
- CG1
- MB**
- MB1
- CP95
- C95
- C92
- CA1
- CS1

**Component Parts**

No.	Description	Material	Note
①	<b>Rod cover</b>	Aluminum die-cast	Metallic painted
②	<b>Head cover</b>	Aluminum die-cast	Metallic painted
③	<b>Cylinder tube</b>	Aluminum alloy	Hard anodized
④	<b>Piston rod</b>	Carbon steel	Hard chrome plated
⑤	<b>Piston</b>	Aluminum alloy	Chromated
⑥	<b>Bushing</b>	Lead bronze cast	
⑦	<b>Cushion valve</b>	Steel wire	Nickel plated
⑧	<b>Snap ring</b>	Steel for spring	ø40 to ø100
⑨	<b>Tie rod</b>	Carbon steel	Uni-chromated
⑩	<b>Tie rod nut</b>	Carbon steel	Nickel plated
⑪	<b>Wear rod</b>	Resin	
⑫	<b>Rod end nut</b>	Carbon steel	Nickel plated
⑬ *	<b>Back up O ring</b>	NBR	
⑭ *	<b>Rod seal</b>	NBR	
⑮ *	<b>Piston seal</b>	NBR	
⑯	<b>Cushion valve seal</b>	NBR	
⑰ *	<b>Cylinder tube gasket</b>	NBR	
⑱	<b>Piston gasket</b>	NBR	

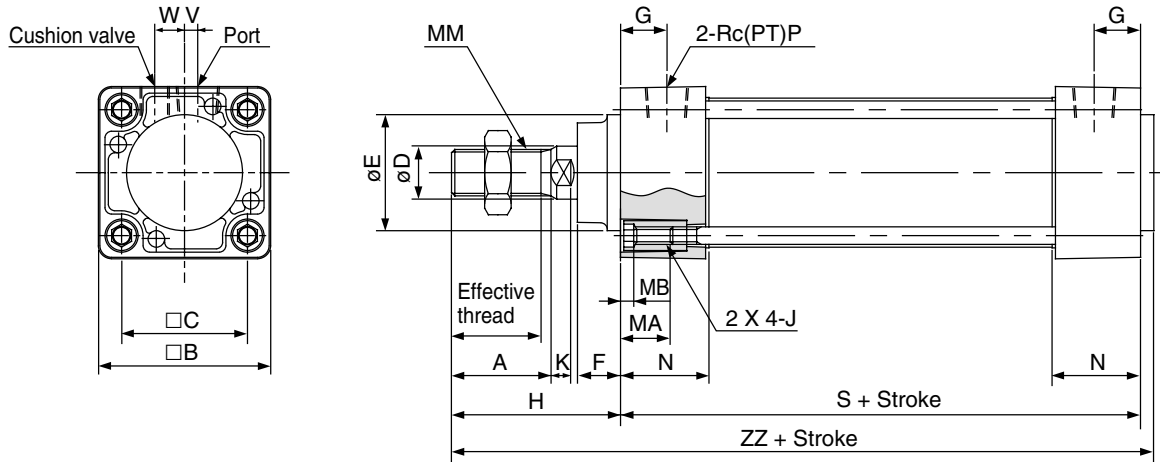
**Replacement Parts: Seal Kits**

Bore (mm)	Kit No.	Contents
32	MBQ32-PS	Set of the No. ⑬, ⑭, ⑮, and ⑰.
40	MBQ40-PS	
50	MBQ50-PS	
63	MBQ63-PS	
80	MBQ80-PS	
100	MBQ100-PS	

\* The seal kit includes 2 cushion seals, 1 rod seal, 1 piston seal, and 2 tube gaskets.

# Series MB□Q

## Basic/(B)

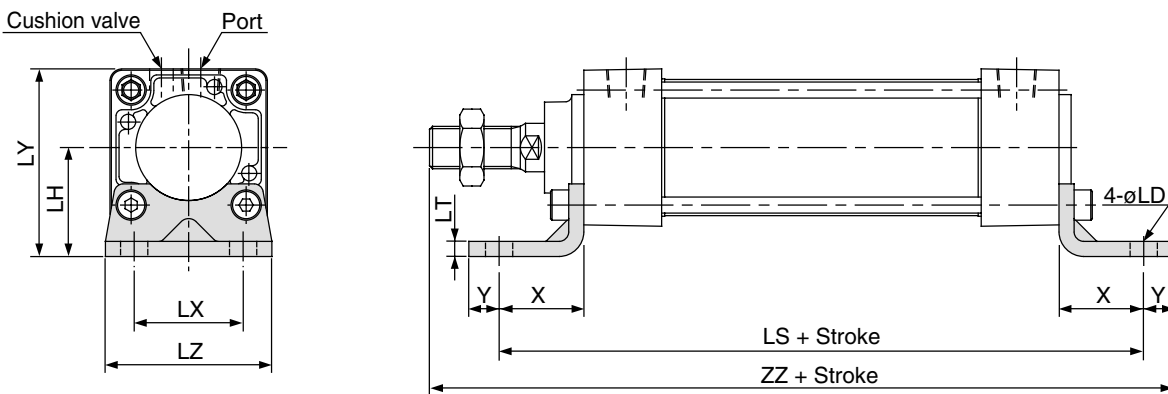


																					(mm)	
Bore (mm)	Stroke range	Effective thread length	Width across flats	A	□B	□C	D	Ee11	F	G	H	MA	MB	J	K	MM	N	P	S	V	W	ZZ
32	up to 500	19.5	10	22	46	32.5	12	30	13	13	47	16	4	M6	6	M10 X 1.25	27	1/8	84	4	6.5	135
40	up to 500	27	14	30	52	38	16	35	13	14	51	16	4	M6	6	M14 X 1.5	27	1/4	84	4	9	139
50	up to 600	32	18	35	65	46.5	20	40	14	15.5	58	16	5	M8	7	M18 X 1.5	31.5	1/4	94	5	10.5	156
63	up to 600	32	18	35	75	56.5	20	45	14	16.5	58	16	5	M8	7	M18 X 1.5	31.5	3/8	94	9	12	156
80	up to 750	37	22	40	95	72	25	45	20	19	72	16	5	M10	10	M22 X 1.5	38	3/8	114	11.5	14	190
100	up to 750	37	26	40	114	89	30	55	20	19	72	16	5	M10	10	M26 X 1.5	38	1/2	114	17	15	190

## With Mounting Bracket

\* Refer to basic mounting/(B) for other dimensions and with rod boot.

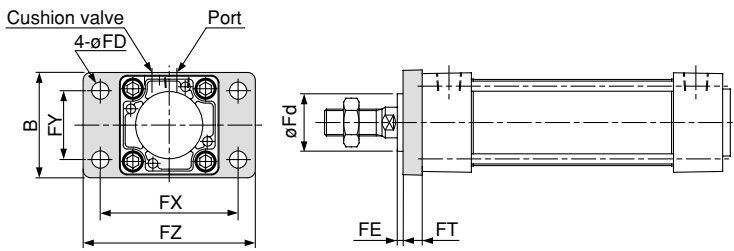
## Foot/(L)



													(mm)
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		

## With Mounting Bracket

### Front flange/(F)

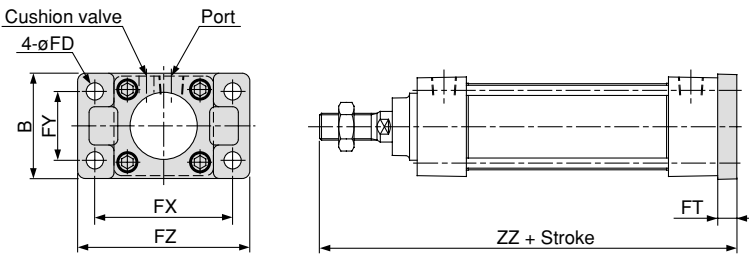


### Front flange

(mm)

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

### Rear flange/(G)

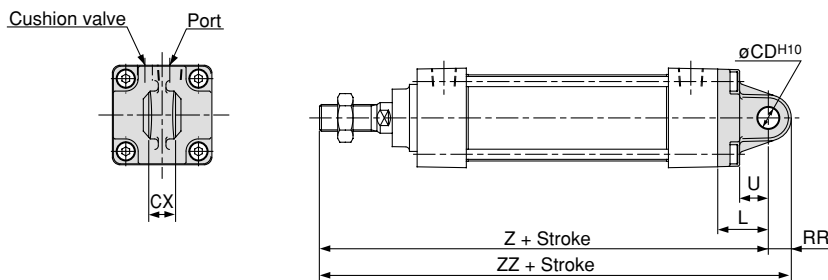


### Rear flange

(mm)

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 750	100	12	16	126	63	153	202
100	up to 750	120	14	16	150	75	178	202

### Single clevis/(C)

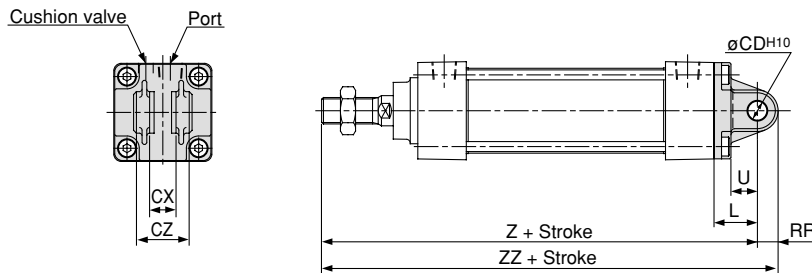


### Single clevis

(mm)

Bore size (mm)	Stroke range	L	RR	U	CD <sup>H10</sup>	CX <sup>-0.1</sup> <sub>-0.3</sub>	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 750	42	23	26	22	30	228	251
100	up to 750	42	23	26	22	30	228	251

### Double clevis/(D)

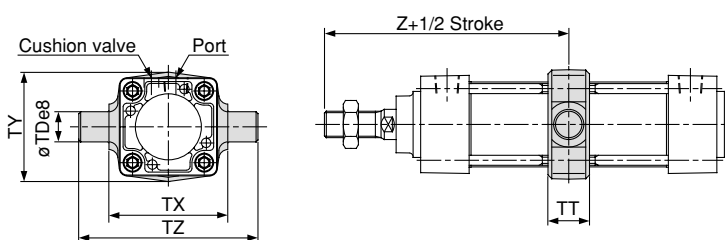


### Double clevis

(mm)

Bore size (mm)	Stroke range	L	RR	U	CD <sup>H10</sup>	CX <sup>+0.3</sup> <sub>-0.1</sub>	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 750	42	23	26	22	30	60	228	251
100	up to 750	42	23	26	22	30	60	228	251

### Centre trunnion/(T)



### Centre trunnion

(mm)

Bore size (mm)	Stroke range	TDe8	TT	TX	TY	TZ	Z
32	up to 500	12	17	50	49	74	89
40	up to 500	16	22	63	58	95	93
50	up to 600	16	22	75	71	107	105
63	up to 600	20	28	90	87	130	105
80	up to 750	20	34	110	110	150	129
100	up to 750	25	40	132	136	182	129

CJ1

CJP

CJ2

CM2

C85

C76

CG1

**MB**

MB1

CP95

C95

C92

CA1

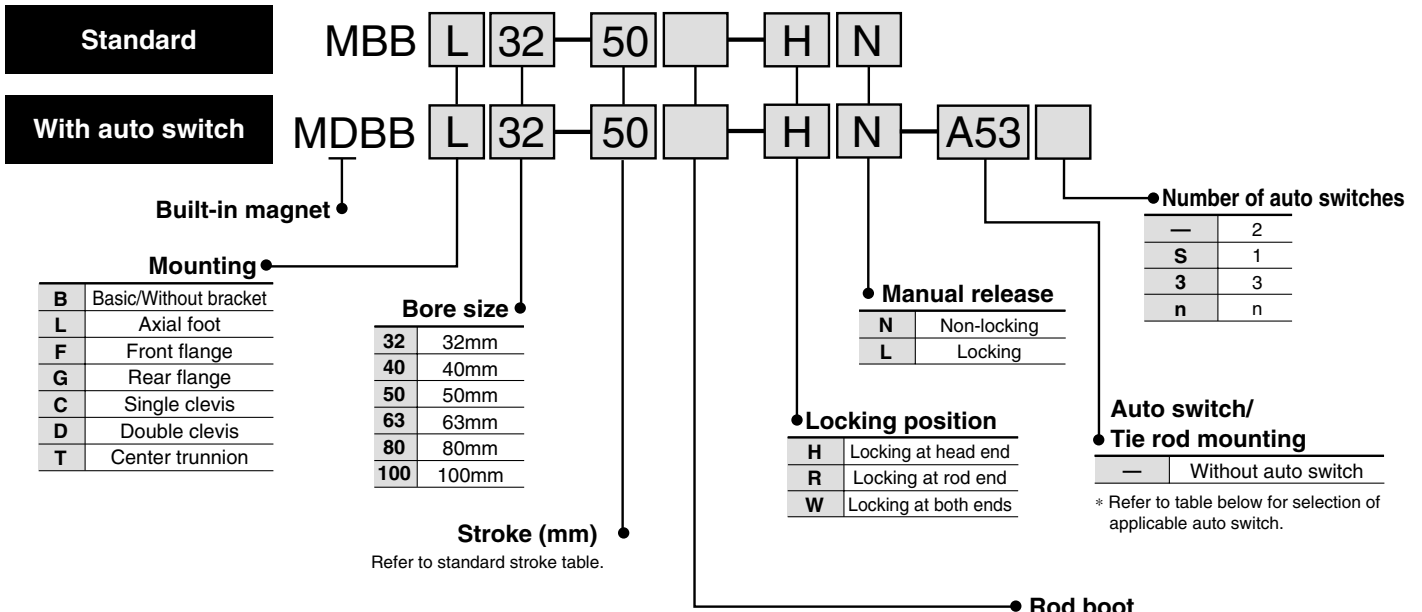
CS1

# Air Cylinder/End Lock

# Series *MBB*

ø32, ø40, ø50, ø63, ø80, ø100

## How to Order



### Applicable Auto Switches/Tie rod mounting

Style	Special function	Electrical entry	Indicator	Wiring (Output)	Load voltage		Auto switch model	Lead wire*(m)			Applicable load		
					DC	AC		0.5 (-)	3 (L)	5 (Z)			
Reed switch	—	Grommet	Yes	3 wire (Equiv. to NPN)	24V	5V	—	A56	●	●	—	IC circuit	
						12V	—	A53	●	●	●	—	
						12V	100V, 200V	A54	●	●	●	—	
						5V, 12V	—	A67	●	●	—	IC circuit	
						12V	≤ 200V	A64	●	●	—	—	
Diagnostic indication (2 colour)	—	—	—	—	—	—	A59W	●	●	—	—		
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	F59	●	●	○	IC circuit	
						3 wire (PNP)	—	F5P	●	●	○	—	
						2 wire	—	J51	●	●	○	—	
						12V	100V, 200V	J59	●	●	○	—	
						3 wire (NPN)	5V, 12V	F59W	●	●	○	IC circuit	
						3 wire (PNP)	—	F5PW	●	●	○	—	
						2 wire	24V	12V	J59W	●	●	○	—
						Water resistant (2 colour)	—	—	F5BA	—	●	○	—
						With timer	—	—	F5NT	—	●	○	IC circuit
						Diagnostic output (2 colour)	—	—	F59F	●	●	○	—
Latch diagnostic output (2 colour)	—	—	4 wire (NPN)	—	—	—	F5LF	●	●	○	—		

—	None
J	Nylon tarpaulin
K	Heat resistant tarpaulin

\* Lead wire length 0.5m ..... - (Example): A53  
3m ..... L (Example): A53L  
5m ..... Z (Example): A53Z  
\* Solid state switches marked with "○" are manufactured upon receipt of order.

### Mounting Bracket Part No.

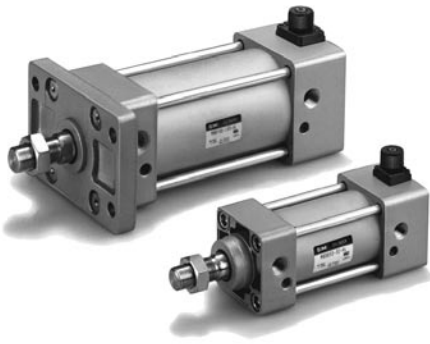
Bore size (mm)	32	40	50	63	80	100
<b>Foot</b> <sup>(1)</sup>	MB-L03	MB-L04	MB-L05	MB-L06	MB-L08	MB-L10
<b>Flange</b>	MB-F03	MB-F04	MB-F05	MB-F06	MB-F08	MB-F10
<b>Single clevis</b>	MB-C03	MB-C04	MB-C05	MB-C06	MB-C08	MB-C10
<b>Double clevis</b>	MB-D03	MB-D04	MB-D05	MB-D06	MB-D08	MB-D10

Note 1) Two foot brackets required for one cylinder.  
\* Accessories for each mounting bracket are as follows.  
Foot, Flange, Single clevis: Mounting bolts  
Double clevis: Clevis pin, Cotter pin  
Refer to p.1.8-13 for details.

### Auto Switch Mounting Bracket Part No.

Bore size (mm)	32, 40	50, 63	80, 100
Mounting bracket	BT-03	BT-05	BT-06

A set of following stainless steel mounting screws is attached. (A mounting bracket itself is not attached. Please order it separately.)  
BBA1: D-A5/A6/F5/J5 types  
\*D-F5BAL\* switch is set on the cylinder with the screws above when shipped.  
When a switch only is shipped, "BBA1" screws are attached.



## Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting single rod					
Fluid	Air					
Proof pressure	1.5MPa					
Max. operating pressure	1.0MPa					
Min. operating pressure	0.15MPa*					
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)					
Operating piston speed	50 to 1000mm/s					
Allowable stroke tolerance	up to 250: $^{+1.0}_0$ ; 251 to 1000: $^{+1.4}_0$ ; 1001 to 1500: $^{+1.8}_0$					
Cushion	Both ends (Air cushion)					
Thread tolerance	JIS class 2					
Port size	Rc(PT) $^{1/8}$	Rc(PT) $^{1/4}$	Rc(PT) $^{1/4}$	Rc(PT) $^{3/8}$	Rc(PT) $^{3/8}$	Rc(PT) $^{1/2}$
Mounting	Basic, Foot, Front flange, Rear flange, Single clevis, Double clevis, Centre trunnion					

\* 0.05MPa except locking parts.



## Made to Order

Refer to p.5.4-1 for made to order products of series MBB.

## Standard Stroke

Bore (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.

## Weight/Aluminum Tube

Bore size (mm)		32	40	50	63	80	100
Basic weight	Basic	0.50	0.69	1.19	1.47	2.73	3.70
	Foot	0.68	0.93	1.56	1.93	3.61	4.8
	Flange	0.79	1.06	1.64	2.26	4.18	7.01
	Single clevis	0.75	0.92	1.53	2.1	3.84	6.87
	Double clevis	0.76	0.96	1.62	2.26	4.13	7.39
	Trunnion	0.79	1.05	1.67	2.27	4.28	7.37
Additional weight per 50 stroke	All mounting bracket	0.11	0.16	0.26	0.27	0.42	0.56
	Single knuckle	0.15	0.23	0.26	0.26	0.60	0.83
Accessories	Double knuckle (with pin)	0.22	0.37	0.43	0.43	0.87	1.27

## Locking Specifications

Locking position	Head end, rod end, both ends					
Holding force (Max.)(N)	$\phi 32$	$\phi 40$	$\phi 50$	$\phi 63$	$\phi 80$	$\phi 100$
	550	860	1340	2140	3450	5390
Back lash	1.5mm or less					
Manual release	Non-locking style, locking style					

## Accessories

Mounting		Basic	Foot	Font flange	Rear flange	Single clevis	Double clevis	Centre trunnion
Standard	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
	Locking release bolt (N type only)	●	●	●	●	●	●	●
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●	●

## Additional Weight of Locking Part

Bore size (mm)		32	40	50	63	80	100
Manual release non-locking (N)	Locking at head end (H)	0.08	0.13	0.21	0.30	0.75	1.10
	Locking at rod end (R)	0.08	0.13	0.20	0.29	0.71	1.03
	Locking at both ends (W)	0.16	0.26	0.41	0.59	1.46	2.13
Manual release locking (L)	Locking at head end (H)	0.09	0.15	0.23	0.32	0.78	1.13
	Locking at rod end (R)	0.09	0.15	0.22	0.31	0.74	1.06
	Locking at both ends (W)	0.18	0.30	0.45	0.63	1.52	2.19

Calculation example: **MBBL32-100-HN**

- Basic weight ..... 0.74
  - Additional weight ..... 0.11/50 stroke
  - Cylinder stroke ..... 100 stroke
  - Locking weight ..... 0.08 (Locking at head end, manual release non-locking style)
- 0.74+0.11X100/50+0.08=1.04kg

CJ1

CJP

CJ2

CM2

C85

C76

CG1

MB

MB1

CP95

C95

C92

CA1

CS1

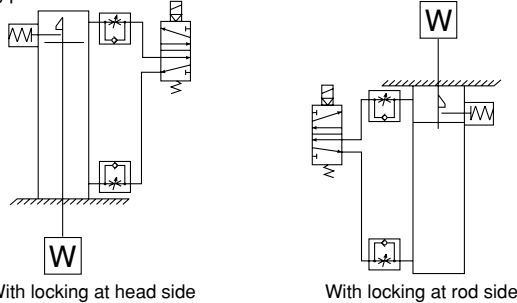
# Series MBB

## Cautions for Using

### 1. Use recommended pneumatic circuit

#### ⚠ Caution

For correct operation of the locking and release mechanism, please use the following pneumatic circuit.



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

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

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

Be sure air is supplied to side of cylinder without the locking mechanism, as above, prior to supplying air pressure to the side with end lock or lock may not be released. (Refer to "Release of lock".)

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

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

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

If cylinder is used at 50% load capacity or more, lock may be damaged.

#### ⑤ Do not use two cylinders in parallel at same time.

Avoid using 2 or more end lock cylinders at same time to perform a single task because binding may occur and one of the cylinders end lock may not release.

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

Meter-in control may not allow lock to release.

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

If cylinder piston does not reached end of stroke, end lock may not lock or release.

### 2. Operating pressure

#### ⚠ Caution

Use pressures over 0.15MPa at port with locking mechanism.

### 3. Exhaust speed

#### ⚠ Caution

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

### 4. Relationship with cushion

#### ⚠ Caution

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

### 5. Release of lock

#### ⚠ Warning

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

### 6. Manual release

#### ⚠ Caution

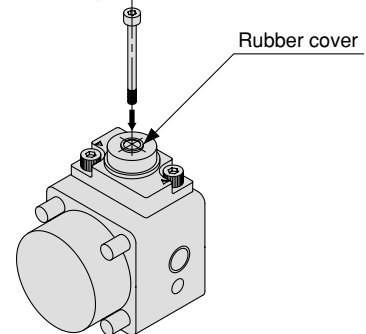
##### Non-locking style

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

Bore size (mm)	Thread size	Pulling force	Stroke (mm)
32	≥ M2.5 X 0.45 X 25 ℓ	4.9N	2
40, 50, 63	≥ M3 X 0.5 X 30 ℓ	10N	3
80, 100	≥ M5 X 0.8 X 40 ℓ	24.5N	3

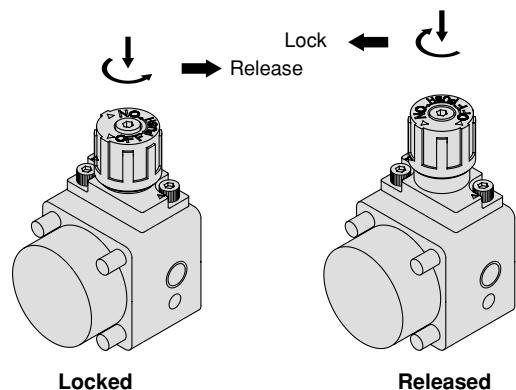
\* Remove bolt under normal operations.

It may cause malfunction of locking and release.



#### Locking style

Turn 90° to counterclockwise pushing M/O button. Lock is released when ▲ on cap and ▼ OFF mark on M/O button correspond. (Lock remains released.) When locking is desired, turn M/O button clockwise 90° while pushing fully, correspond ▲ on cap and ▼ ON mark on M/O button. The correct position is confirmed by click sound "click". If not confirmed, locking is not done.

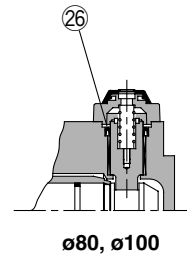
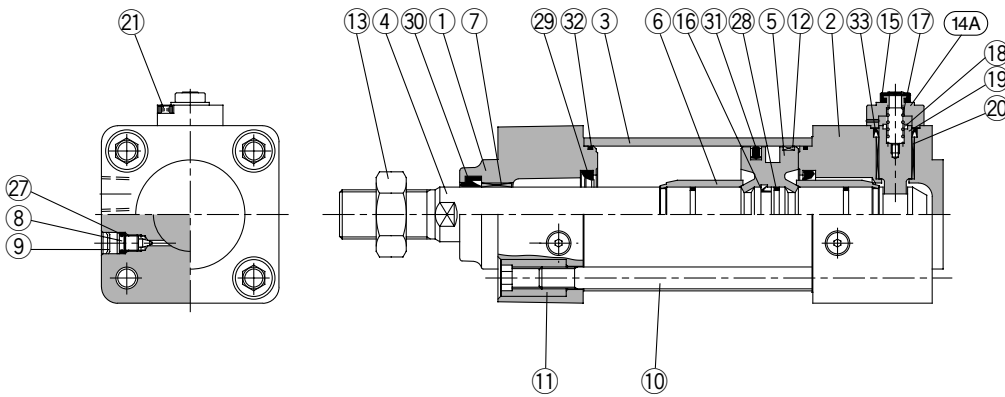




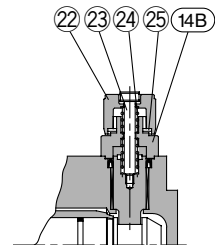
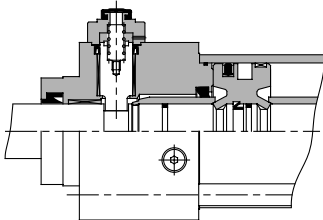
## Construction

### Locking at head end

Manual release non-locking style: N



### Locking at rod end



Manual release non-locking style: L

### Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Metallic painted
②	Head cover	Aluminum alloy	Metallic painted
③	Cylinder tube	Aluminum alloy	Hard anodized
④	Piston rod	Carbon steel	Hard chrome plated
⑤	Piston	Aluminum alloy	Chromated
⑥	Cushion ring	Brass	
⑦	Bushing	Lead bronze casting	
⑧	Cushion valve	Steel wire	Nickel plated
⑨	Snap ring	Steel for spring	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
⑭A	Cover A	Aluminum alloy	Painted black
⑭B	Cover B	Carbon steel	Tufftride
⑮	Rubber cover	Synthetic rubber	
⑯	Piston holder	Urethane	

### Component Parts

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

### Replacement Part: Seal Kits

Bore size (mm)	Kit No.	Contents
32	MBB32-PS	Set of the No. ㉙, ㉚, ㉛, ㉜ and ㉝.
40	MBB40-PS	
50	MBB50-PS	
63	MBB63-PS	
80	MBB80-PS	
100	MBB100-PS	

\* The seal kit includes 2 cushion seals, 1 rod seal, 1 piston seal, and 2 tube gaskets.

CJ1

CJP

CJ2

CM2

C85

C76

CG1

**MB**

MB1

CP95

C95

C92

CA1

CS1

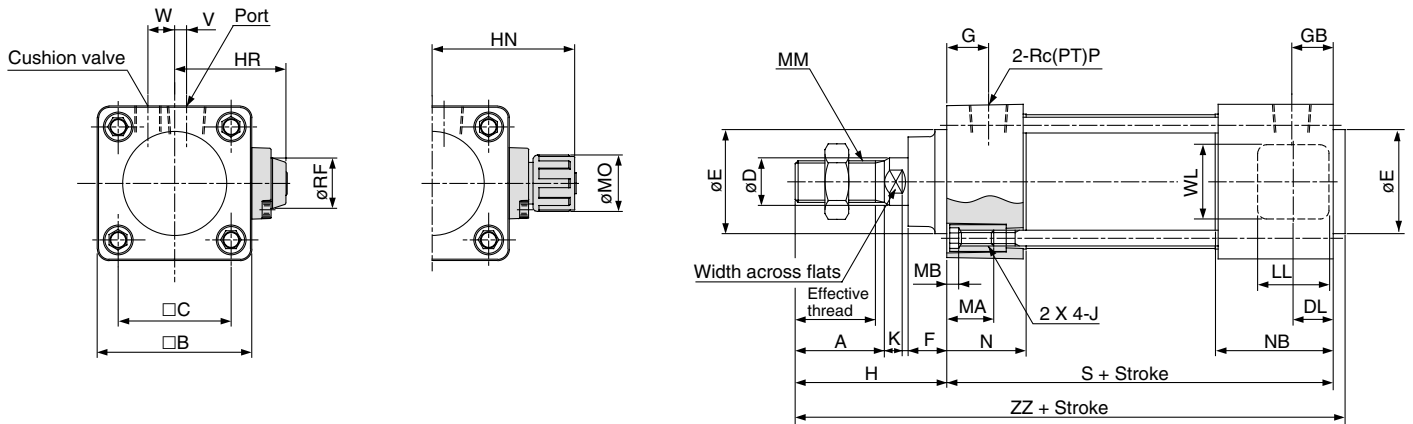
# Series MBB

## Basic/(B)

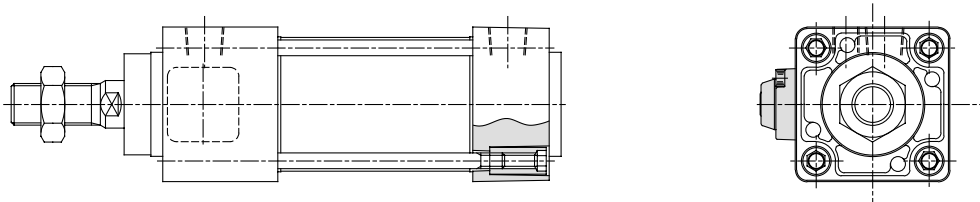
Locking at head end : MBB  Bore size —  Stroke — H

Manual release non-locking style: N

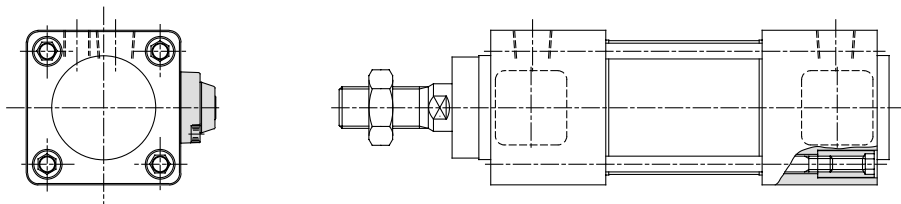
Manual release locking style: L



Locking at rod end: MBBB  Bore size —  Stroke — R



Locking at both ends: MBBB  Bore size —  Stroke — W



-H/-R

(mm)

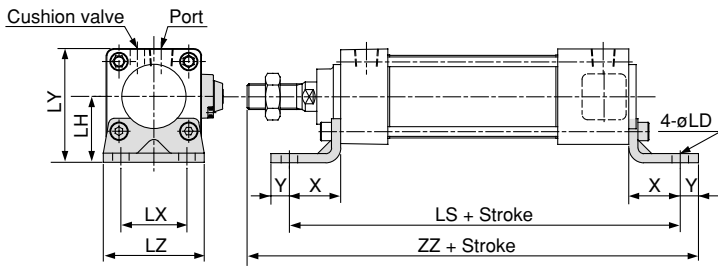
Bore size (mm)	Stroke range (mm)	Effective thread length	Width across flats	A	□B	□C	D	DL	E	F	G	GB	H	HR	HN	J	K	LL	MA	MB	MM
32	up to 500	19.5	10	22	46	32.5	12	9	30	13	13	21	47	33.5	45	M6	6	15	16	4	M10 X 1.25
40	up to 500	27	14	30	52	38	16	12	35	13	14	27	51	38.5	52.5	M6	6	21	16	4	M14 X 1.5
50	up to 600	32	18	35	65	46.5	20	13	40	14	15.5	27.5	58	45	59	M8	7	21	16	5	M18 X 1.5
63	up to 600	32	18	35	75	56.5	20	13	45	14	16.5	28.5	58	50	64	M8	7	21	16	5	M18 X 1.5
80	up to 750	37	22	40	95	72	25	16	45	20	19	37	72	62	76.5	M10	10	30	16	5	M22 X 1.5
100	up to 750	37	26	40	114	89	30	16	55	20	19	37	72	71.5	86	M10	10	30	16	5	M26 X 1.5

-W

Bore size (mm)	Stroke range (mm)	MO	N	NB	P	RF	S	V	W	WL	ZZ	S	ZZ
32	up to 500	19	27	35	1/8	11	92	4	6.5	24	143	100	151
40	up to 500	19	27	40	1/4	11	97	4	9	24	152	110	165
50	up to 600	19	31.5	43.5	1/4	11	106	5	10.5	24	168	118	180
63	up to 600	19	31.5	43.5	3/8	11	106	9	12	24	168	118	180
80	up to 750	23	38	56	3/8	21	132	11.5	14	40	208	150	226
100	up to 750	23	38	56	1/2	21	132	17	15	40	208	150	226

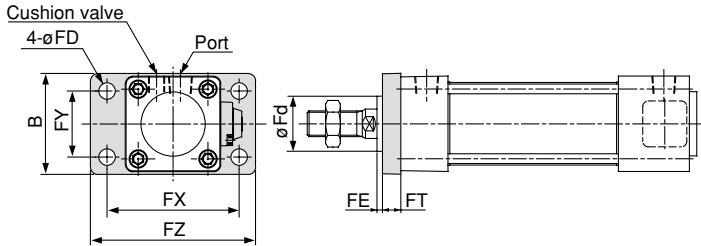
## With Mounting Bracket

### Foot(L)/Locking at head end (-H□)



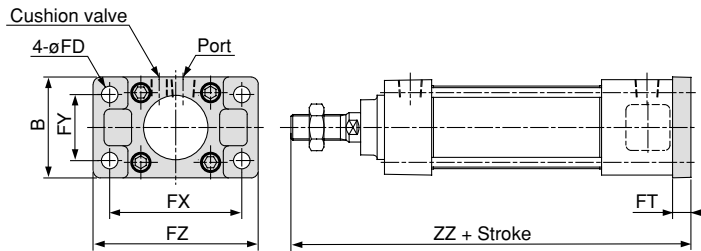
-H□/ -R□		(mm)											-W□	
Bore size (mm)	Stroke range	X	Y	LD	LH	LS	LT	LX	LY	LZ	ZZ	LS	ZZ	
32	up to 700	22	9	7	30	136	3.2	32	53	50	170	144	178	
40	up to 800	24	11	9	33	145	3.2	38	59	55	183	158	196	
50	up to 1000	27	11	9	40	160	3.2	46	72.5	70	202	172	214	
63	up to 1000	27	14	12	45	160	3.6	56	82.5	80	205	172	217	
80	up to 1000	30	14	12	55	192	4.5	72	102.5	100	248	210	266	
100	up to 1000	32	16	14	65	196	4.5	89	122	120	252	214	270	

### Front flange(F)/Locking at head end (-H□)



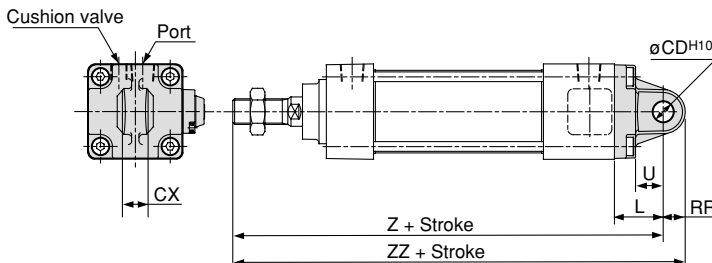
-H□/ -R□/ -W□		(mm)							
Bore size (mm)	Stroke range	B	FD	FE	FT	FX	FY	FZ	Fd
32	up to 700	50	7	3	10	64	32	79	25
40	up to 800	55	9	3	10	72	36	90	31
50	up to 1000	70	9	2	12	90	45	110	38.5
63	up to 1000	80	9	2	12	100	50	120	39.5
80	up to 1000	100	12	4	16	126	63	153	45.5
100	up to 1000	120	14	4	16	150	75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

### Rear flange(G)/Locking at head end (-H□)



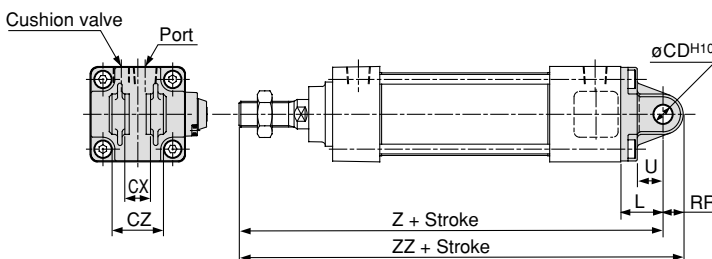
-H□/ -R□		(mm)								-W□
Bore size (mm)	Stroke range	B	FD	FT	FX	FY	FZ	ZZ	ZZ	
32	up to 500	50	7	10	64	32	79	149	157	
40	up to 500	55	9	10	72	36	90	158	171	
50	up to 600	70	9	12	90	45	110	176	188	
63	up to 600	80	9	12	100	50	120	176	188	
80	up to 750	100	12	16	126	63	153	220	238	
100	up to 750	120	14	16	150	75	178	220	238	

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



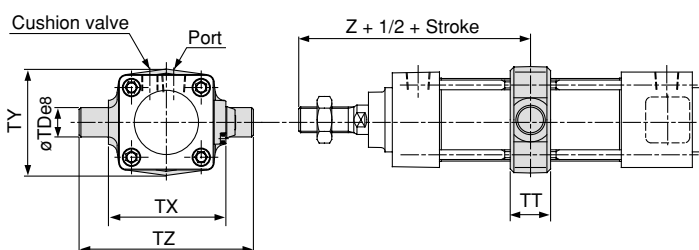
-H□/ -R□		(mm)								-W□	
Bore size (mm)	Stroke range	L	RR	U	CDH10	CX <sup>+0.1</sup> <sub>-0.3</sub>	Z	ZZ	Z	ZZ	
32	up to 500	23	10.5	13	10	14	162	172.5	170	180.5	
40	up to 500	23	11	13	10	14	171	182	184	195	
50	up to 600	30	15	17	14	20	194	209	206	221	
63	up to 600	30	15	17	14	20	194	209	206	221	
80	up to 750	42	23	26	22	30	246	269	264	287	
100	up to 750	42	23	26	22	30	246	269	264	287	

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



-H□/ -R□		(mm)								-W□	
Bore size (mm)	Stroke range	L	RR	U	CDH10	CX <sup>+0.3</sup> <sub>-0.1</sub>	CZ	Z	ZZ	Z	ZZ
32	up to 500	23	10.5	13	10	14	28	162	172.5	170	180.5
40	up to 500	23	11	13	10	14	28	171	182	184	195
50	up to 600	30	15	17	14	20	40	194	209	206	221
63	up to 600	30	15	17	14	20	40	194	209	206	221
80	up to 750	42	23	26	22	30	60	246	269	264	287
100	up to 750	42	23	26	22	30	60	246	269	264	287

### Centre trunnion(T)/Locking at head end (-H□)



-H□		(mm)						-R□/ -W□	
Bore size (mm)	Stroke range	TDe8	TT	TX	TY	TZ	Z	Z	
32	up to 500	12	17	50	49	74	89	97	
40	up to 500	16	22	63	58	95	93	106	
50	up to 600	16	22	75	71	107	105	117	
63	up to 600	20	28	90	87	130	105	117	
80	up to 750	20	34	110	110	150	129	147	
100	up to 750	25	40	132	136	182	129	147	

CJ1

CJP

CJ2

CM2

C85

C76

CG1

**MB**

MB1

CP95

C95

C92

CA1

CS1

