

Air Cylinder

Series MB

ø32, ø40, ø50, ø63, ø80, ø100, ø125



CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

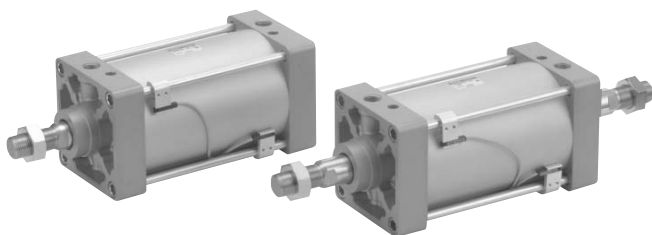
D-

-X

20-

Data

ø125 newly introduced



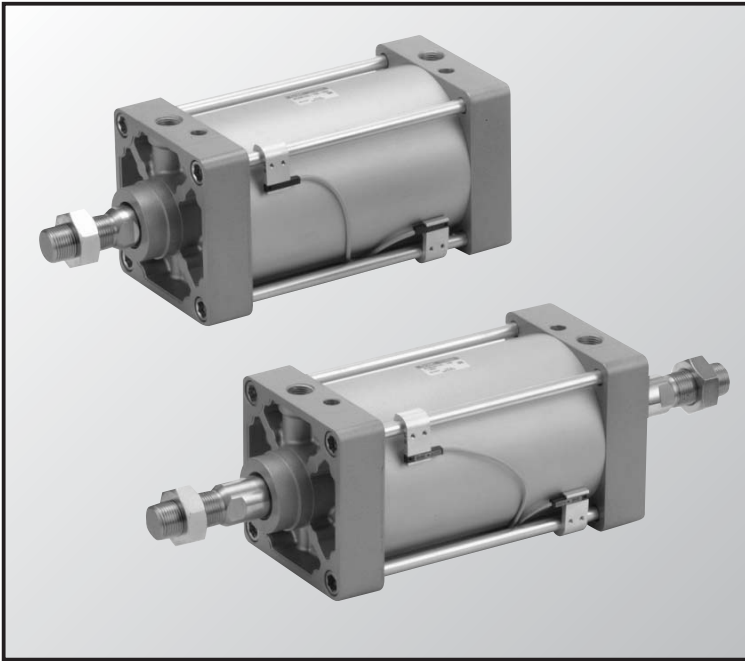
Double acting,
Single rod

Double acting,
Double rod

Double acting,
Non-rotating rod

Series MB, MBW, MBK,

ø125 newly introduced
(Double acting single rod, Double acting double rod)



Compact and lightweight design

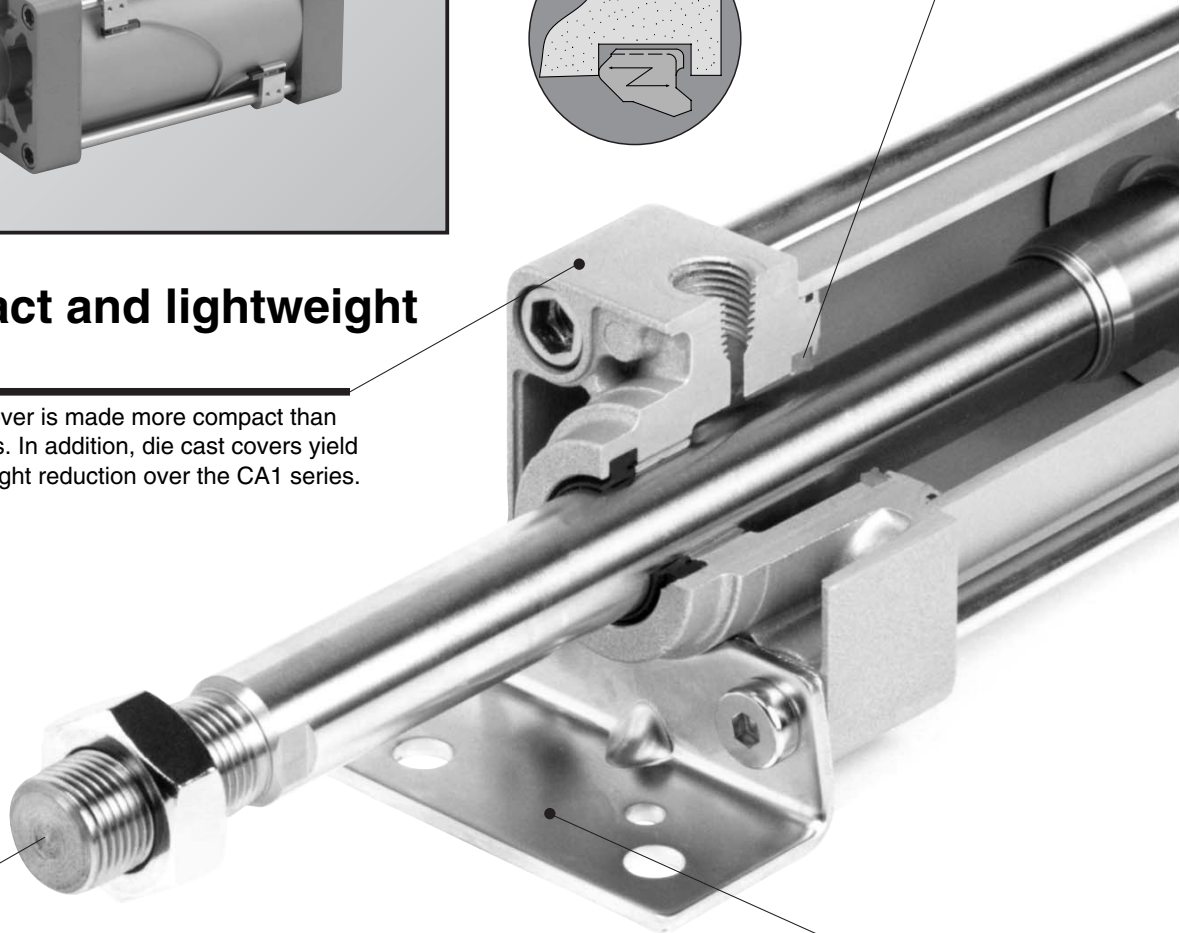
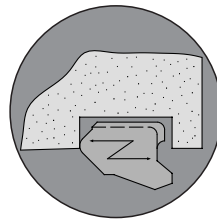
The square cover is made more compact than the CA1 series. In addition, die cast covers yield 10 to 25% weight reduction over the CA1 series.

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.

Improved cushion capacity

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

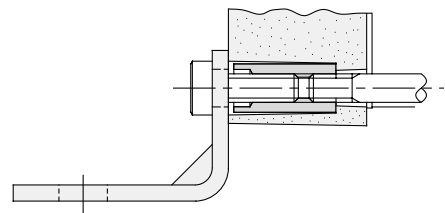


Minimal rod deflection

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

Accurate mounting

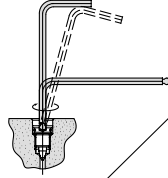
The cylinder cover and mounting bracket with high dimensional accuracy simplifies installation and extends service life.



Low friction End lock type
MB□Q, MBB ø32, ø40, ø50, ø63, ø80, ø100, ø125

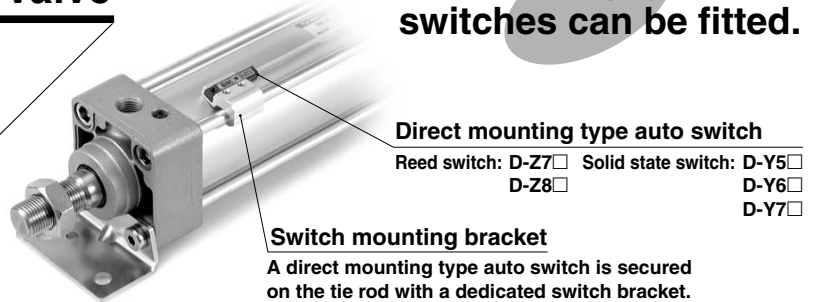
Easy adjustment of cushion valve

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



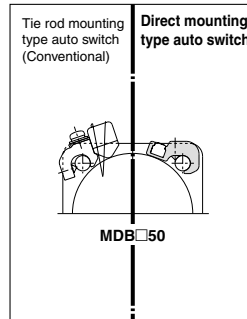
Port

Direct mounting type auto switches can be fitted.



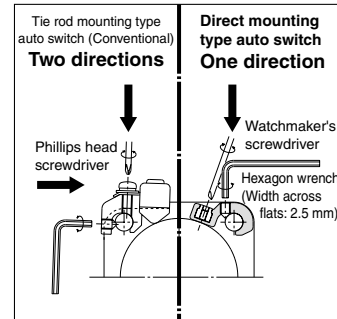
Miniaturization

Reduces the amount the auto switch protrudes from the cylinder.



Improved operability

Auto switch mounting and adjustment of the mounting position can be made via the same direction.



Auto switch

inventory control can be simplified.

Auto switch inventory control in the field can be simplified because direct mounting type auto switches are applicable to a wide variety of cylinders.

Variations

Variations		Standard stroke (mm)																		
Standard/Double acting	JIS Symbol	Bore	25	50	75	100	125	175	200	250	300	350	400	450	500	700	800	900	1000	
	Single rod Series MB		32	•	•	•	•	•	•	•	•	•	•	•	•	•				
	Double rod Series MBW		40	•	•	•	•	•	•	•	•	•	•	•	•	•				
	* Non-rotating rod Series MBK		50	•	•	•	•	•	•	•	•	•	•	•	•	•				
	* Low friction Series MB□Q		80	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	(1)	
	* End lock Series MBB		100	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	(1)	
		125	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	

Built-in magnet	Rod boot	Mounting	Accessory	
•	•	•	•	<p>Basic Axial foot Rod side flange Head side flange Single clevis Double clevis Center trunnion</p> <p>Standard Rod end nut Option Knuckle joint pin Clevis pin Single knuckle joint Double knuckle joint Trunnion pivot bracket Double clevis pivot bracket</p> <p>Page 6-6-4</p>
•	•	•	•	<p>Basic Foot Flange Center trunnion</p> <p>Standard Rod end nut Option Knuckle joint pin Single knuckle joint Double knuckle joint Trunnion pivot bracket</p> <p>Page 6-6-16</p>
•	•	•	•	<p>Basic Axial foot Rod side flange Head side flange Single clevis Double clevis Center trunnion</p> <p>Standard Rod end nut Option Knuckle joint pin Clevis pin Single knuckle joint Double knuckle joint Trunnion pivot bracket Double clevis pivot bracket</p> <p>Page 6-6-22</p>
•	•	•	•	<p>Basic Axial foot Rod side flange Head side flange Single clevis Double clevis Center trunnion</p> <p>Standard Rod end nut Option Knuckle joint pin Clevis pin Single knuckle joint Double knuckle joint Trunnion pivot bracket Double clevis pivot bracket</p> <p>Page 6-6-26</p>
•	•	•	•	<p>Basic Axial foot Rod side flange Head side flange Single clevis Double clevis Center trunnion</p> <p>Standard Rod end nut Locking release bolt (N only) Option Knuckle joint pin Clevis pin Single knuckle joint Double knuckle joint Trunnion pivot bracket Double clevis pivot bracket</p> <p>Page 6-6-32</p>

* ø125 is not included in MBK, MB□Q and MBB.
 Note 1) Standard stroke for MBK series is below 700.

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

Air Cylinder: Standard Type Double Acting, Single Rod Series MB

ø32, ø40, ø50, ø63, ø80, ø100, ø125

How to Order

Without auto switch MB L 32 [] 50 []

With auto switch MDB L 32 [] 50 [] Y7BW []

Built-in magnet

Mounting

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

Bore size

32	32 mm
40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm
125	125 mm

Port thread type

Symbol	Type
Nil	Rc
TN	NPT
TF	G

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

Auto switch

Nil	Without auto switch
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* For applicable auto switches, refer to the table below.
* The auto switches for D-Z7□/Z80/Y59□/Y69□/Y7□□ are included but unmounted. (Only the switch mounting brackets for the above models are mounted.)

Number of auto switches

Nil	2
S	1
3	3
n	n

Rod boot/Cushion

Rod boot	Nil	None
	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	Nil	Both ends
	N Note 1)	None

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: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 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	Tie-rod mounting	Band mounting	0.5 (Nil)	3 (L)	5 (Z)		IC circuit	Relay PLC			
Reed switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	—	5 V	—	Z76	—	●	●	—	—	IC circuit	—		
				2-wire	24 V	12 V	100 V	—	Z73	—	●	●	●	—	—	Relay PLC	
	100 V, 200 V	—					A54	—	●	●	●						
	—	—					A33	—	—	—	—						
Diagnostic indication (2-color indication)	Grommet	—	—	—	—	A34	—	—	—	—	—	—	—				
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	Y59A	—	●	●	○	○	IC circuit	Relay PLC		
				3-wire (PNP)				Y7P	—	●	●	○	○				
	2-wire	—		100 V, 200 V	J51	—	●	●	○	○	—						
					Y59B	—	●	●	○	○	—						
	3-wire (NPN)	—		12 V	—	G39	—	—	—	—	—	—	—	—			
					2-wire	—	K39	—	—	—	—	—	—	—			
	Diagnostic indication (2-color indication)	Grommet		5 V, 12 V	3-wire (NPN)	24 V	5 V, 12 V	—	Y7NW	—	●	●	○	○		IC circuit	—
					3-wire (PNP)				Y7PW	—	●	●	○	○			
	Water resistant (2-color indication)	Grommet		12 V	2-wire	24 V	12 V	—	Y7BW	—	●	●	○	○		—	—
					Y7BA				—	—	●	○	○	○			
Diagnostic output (2-color indication)	Grommet	5 V, 12 V	4-wire (NPN)	24 V	5 V, 12 V	—	F59F	—	●	●	○	○	IC circuit	—			
			2-wire				P5DW	—	—	—	●	●			○	○	
Magnetic field resistant	Grommet	—	—	—	—	—	—	—	—	—	—	—	—	—			

* Lead wire length symbols: 0.5 m Nil (Example) A54
3 m L (Example) A54L
5 m Z (Example) A54Z

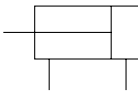
** Solid state switches marked with a "○" are produced upon receipt of order.

• Besides the above models, there are some other auto switches that are applicable. For detailed information, please refer to page 6-6-14.

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



JIS Symbol
Double acting



Made to Order Specifications (For details, refer to 6-6-39.)

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 position
-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 extend stroke
-XC9	Adjustable stroke cylinder/Adjustable retract stroke
-XC10	Dual stroke cylinder/Double rod
-XC11	Dual stroke cylinder/Single rod
-XC12	Tandem cylinder
-XC14	Change of trunnion bracket mounting position
-XC22	Fluorine 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

Specifications

Bore size (mm)	32	40	50	63	80	100	125
Action	Double acting, Single rod						
Fluid	Air						
Proof pressure	1.5 MPa						
Max. operating pressure	1.0 MPa						
Min. 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)						
Operating piston speed	50 to 1000 mm/s						50 to 700 mm/s
Allowable stroke tolerance	up to 250: $^{+1.0}_0$, 251 to 1000: $^{+1.4}_0$, 1001 to 1500: $^{+1.8}_0$						
Cushion ^{Note 1)}	Both ends (Air cushion)						
Thread tolerance	JIS Class 2						
Port size (Rc, NPT, G)	1/8	1/4	1/4	3/8	3/8	1/2	1/2
Mounting	Basic, Foot, Rod side flange, Head side 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
125	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800	1500

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

Accessory

Mounting		Basic	Foot	Rod side flange	Head side 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	70°C
K	Heat resistant tarpaulin	110°C *

* Max. ambient temperature for rod boot itself.

Mounting Bracket Part No.

Bore size (mm)	32	40	50	63	80	100	125
Foot ^{Note 1)}	MB-L03	MB-L04	MB-L05	MB-L06	MB-L08	MB-L10	MB-L12
Flange	MB-F03	MB-F04	MB-F05	MB-F06	MB-F08	MB-F10	MB-F12
Single clevis	MB-C03	MB-C04	MB-C05	MB-C06	MB-C08	MB-C10	MB-C12
Double clevis	MB-D03	MB-D04	MB-D05	MB-D06	MB-D08	MB-D10	MB-D12

Note 1) Two foot brackets required for one cylinder.

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

Foot, Flange, Single clevis: Mounting bolts

Double clevis: Clevis pin, Cotter pin → Refer to page 6-6-11 for details.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

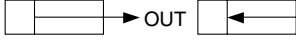
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Data

Series MB

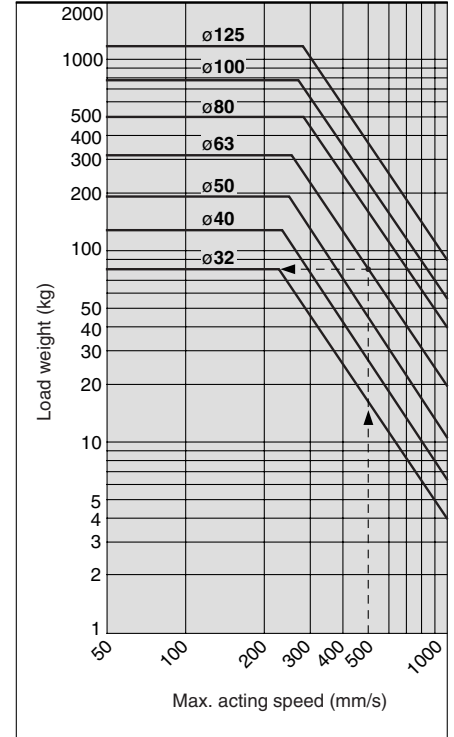
Theoretical Force

(Unit: N)  OUT IN

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

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

Allowable Kinetic Energy



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

Weight/Aluminum Tube

(kg)

Bore size (mm)		32	40	50	63	80	100	125
Basic weight	Basic	0.50	0.69	1.19	1.47	2.73	3.70	5.48
	Foot	0.62	0.83	1.41	1.75	3.23	4.36	7.56
	Flange	0.79	1.06	1.64	2.26	4.18	7.01	9.64
	Single clevis	0.75	0.92	1.53	2.10	3.84	6.87	8.05
	Double clevis	0.76	0.96	1.62	2.26	4.13	7.39	8.25
	Trunnion	0.79	1.05	1.67	2.27	4.28	7.37	8.46
Additional weight per each 50 mm stroke	All mounting bracket	0.11	0.16	0.26	0.27	0.42	0.56	0.71
Accessory	Single knuckle joint	0.15	0.23	0.26	0.26	0.60	0.83	1.10
	Double knuckle joint (with pin)	0.22	0.37	0.43	0.43	0.87	1.27	0.91
Square tube	Additional weight to the basic weight *	0.03	0.03	0.05	0.07	0.11	0.13	—
	Additional weight per each 50 mm stroke	0.16	0.21	0.33	0.37	0.56	0.72	—

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

- Basic weight 0.50 (Basic, ø32)
- Additional weight ... 0.11/50 stroke
- Cylinder stroke 100 stroke

$$0.50 + 0.11 \times 100/50 = 0.72 \text{ kg}$$

Auto Switch Mounting Bracket Part No.

(mm)

Auto switch model	Bore size						
	32	40	50	63	80	100	125
D-A3□/A44 D-G39/K39	BMB2-032	BMB2-040	BMB1-050	BMB1-063	BMB1-080	BMB1-100	BS1-125
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W/J59W D-F59F D-F5BAL D-F5NTL	BT-03	BT-03	BT-05	BT-05	BT-06	BT-06	BT-08
D-P5DWL	BMB3T-040	BMB3T-040	BMB3T-050	BMB3T-050	BMB3T-080	BMB3T-080	BAP2T-080
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W D-Y7□WV D-Y7BAL	BMB4-032	BMB4-032	BMB4-050	BMB4-050	BA4-063	BA4-063	BA4-080

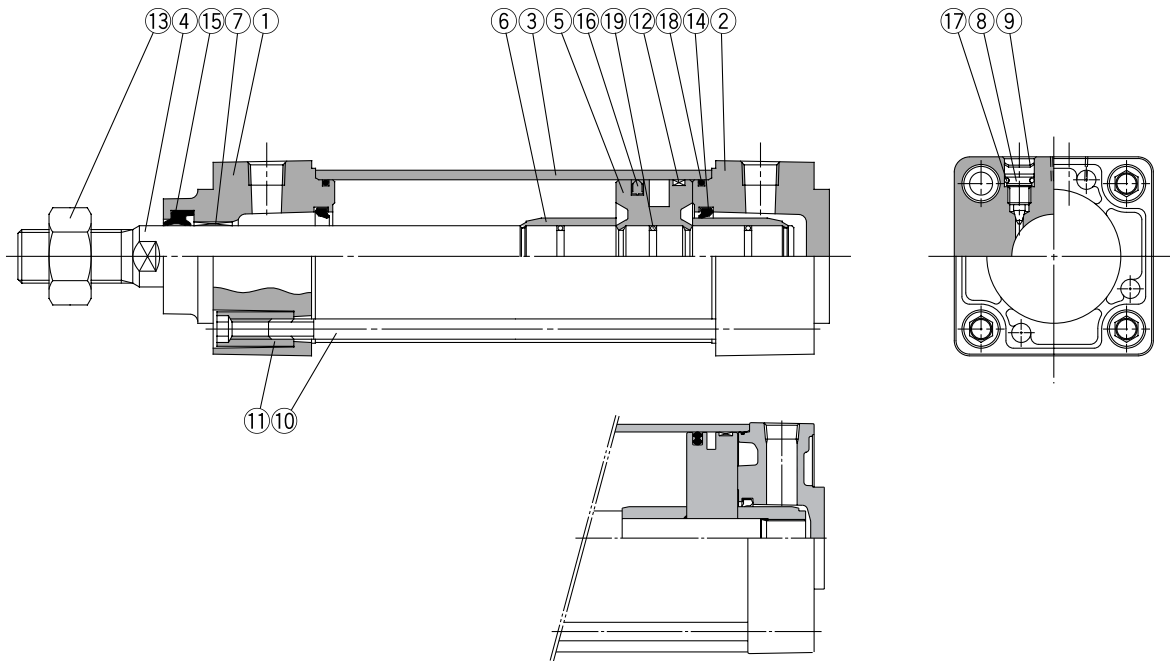
[A set of stainless steel mounting screws]

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.

Construction



MB125

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	Carbon steel	Hard chrome plated
⑤	Piston	Aluminum alloy	Chromated
⑥	Cushion ring	Brass	
⑦	Bushing	Lead bronze cast	
⑧	Cushion ring	Steel wire	Nickel plated
⑨	Snap ring	Steel for spring	ø40 to ø100
⑩	Tie rod	Carbon steel	Uni-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 Air Cylinder

20 - MB Mounting bracket Bore size Stroke Suffix

↓ Copper-free

Copper material has been replaced with non-copper material to prevent generation of copper ions. This is to eliminate influence of copper ions and fluororesin upon color CRT.

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	
125	MB125-PS	

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

Water Resistant Air Cylinder

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

Specifications

Action	Double acting single rod
Bore size	ø32, ø40, ø50, ø63, ø80, ø100
Max. operating pressure	1 MPa
Min. operating pressure	0.05 MPa
Cushion	Air cushion <small>Note 1)</small>
Piping	Screw-in piping
Operating piston speed	50 to 1000 mm/s
Mounting bracket	Basic, Axial foot, Rod side flange, Head side flange, Single clevis, Double clevis, Center trunnion

* Auto switch capable.

★ The cylinder should be operated within its allowable kinetic energy. (Refer to page 6-6-6.)

Note 1) In case of types with no air cushion, a rubber bumper is used.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

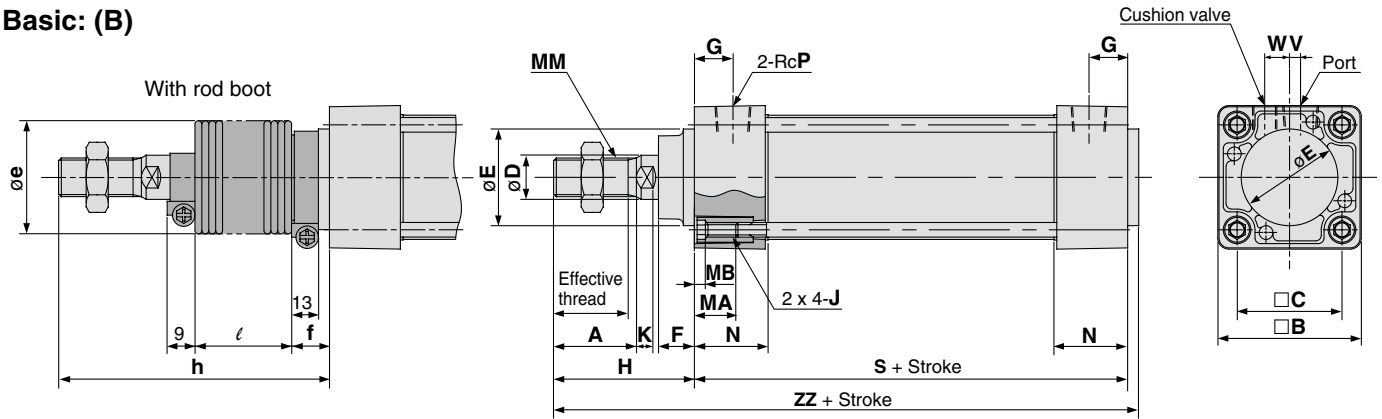
20-

Data

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: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

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
			125	132	235

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	to 500	19.5	10	22	46	32.5	12	30	13	13	47	16	4	M6 x 1	6	M10 x 1.25	27	1/8	84	4	6.5	135
40	to 500	27	14	30	52	38	16	35	13	14	51	16	4	M6 x 1	6	M14 x 1.5	27	1/4	84	4	9	139
50	to 600	32	18	35	65	46.5	20	40	14	15.5	58	16	5	M8 x 1.25	7	M18 x 1.5	31.5	1/4	94	5	10.5	156
63	to 600	32	18	35	75	56.5	20	45	14	16.5	58	16	5	M8 x 1.25	7	M18 x 1.5	31.5	3/8	94	9	12	156
80	to 800	37	22	40	95	72	25	45	20	19	72	16	5	M10 x 1.5	10	M22 x 1.5	38	3/8	114	11.5	14	190
100	to 800	37	26	40	114	89	30	55	20	19	72	16	5	M10 x 1.5	10	M26 x 1.5	38	1/2	114	17	15	190
125	to 1000	50	27	54	136	110	32	60	27	19	97	20	6	M12 x 1.75	13	M27 x 2.0	38	1/2	120	17	15	223

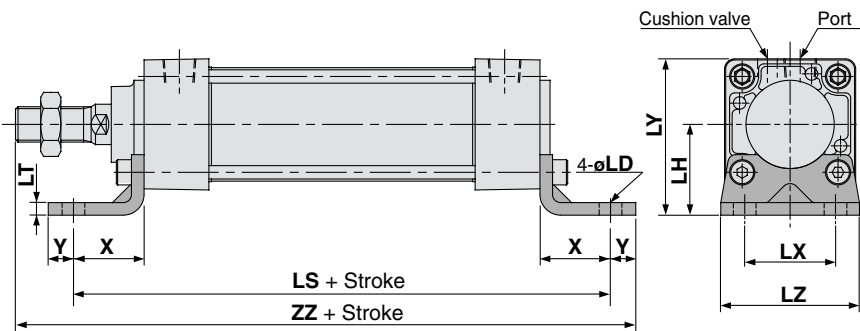
With Rod Boot

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	801 to 900	901 to 1000	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000									
32	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	—	—	—	—	—	—	—	—	—	—	—
125	75	27	10	20	30	40	60	80	100	120	140	160	180	200	120	130	140	150	170	190	210	230	250	270	290	310	—	—	—	—	—	—	—	—	—

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: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

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
125	222	294

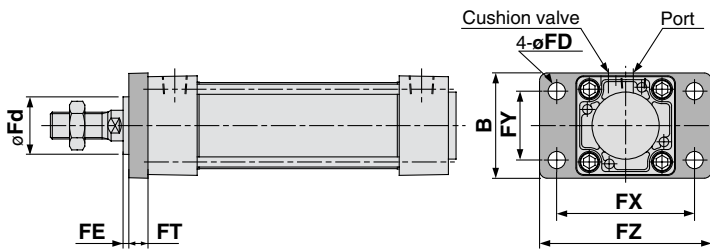
Foot

Bore size (mm)	Stroke range	X	Y	LD	LH	LS*	LT	LX	LY	LZ	ZZ*
32	to 700	22	9	7	30	128	3.2	32	53	50	162
40	to 800	24	11	9	33	132	3.2	38	59	55	170
50	to 1000	27	11	9	40	148	3.2	46	72.5	70	190
63	to 1000	27	14	12	45	148	3.6	56	82.5	80	193
80	to 1000	30	14	12	55	174	4.5	72	102.5	100	230
100	to 1000	32	16	14	65	178	4.5	89	122	120	234
125	to 1400	45	20	14	81	210	8	90	149	136	282

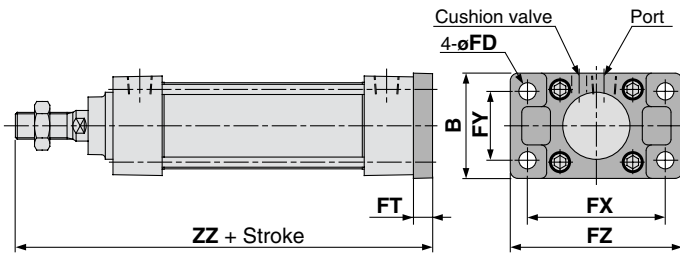
Air Cylinder: Standard Type Double Acting, Single Rod **Series MB**

With Mounting Bracket

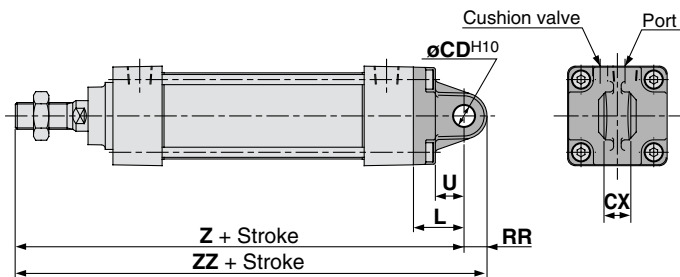
Rod side flange: (F)



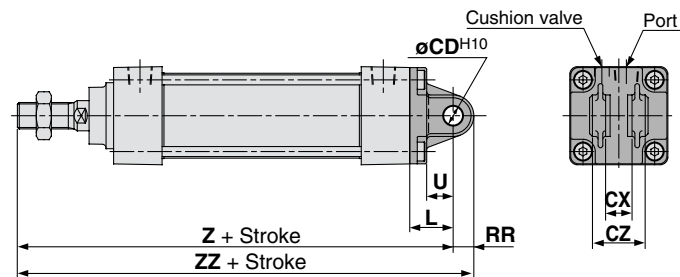
Head side flange: (G)



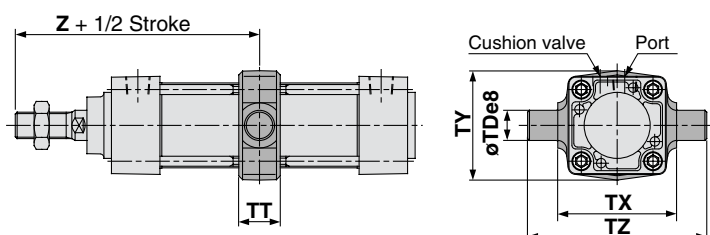
Single clevis: (C)



Double clevis: (D)



Center trunnion: (T)



Rod side Flange

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

Without Air Cushion

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

Head Side Flange

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

Without Air Cushion

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

Single clevis

Bore size (mm)	Stroke range	L	RR	U	CDH10	CX ^{-0.1} _{-0.3}	Z*	ZZ*
32	to 500	23	10.5	13	10	14	154	164.5
40	to 500	23	11	13	10	14	158	169
50	to 600	30	15	17	14	20	182	197
63	to 600	30	15	17	14	20	182	197
80	to 800	42	23	26	22	30	228	251
100	to 800	42	23	26	22	30	228	251
125	to 1000	50	28	30	25	32	267	295

* Rod/Head side 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; ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

Without Air Cushion

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

Double Clevis

Bore size (mm)	Stroke range	L	RR	U	CDH10	CX ^{+0.3} _{+0.1}	CZ	Z*	ZZ*
32	to 500	23	10.5	13	10	14	28	154	164.5
40	to 500	23	11	13	10	14	28	158	169
50	to 600	30	15	17	14	20	40	182	197
63	to 600	30	15	17	14	20	40	182	197
80	to 800	42	23	26	22	30	60	228	251
100	to 800	42	23	26	22	30	60	228	251
125	to 1000	50	28	30	25	32	64	267	295

** Center 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; ø32, ø40: +3 mm, ø50, ø63: +4 mm, ø80, ø100: +5 mm, ø125: +6 mm

Without Air Cushion

Bore size (mm)	Z
32	92
40	96
50, 63	109
80, 100	134
125	163

Center Trunnion

Bore size (mm)	Stroke range	TDe8	TT	TX	TY	TZ	Z**
32	to 500	12	17	50	49	74	89
40	to 500	16	22	63	58	95	93
50	to 600	16	22	75	71	107	105
63	to 600	20	28	90	87	130	105
80	to 800	20	34	110	110	150	129
100	to 800	25	40	132	136	182	129
125	to 1000	25	50	160	160	210	157

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

20-

Data

Series MB

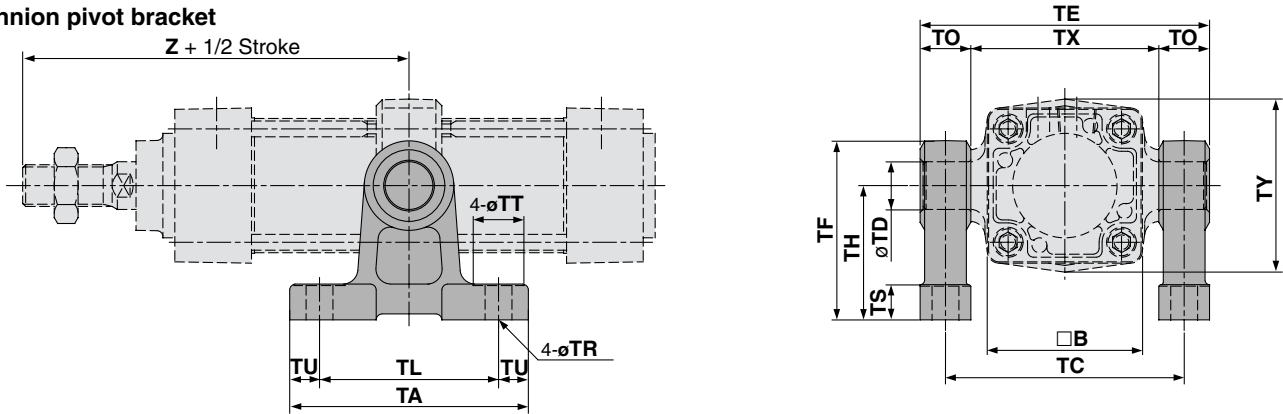
Trunnion/Double Clevis Pivot Bracket

Part No.

Cylinder model	MB□32	MB□40	MB□50	MB□63	MB□80	MB□100	MB□125
Description	MB-S03	MB-S04	MB-S04	MB-S06	MB-S06	MB-S10	MB-S12
Trunnion pivot bracket Note 1)	MB-S03	MB-S04	MB-S04	MB-S06	MB-S06	MB-S10	MB-S12
Double clevis pivot bracket	MB-B03	MB-B05	MB-B05	MB-B08	MB-B08	MB-B12	MB-B12

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

Trunnion pivot bracket



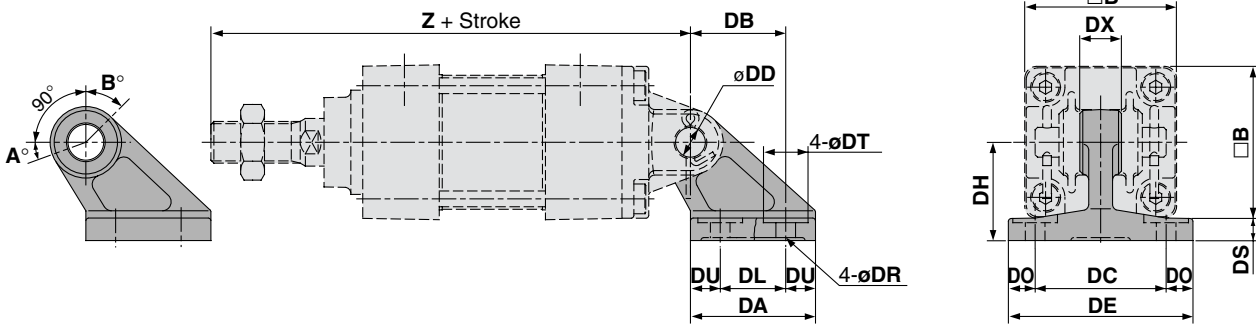
(mm)

Without Air Cushion

Part no.	Bore size (mm)	B	TA	TL	TU	TC	TX	TE	TO	TR	TT	TS	TH	TF	Z**	TDH10
MB-S03	32	46	62	45	8.5	62	50	74	12	7	13	10	35	47	89	12 ^{+0.070} ₀
MB-S04	40	52	80	60	10	80	63	97	17	9	17	12	45	60	93	16 ^{+0.070} ₀
	50	65	80	60	10	92	75	109	17	9	17	12	45	60	105	16 ^{+0.070} ₀
MB-S06	63	75	100	70	15	110	90	130	20	11	22	14	60	80	105	20 ^{+0.084} ₀
	80	95	100	70	15	130	110	150	20	11	22	14	60	80	129	20 ^{+0.084} ₀
MB-S10	100	114	120	90	15	158	132	184	26	13.5	24	17	75	100	129	25 ^{+0.084} ₀
MB-S12	125	136	142	105	18.5	186	160	212	26	13.5	24	25	85	115	157	25 ^{+0.084} ₀

Bore size (mm)	Z
32	92
40	96
50	109
63	109
80	134
100	134
125	163

Double clevis pivot bracket



(mm)

Without Air Cushion

Part no.	Bore size (mm)	B	DA	DB	DL	DU	DC	DX	DE	DO	DR	DT	DS	DH	Z*	DDH10
MB-B03	32	46	42	32	22	10	44	14	62	9	6.6	15	7	33	154	10 ^{+0.058} ₀
	40	52	42	32	22	10	44	14	62	9	6.6	15	7	33	158	10 ^{+0.058} ₀
MB-B05	50	65	53	43	30	11.5	60	20	81	10.5	9	18	8	45	182	14 ^{+0.070} ₀
	63	75	53	43	30	11.5	60	20	81	10.5	9	18	8	45	182	14 ^{+0.070} ₀
MB-B08	80	95	73	64	45	14	86	30	111	12.5	11	22	10	65	228	22 ^{+0.084} ₀
	100	114	73	64	45	14	86	30	111	12.5	11	22	10	65	228	22 ^{+0.084} ₀
MB-B12	125	136	90	78	60	15	110	32	136	13	13.5	24	14	75	267	25 ^{+0.084} ₀

Bore size (mm)	Z
32	160
40	164
50	190
63	190
80	238
100	238
125	279

Rotating Angle

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

* Mounting plate

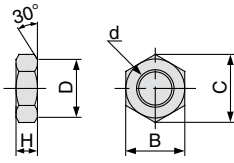
Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston; ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

** 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: +3 mm, ø50, ø63: +4 mm, ø80, ø100: +5 mm, ø125: +6 mm

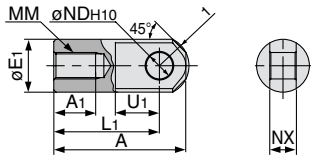
Dimensions for Accessories

Rod end nut
(Standard)



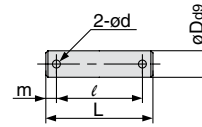
Part no.	Bore size (mm)	d	H	B	C	D
NT-03	32	M10 x 1.25	6	17	19.6	16.5
NT-04	40	M14 x 1.5	8	22	25.4	21
NT-05	50, 63	M18 x 1.5	11	27	31.2	26
NT-08	80	M22 x 1.5	13	32	37.0	31
NT-10	100	M26 x 1.5	16	41	47.3	39
NT-12M	125	M27 x 2.0	16	41	47.3	39

I type
Single knuckle
joint



Part no.	Bore size (mm)	A	A ₁	E ₁	L ₁	MM	R ₁	U ₁	ND _{H10}	NX
I-03M	32	40	14	20	30	M10 x 1.25	12	16	10 ^{+0.058} ₀	14 ^{-0.10} _{-0.30}
I-04M	40	50	19	22	40	M14 x 1.5	12.5	19	10 ^{+0.058} ₀	14 ^{-0.10} _{-0.30}
I-05M	50, 63	64	24	28	50	M18 x 1.5	16.5	24	14 ^{+0.070} ₀	20 ^{-0.10} _{-0.30}
I-08M	80	80	26	40	60	M22 x 1.5	23.5	34	22 ^{+0.084} ₀	30 ^{-0.10} _{-0.30}
I-10M	100	80	26	40	60	M26 x 1.5	23.5	34	22 ^{+0.084} ₀	30 ^{-0.10} _{-0.30}
I-12M	125	119	36	46	92	M27 x 2.0	28.5	34	25 ^{+0.084} ₀	32 ^{-0.10} _{-0.30}

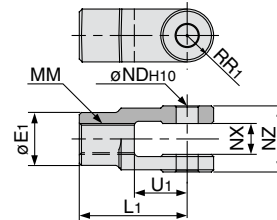
Knuckle joint pin
Clevis pin



Part no.	Bore size (mm)		D _{as}	L	l	m	d (Through hole diameter)	Note 1) Applicable cotter pin
	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
IY-12	125	25	25 ^{-0.065} _{-0.117}	79.5	69.5	5	4	ø4 x 40 l

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

Y type
Double knuckle
joint



Part no.	Bore size (mm)	E ₁	L ₁	MM	R ₁	U ₁	ND _{H10}	NX	NZ
Y-03M	32	20	30	M10 x 1.25	10	16	10 ^{+0.058} ₀	14 ^{+0.30} _{+0.10}	28 ^{-0.10} _{-0.30}
Y-04M	40	22	40	M14 x 1.5	11	19	10 ^{+0.058} ₀	14 ^{+0.30} _{+0.10}	28 ^{-0.10} _{-0.30}
Y-05M	50, 63	28	50	M18 x 1.5	14	24	14 ^{+0.070} ₀	20 ^{+0.30} _{+0.10}	40 ^{-0.10} _{-0.30}
Y-08M	80	40	65	M22 x 1.5	20	34	22 ^{+0.084} ₀	30 ^{+0.30} _{+0.10}	60 ^{-0.10} _{-0.30}
Y-10M	100	40	65	M26 x 1.5	20	34	22 ^{+0.084} ₀	30 ^{+0.30} _{+0.10}	60 ^{-0.10} _{-0.30}
Y-12M	125	46	100	M27 x 2	27	42	25 ^{+0.084} ₀	32 ^{+0.30} _{+0.10}	64 ^{-0.10} _{-0.30}

Note) For a double clevis, a pin (cotter pin) and a flat washer are equipped as standard.

Combinations of Support Brackets

Available Combination..... Refer to below picture together.

Bracket for work 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

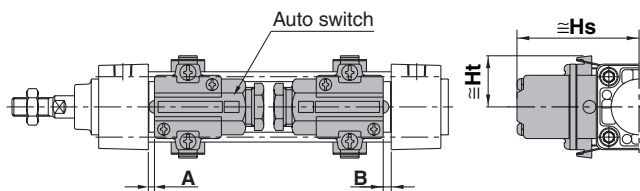
- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB**
- MB1
- CA2
- CS1
- C76
- C85
- C95
- CP95
- NCM
- NCA
- D-
- X
- 20-
- Data

Series MB

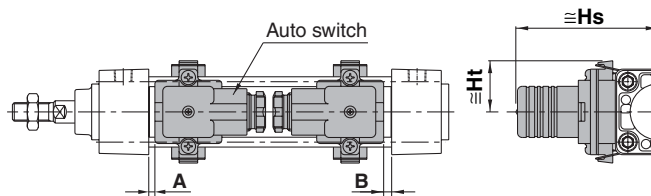
Auto Switch Mounting Position/Mounting Height

Band mounting

D-A3□/G39/K39



D-A44

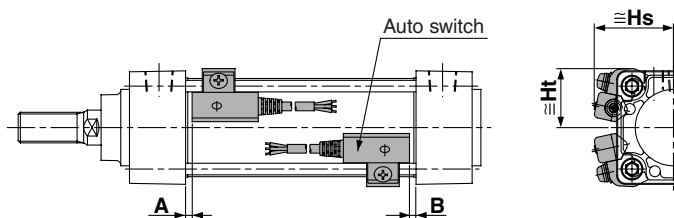


Tie-rod mounting

D-F5□/J5□

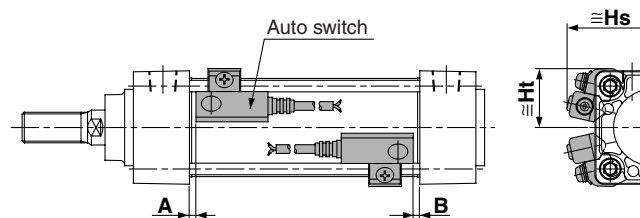
D-F5□W/J59W/F5BAL

D-F59F/F5NTL



D-A5□/A6□

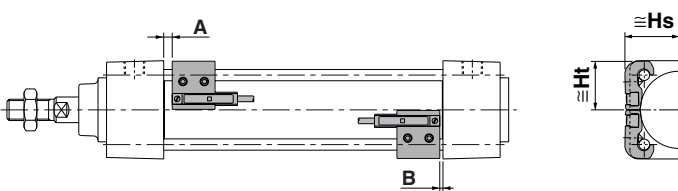
D-A59W



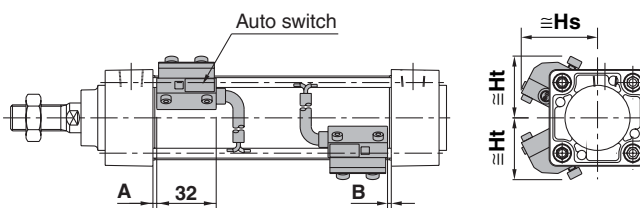
D-Z7□/Z80

D-Y59□/Y69□/Y7P/Y7PV

D-Y7□W/Y7□WV/Y7BAL



D-P5DWL



Auto Switch Mounting Position/Mounting Height

Auto Switch Mounting Position

(mm)

Bore size (mm)	D-A5□ D-A6□		D-A59W		D-F5□W D-J59W D-F5□ D-J5□ D-F5BAL D-F59F		D-F5NTL		D-A3□ D-A44 D-G39 D-K39		D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W, D-Y7□WV D-Y7BAL		D-P5DWL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
32	0.5	0	4.5	2	7	4.5	12	9.5	0.5	0	4	1.5	3.5	1
40	0.5	0	4.5	2	7	4.5	12	9.5	0.5	0	4	1.5	3.5	1
50	1	0	5	2.5	7.5	5	12.5	10	1	0	4.5	2	4	1.5
63	1	0	5	2.5	7.5	5	12.5	10	1	0	4.5	2	4	1.5
80	4	2.5	8	6.5	10.5	9	15.5	14	4	2.5	7.5	6	7	5.5
100	4	2.5	8	6.5	10.5	9	15.5	14	4	2.5	7.5	6	7	5.5
125	6	6	10	10	12.5	12.5	17.5	17.5	6	6	9.5	9.5	9	9

* Types without air cushion have different values for auto switch mounting positions. Add the following values to values A and B each.
3 mm (ø32 and ø40), 4 mm (ø50 and ø63), 5 mm (ø80 and ø100) and 6 mm (ø125).

Auto Switch Mounting Height

(mm)

Bore size (mm)	D-A5□ D-A6□ D-A59W		D-F5□, D-J5□ D-F59F D-F5□W, D-J59W D-F5BAL, D-F5NTL		D-A3□ D-G39 D-K39		D-A44		D-Z7□/Z-80 D-Y59□ D-Y7P D-Y7□W		D-Y69□ D-Y7PV D-Y7□WV		D-Y7BAL		D-P5DWL	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
32	35	24.5	32.5	25	67	27.5	77	27.5	25.5	23	26.5	23	30	23	38	31
40	38.5	27.5	36.5	27.5	71.5	27.5	81.5	27.5	29.5	26	30	26	34	26	42	33
50	43.5	34.5	41	34	77	—	87	—	33.5	31	34.5	31	38	31	46.5	39
63	48.5	39.5	46	39	83.5	—	93.5	—	39	36	40	36	43	36	51.5	44
80	55	46.5	52.5	46.5	92.5	—	103	—	47.5	45	48.5	45	52	45	58	51.5
100	62	55	59.5	55	103	—	113.5	—	55.5	53.5	56.5	53.5	60	53.5	65.5	60.5
125	71.5	66.5	70.5	66.5	115	—	125	—	67.5	65	68.5	65	72	65	76.5	72

Operating Range

(mm)

Auto switch type	Bore size						
	32	40	50	63	80	100	125
D-Z7□/Z80	7.5	8.5	7.5	9.5	9.5	10.5	13
D-A5□/A6□	9	9	10	11	11	11	10
D-A59W	13	13	13	14	14	15	17
D-A3□/A44	9	9	10	11	11	11	10
D-Y59□/Y69□ D-Y7P/Y7□V D-Y7□W/Y7□WV	5.5	5.5	7	7.5	6.5	5.5	7
D-Y7BAL	3.5	3.5	3.5	4	4.5	5	6
D-F5□/J5□ D-F5□W/J59W D-F5BAL/F5NTL D-F59F	3.5	4	4	4.5	4.5	4.5	5
D-G39/K39	9	9	9	10	10	11	11
D-P5DWL	4	4	4	4.5	4	4.5	4.5

* These values are given as guidelines including the hysteresis and are not guaranteed. They may vary significantly depending on the environment (with ±30% variations).

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

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Data

Minimum Strokes for Auto Switch Mounting

Auto switch model	No. of auto switches	Center trunnion (mm)					
		ø32	ø40	ø50	ø63	ø80	ø100
D-A3 □ D-G39 D-K39	2 (Different sides)	60	65	75	80	85	90
	2 (Same side)	90	95	100	105	110	125
	n (Different sides)	60 + 30 (n-2) n = 2, 4, 6, 8...	65 + 30 (n-2) n = 2, 4, 6, 8...	75 + 30 (n-2) n = 2, 4, 6, 8...	80 + 30 (n-2) n = 2, 4, 6, 8...	85 + 30 (n-2) n = 2, 4, 6, 8...	90 + 30 (n-2) n = 2, 4, 6, 8...
	n (Same side)	90 + 100 (n-2) n = 2, 4, 6, 8...	95 + 100 (n-2) n = 2, 4, 6, 8...	100 + 100 (n-2) n = 2, 4, 6, 8...	105 + 100 (n-2) n = 2, 4, 6, 8...	110 + 100 (n-2) n = 2, 4, 6, 8...	125 + 100 (n-2) n = 2, 4, 6, 8...
	1	60	65	75	80	85	90
D-A44	2 (Different sides)	70	75	80	85	90	
	2 (Same side)	70	75	80	85	90	
	n (Different sides)	70 + 30 (n-2) n = 2, 4, 6, 8...	75 + 30 (n-2) n = 2, 4, 6, 8...	80 + 30 (n-2) n = 2, 4, 6, 8...	85 + 30 (n-2) n = 2, 4, 6, 8...	90 + 30 (n-2) n = 2, 4, 6, 8...	
	n (Same side)	70 + 50 (n-2) n = 2, 4, 6, 8...	75 + 50 (n-2) n = 2, 4, 6, 8...	80 + 50 (n-2) n = 2, 4, 6, 8...	85 + 50 (n-2) n = 2, 4, 6, 8...	90 + 50 (n-2) n = 2, 4, 6, 8...	
	1	70	75	80	85	90	
D-A5 □ D-A6 □	2 (Different sides or Same side) 1	60	80	105	110	115	115
	n (Same side)	60 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	80 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	105 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	110 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	115 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	115 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...
D-A59W	2 (Different sides or Same side)	60	70	85	110	115	120
	n (Same side)	60 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	70 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	85 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	110 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	115 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	120 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...
	1	60	70	85	110	115	120
D-F5 □ D-J5 □ D-F5 □W D-J59W D-F5BAL D-F59F	2 (Different sides or Same side)	90	95	110	115	120	130
	n (Same side)	90 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	95 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	110 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	115 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	120 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	130 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...
	1	90	95	110	115	120	130
D-F5NTL	2 (Different sides or Same side)	100	105	120	125	130	140
	n (Same side)	100 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	105 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	120 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	125 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	130 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	140 + 55 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...
	1	100	105	120	125	130	140
D-Z7 □ D-Z80 D-Y59 □ D-Y7P D-Y7 □W	2 (Different sides or Same side) 1	80	85	90	95	100	105
	n	80 + 40 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	85 + 40 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	90 + 40 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	95 + 40 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	100 + 40 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	105 + 40 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...
D-Y69 □ D-Y7PV D-Y7 □WV	2 (Different sides or Same side) 1	60	65	70	75	85	85
	n	60 + 30 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	65 + 30 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	70 + 30 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	75 + 30 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	85 + 30 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	85 + 30 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...
D-Y7BAL	2 (Different sides or Same side) 1	85	90	100	105	110	115
	n	85 + 45 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	90 + 45 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	100 + 45 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	105 + 45 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	110 + 45 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	115 + 45 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...
D-P5DWL	2 (Different sides or Same side) 1	120	130	140	150		
	n	120 + 65 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	130 + 65 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	140 + 65 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...	150 + 65 $\frac{(n-4)}{2}$ n = 4, 8, 12, 16...		

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	Auto switch model	Electrical entry (Direction)	Feature
Reed switch	D-A53/A56	Grommet (In-line)	—
	D-A64/A67		Without indicator light
	D-Z80		
Solid state switch	D-F59/F5P/J59	Grommet (In-line)	—
	D-F59W/F5PW/J59W		2-color indication
	D-F5BAL		2-color indication, Water resistant
	D-F5NTL		Timer
	D-Y69A/Y69B/Y7PV	Grommet (Perpendicular)	—
	D-Y7NWV/Y7PWV/Y7BWV		2-color indication

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

(mm)

Auto switch model	No. of auto switches	Support bracket except center trunnion		
		ø32, ø40, ø50, ø63	ø80, ø100	ø125
D-A3□ D-G39 D-K39	2 (Different sides)	35		
	2 (Same side)	100		
	n (Different sides)	$35 + 30(n-2)$ $n = 2, 3, 4...$		
	n (Same side)	$100 + 100(n-2)$ $n = 2, 3, 4...$		
	1	10		
D-A44	2 (Different sides)	35		
	2 (Same side)	55		
	n (Different sides)	$35 + 30(n-2)$ $n = 2, 3, 4...$		
	n (Same side)	$55 + 50(n-2)$ $n = 2, 3, 4...$		
	1	10		
D-A5□ D-A6□	2 (Different sides or Same side) 1	15	20	20
	n (Same side)	$15 + 55 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$	$20 + 55 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$	$20 + 55 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$
D-A59W	2 (Different sides or Same side)	20	25	25
	n (Same side)	$20 + 55 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$	$25 + 55 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$	$25 + 55 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$
	1	15	25	25
D-F5□ D-J5□ D-F5□W D-J59W D-F5BAL D-F59F	2 (Different sides or Same side)	15	25	25
	n (Same side)	$15 + 55 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$	$25 + 55 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$	$25 + 55 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$
	1	10	25	25
D-F5NTL	2 (Different sides or Same side)	15	25	30
	n (Same side)	$15 + 55 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$	$25 + 55 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$	$30 + 55 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$
	1	10	25	30
D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W	2 (Different sides or Same side) 1	15		
	n side	$15 + 40 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$		
D-Y69□ D-Y7PV D-Y7□WV	2 (Different sides or Same side) 1	10		
	n	$10 + 30 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$		
D-Y7BAL	2 (Different sides or Same side) 1	20		
	n	$20 + 45 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$		
D-P5DWL	2 (Different sides or Same side) 1	15		20
	n	$15 + 65 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$	$20 + 65 \frac{(n-2)}{2}$ $n = 2, 4, 6, 8...$	

CJ1

CJP

CJ2

CM2

CG1

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MB1

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C95

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Data

Air Cylinder: Standard Type Double Acting, Double Rod Series **MBW**

ø32, ø40, ø50, ø63, ø80, ø100, ø125

How to Order

Without auto switch MBW L 32 [] 150 []

With auto switch MDBW L 32 [] 150 [] Y7BW []

Number of auto switches

Nil	2
S	1
3	3
n	n

Auto switch

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

* For applicable auto switches, refer to the table below.
* The auto switches for D-Z7□/Z80/Y59□/Y69□/Y7□□ are included but unmounted. (Only the switch mounting brackets for the above models are mounted.)

Rod boot/Cushion

Rod boot	Nil	None
	J	Nylon tarpaulin (one end)
	JJ	Nylon tarpaulin (both ends)
	K	Heat resistant tarpaulin (one end)
Cushion	KK	Heat resistant tarpaulin (both ends)
	—	Both ends
	N Note 1)	None

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: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

Built-in magnet

Mounting

B	Basic/Without bracket
L	Foot
F	Flange
T	Center trunnion

Bore size

32	32 mm
40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm
125	125 mm

Port thread type

Symbol	Type
Nil	Rc
TN	NPT
TF	G

Stroke (mm)

Refer to "Standard Stroke" on page 6-6-17.

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	Tie-rod mounting	Band mounting	0.5 (Nil)	3 (L)	5 (Z)				
Reed switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	—	5 V	—	Z76	—	●	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	Z73	—	●	●	●	—	—	—
		100 V, 200 V					A54	—	●	●	●	—	—	—	PLC
		—					A33	—	—	—	—	—	—	—	—
	Diagnostic indication (2-color indication)	Grommet	—	—	—	—	A34	—	—	—	—	—	—	Relay PLC	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	Y59A	—	●	●	○	○	IC circuit	Relay PLC
				3-wire (PNP)				Y7P	—	●	●	○	○	—	
				2-wire	—	100 V, 200 V	J51	—	●	●	○	—	—		
		Terminal conduit		12 V			Y59B	—	●	●	○	○	—		
				5 V, 12 V			—	—	—	—	—	—	—	IC circuit	
		Diagnostic indication (2-color indication)		Grommet	24 V	2-wire	12 V	—	—	K39	—	—	—	—	
	3-wire (NPN)		5 V, 12 V			—	—	—	—	—	—	—	—	IC circuit	
	3-wire (PNP)		5 V, 12 V			—	—	—	—	—	—	—	—	IC circuit	
	2-wire		12 V			Y7NW	—	●	●	○	○	—	—		
	Water resistant (2-color indication)	Grommet	24 V	2-wire	12 V	—	—	Y7PW	—	●	●	○	○	—	
Diagnostic output (2-color indication)	4-wire (NPN)			5 V, 12 V	—	—	—	—	—	—	—	IC circuit			
Magnetic field resistant	Grommet	—	2-wire	—	—	—	P5DW	—	—	●	●	○	○	—	

* Lead wire length symbols: 0.5 m Nil (Example) A54
3 m L (Example) A54L
5 m Z (Example) A54Z

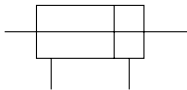
** Solid state switches marked with a "○" are produced upon receipt of order.

• Besides the above models, there are some other auto switches that are applicable. For detailed information, please refer to page 6-6-14.

Air Cylinder: Standard Type Double Acting, Double Rod Series MBW



JIS Symbol
Double acting



Made to Order Specifications (For details, refer to 6-6-39.)

Symbol	Specifications
-XB6	Heat resistant cylinder (150°C)
-XB13	Low speed cylinder (5 to 50 mm/s)
-XC3	Special port position
-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
-XC22	Fluorine 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

Standard Stroke

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

Intermediate strokes are available.
(No spacer is used)

Specifications

Bore size (mm)	32	40	50	63	80	100	125
Action	Double acting, Double rod						
Fluid	Air						
Proof pressure	1.5 MPa						
Max. operating pressure	1.0 MPa						
Min. 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)						
Operating piston speed	50 to 1000 mm/s 50 to 700 mm/s						
Allowable stroke tolerance	up to 250: $^{+1.0}_0$, 251 to 750: $^{+1.4}_0$						
Cushion ^{Note 1)}	Both ends (Air cushion)						
Thread tolerance	JIS Class 2						
Port size (Rc, NPT, G)	1/8	1/4	1/4	3/8	3/8	1/2	1/2
Mounting	Basic, Foot, Flange, Center 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.

Accessory

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

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

Weight/Aluminum Tube

Bore size (mm)		32	40	50	63	80	100	125
Basic weight	Basic	0.56	0.79	1.34	1.65	3.11	4.14	6.48
	Foot	0.68	0.93	1.56	1.93	3.61	4.8	8.56
	Flange	0.85	1.16	1.79	2.44	4.56	7.45	10.64
	Trunnion	0.85	1.15	1.82	2.45	4.66	7.81	9.46
Add'l weight per each 50 mm stroke	All mounting bracket	0.15	0.24	0.34	0.35	0.61	0.84	1.02
	Accessory							
Square tube	Single knuckle	0.15	0.23	0.26	0.26	0.60	0.83	1.10
	Double knuckle (with pin)	0.22	0.37	0.43	0.43	0.87	1.27	0.91
Additional weight to the basic weight *	0.03	0.03	0.05	0.07	0.11	0.13	—	
	Additional weight per each 50 mm stroke	0.20	0.29	0.41	0.45	0.75	1.0	—

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

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

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

Material of Rod Boot

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

* Max. ambient temperature for rod boot itself.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

20-

Data

Series MBW

Auto Switch Mounting Bracket Part No.

(mm)

Auto switch model	Bore size						
	32	40	50	63	80	100	125
D-A3□/A44 D-G39/K39	BMB2-032	BMB2-040	BMB1-050	BMB1-063	BMB1-080	BMB1-100	BS1-125
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W/J59W D-F59F D-F5BAL D-F5NTL	BT-03	BT-03	BT-05	BT-05	BT-06	BT-06	BT-08
D-P5DWL	BMB3T-040	BMB3T-040	BMB3T-050	BMB3T-050	BMB3T-080	BMB3T-080	BAP2T-080
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W D-Y7□WV D-Y7BAL	BMB4-032	BMB4-032	BMB4-050	BMB4-050	BA4-063	BA4-063	BA4-080

[A set of stainless steel mounting screws]

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.

Mounting Bracket Part No.

Bore size (mm)	32	40	50	63	80	100	125
Foot	MB-L03	MB-L04	MB-L05	MB-L06	MB-L08	MB-L10	MB-L12
Flange	MB-F03	MB-F04	MB-F05	MB-F06	MB-F08	MB-F10	MB-F12

* Two foot brackets required for one cylinder.

Water Resistant Air Cylinder

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

Copper-free Air Cylinder

20 – MBW Mounting bracket Bore size Stroke Suffix

┆ Copper-free

Copper material has been replaced with non-copper material to prevent generation of copper ions. This is to eliminate influence of copper ions and fluoro-resin upon color CRT.

Specifications

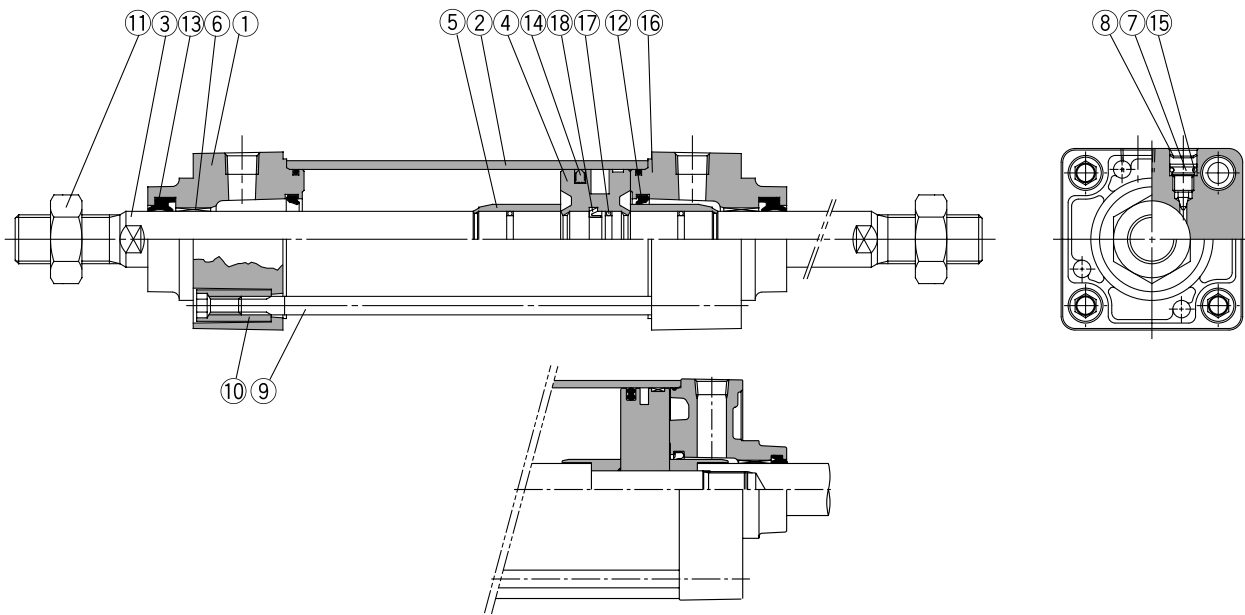
Action	Double acting, Single rod
Bore size	ø32, ø40, ø50, ø63, ø80, ø100
Max. operating pressure	1 MPa
Min. operating pressure	0.05 MPa
Cushion	Air cushion ^{Note 1)}
Piping	Screw-in piping
Operating piston speed	50 to 1000 mm/s
Mounting bracket	Basic, Axial foot, Rod side flange, Head side flange, Single clevis, Double clevis, Center trunnion

* Auto switch capable.

★ The cylinder should be operated within the allowable kinetic energy. (Refer to page 6-6-6.)

Note 1) In case of types with no air cushion, a rubber bumper is used.

Construction



MBW125

Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum die-cast	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	Resin	
⑥	Bushing	Lead bronze cast	
⑦	Cushion valve	Steel wire	Nickel plated
⑧	Snap ring	Steel for spring	ø40 to ø100
⑨	Tie rod	Carbon steel	Uni-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 retainer	Urethane	

Replacement Parts: Seal Kit

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	
125	MBW125-PS	

* Seal kits consist of items ⑫, ⑬, ⑭ and ⑯, and can be ordered by using the seal kit number corresponding to each bore size.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

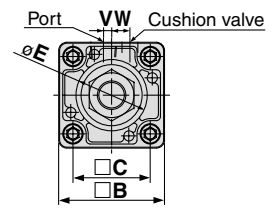
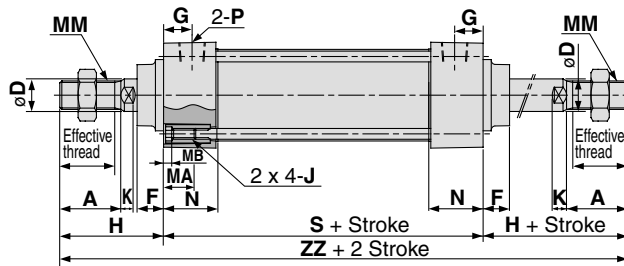
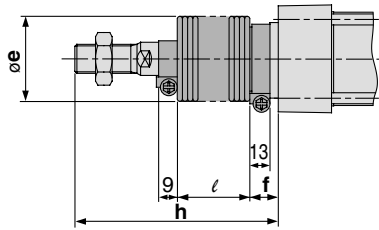
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Data

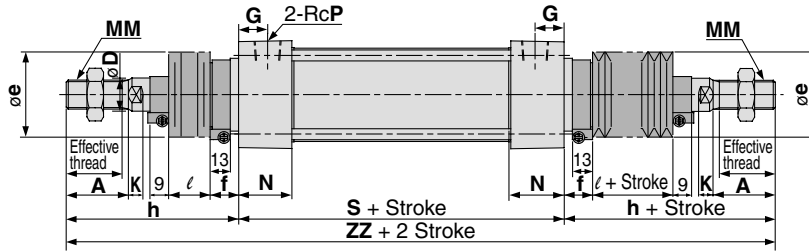
Series MBW

With Mounting Bracket

Basic: (B)



With rod boot



Without Air Cushion

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	to 500	19.5	10	22	46	32.5	12	30	13	13	47	16	4	M6 x 1.0	6	M10 x 1.25	27	1/8	84	4	6.5	178	90	184
40	to 500	27	14	30	52	38	16	35	13	14	51	16	4	M6 x 1.0	6	M14 x 1.5	27	1/4	84	4	9	186	90	192
50	to 600	32	18	35	65	46.5	20	40	14	15.5	58	16	5	M8 x 1.25	7	M18 x 1.5	31.5	1/4	94	5	10.5	210	102	218
63	to 600	32	18	35	75	56.5	20	45	14	16.5	58	16	5	M8 x 1.25	7	M18 x 1.5	31.5	3/8	94	9	12	210	102	218
80	to 800	37	22	40	95	72	25	45	20	19	72	16	5	M10 x 1.5	10	M22 x 1.5	38	3/8	114	11.5	14	258	124	268
100	to 800	37	26	40	114	89	30	55	20	19	72	16	5	M10 x 1.5	10	M26 x 1.5	38	1/2	114	17	15	258	124	268
125	to 1000	50	27	54	136	110	32	60	27	19	97	20	6	M12 x 1.75	13	M27 x 2.0	38	1/2	120	17	15	314	132	326

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	801 to 900	901 to 1000	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000												
32	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	—	—											
125	75	27	10	20	30	40	60	80	100	120	140	160	180	200	120	130	140	150	170	190	210	230	250	270	290	310	340	360	380	400	440	480	520	560	600	640	680	720	—	—										

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

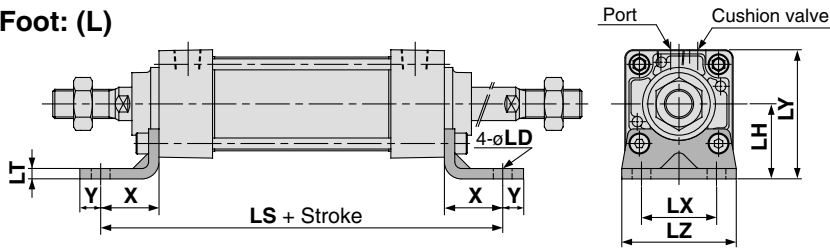
** Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston; ø32, ø40: +3 mm, ø50, ø63: +4 mm, ø80, ø100: +5 mm, ø125: +6 mm (For trunnion mounting and trunnion bracket)

Air Cylinder: Standard Type Double Acting, Double Rod Series MBW

With Mounting Bracket

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

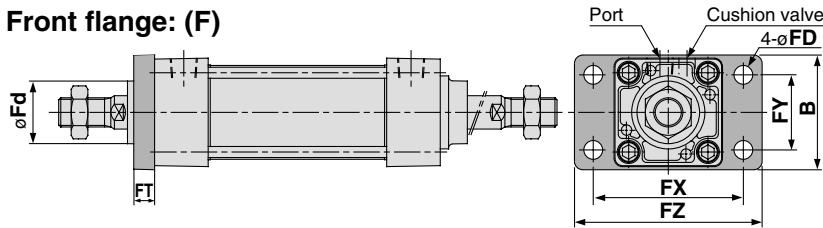
Foot: (L)



Foot

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

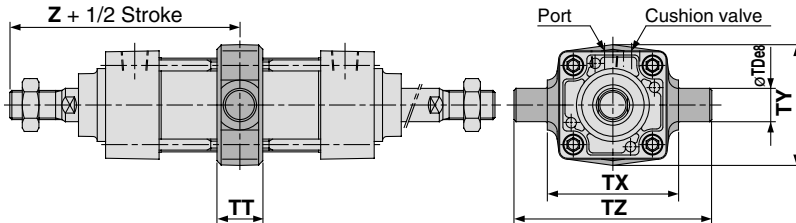
Front flange: (F)



Front Flange

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

Center trunnion: (T)



Center Trunnion

Bore (mm)	Stroke range	TDe8	TT	TX	TY	TZ	Z**
32	to 500	12	17	50	49	74	89
40	to 500	16	22	63	58	95	93
50	to 600	16	22	75	71	107	105
63	to 600	20	28	90	87	130	105
80	to 800	20	34	110	110	150	129
100	to 800	25	40	132	136	182	129
125	to 1000	25	50	160	160	210	157

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

** 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: +3 mm, ø50, ø63: +4 mm, ø80, ø100: +5 mm, ø125: +6 mm (For trunnion mounting and trunnion bracket)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

20-

Data

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

Series **MBK**

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch

With auto switch

Built-in magnet

Mounting

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

Bore size

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

Port thread type

Symbol	Type
Nil	Rc
TN	NPT
TF	G

Stroke (mm)

Refer to "Standard Stroke" on page 6-6-23.

Number of auto switches

Nil	2
S	1
3	3
n	n

Auto switch

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

* For applicable auto switches, refer to the table below.
* The auto switches for D-Z7□/Z80/Y59□/Y69□/Y7□□ are included but unmounted. (Only the switch mounting brackets for the above models are mounted.)

Rod boot/Cushion

Rod boot	Nil	None
	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	Nil	Both ends
	N Note 1)	None

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: +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	Wiring (Output)	Load voltage		Auto switch model		Lead wire length*(m)			Pre-wire connector	Applicable load	
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	3 (L)	5 (Z)			
Reed switch	—	Grommet	Yes	3-wire (NPN)	—	5 V	—	Z76	—	●	●	—	—	IC circuit
				3-wire (PNP)	—	—	—	—	—	—	—	—	—	—
		2-wire		24 V	12 V	100 V, 200 V	Z73	—	●	●	●	—	—	Relay
		2-wire		—	—	—	A54	—	●	●	●	—	—	PLC
	Diagnostic indication (2-color indication)	Grommet	Yes	2-wire	—	—	—	A33	—	—	—	—	—	—
	2-wire			—	—	—	A34	—	—	—	—	—	—	Relay
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	Y59A	—	●	●	○	○	IC circuit
				3-wire (PNP)	—	—	100 V, 200 V	Y7P	—	●	●	○	○	—
		2-wire		—	—	—	J51	—	●	●	○	—	—	
		2-wire		—	12 V	—	Y59B	—	●	●	○	○	—	
		2-wire		—	5 V, 12 V	—	G39	—	—	—	—	—	IC circuit	
		2-wire		—	12 V	—	K39	—	—	—	—	—	—	
	Diagnostic indication (2-color indication)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	Y7NW	—	●	●	○	○	IC circuit
	3-wire (PNP)			—	—	—	Y7PW	—	●	●	○	○	—	
	2-wire			—	12 V	—	Y7BW	—	●	●	○	○	—	
	2-wire			—	12 V	—	Y7BA	—	—	—	●	○	○	—
Water resistant (2-color indication)	Grommet	Yes	4-wire (NPN)	—	5 V, 12 V	—	F59F	—	●	●	○	○	IC circuit	
Diagnostic output (2-color indication)			2-wire	—	—	—	P5DW	—	—	—	●	●	○	—
Magnetic field resistant	Grommet	Yes	2-wire	—	—	—	—	—	—	—	—	—	—	

* Lead wire length symbols: 0.5 m Nil (Example) A54
3 m L (Example) A54L
5 m Z (Example) A54Z

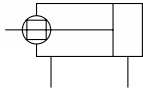
** Solid state switches marked with a "○" are produced upon receipt of order.

• Besides the above models, there are some other auto switches that are applicable. For detailed information, please refer to page 6-6-14.

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



JIS Symbol
Double acting



Made to Order Specifications
(For details, refer to 6-6-39.)

Symbol	Specifications
-XA□	Change of rod end shape
-XC3	Special port position
-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 extend stroke
-XC9	Adjustable stroke cylinder/Adjustable retract stroke
-XC10	Dual stroke cylinder/Double rod
-XC14	Change of trunnion bracket mounting position
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC29	Double knuckle joint with spring pin
-XC30	Front trunnion

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.
(No spacer is used)

Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting, Single rod					
Fluid	Air					
Proof pressure	1.5 MPa					
Max. operating pressure	1.0 MPa					
Min. 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)					
Operating piston speed	50 to 1000 mm/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, NPT, G)	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, Rod side flange, Head side flange, Single clevis, Double clevis, Center trunnion					
Non-rotating accuracy	ø32, ø40	±0.5°				
	ø50, ø63	±0.5°				
	ø80, ø100	±0.3°				
Allowable rotating torque N·m 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.

Accessory

Mounting		Basic	Foot	Rod side flange	Head side flange	Single clevis	Double clevis	Center 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	
Add'l weight per each 50 mm stroke	All mounting bracket	0.11	0.15	0.26	0.27	0.40	0.52	
	Accessory	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	
	Add'l weight per each 50 mm stroke	0.16	0.21	0.33	0.37	0.56	0.72	

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

- Basic weight 0.50 (Basic ø32)
- Additional weight ... 0.11/50 stroke
- Cylinder stroke 100 stroke

$$0.50 + 0.11 \times 100/50 = 0.72 \text{ kg}$$

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

20-

Data

Series MBK

Material of Rod Boot

Symbol	Material	Max. ambient temp.
J	Nylon tarpaulin	70°C
K	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 ²)	Bore size (mm)	Rod diameter (mm ²)
32	675	63	2804
40	1082	80	4568
50	1651	100	7223

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

Auto Switch Mounting Bracket Part No.

(mm)

Auto switch model	Bore size					
	32	40	50	63	80	100
D-A3□/A44 D-G39/K39	BMB2-032	BMB2-040	BMB1-050	BMB1-063	BMB1-080	BMB1-100
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W/J59W D-F59F D-F5BAL D-F5NTL	BT-03	BT-03	BT-05	BT-05	BT-06	BT-06
D-P5DWL	BMB3T-040	BMB3T-040	BMB3T-050	BMB3T-050	BMB3T-080	BMB3T-080
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W D-Y7□WV D-Y7BAL	BMB4-032	BMB4-032	BMB4-050	BMB4-050	BA4-063	BA4-063

[A set of stainless steel mounting screws]

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.

Mounting Bracket Part No.

Bore size (mm)	32	40	50	63	80	100
Foot ^{Note 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.

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

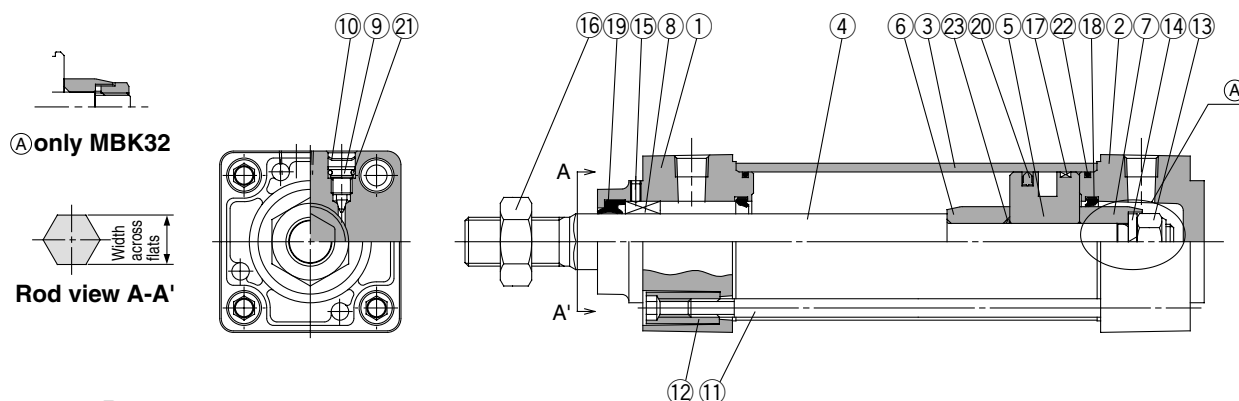
Foot, Flange, Single clevis: Mounting bolts

Double clevis: Clevis pin, Cotter pin

→ Refer to page 6-6-11 for details.

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

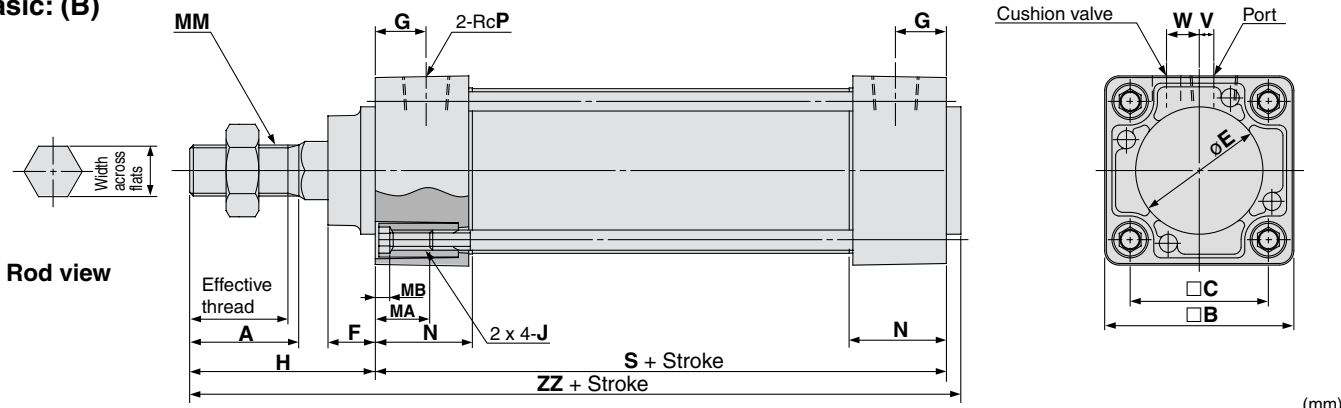
Bore size (mm)	Kit no.	Contents
32	MBK32-PS	Set of the No. ⑱, ⑲, ⑳ and ㉒.
40	MBK40-PS	
50	MBK50-PS	
63	MBK63-PS	
80	MBK80-PS	
100	MBK100-PS	

* 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: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm

Without Mounting Bracket

Basic: (B)



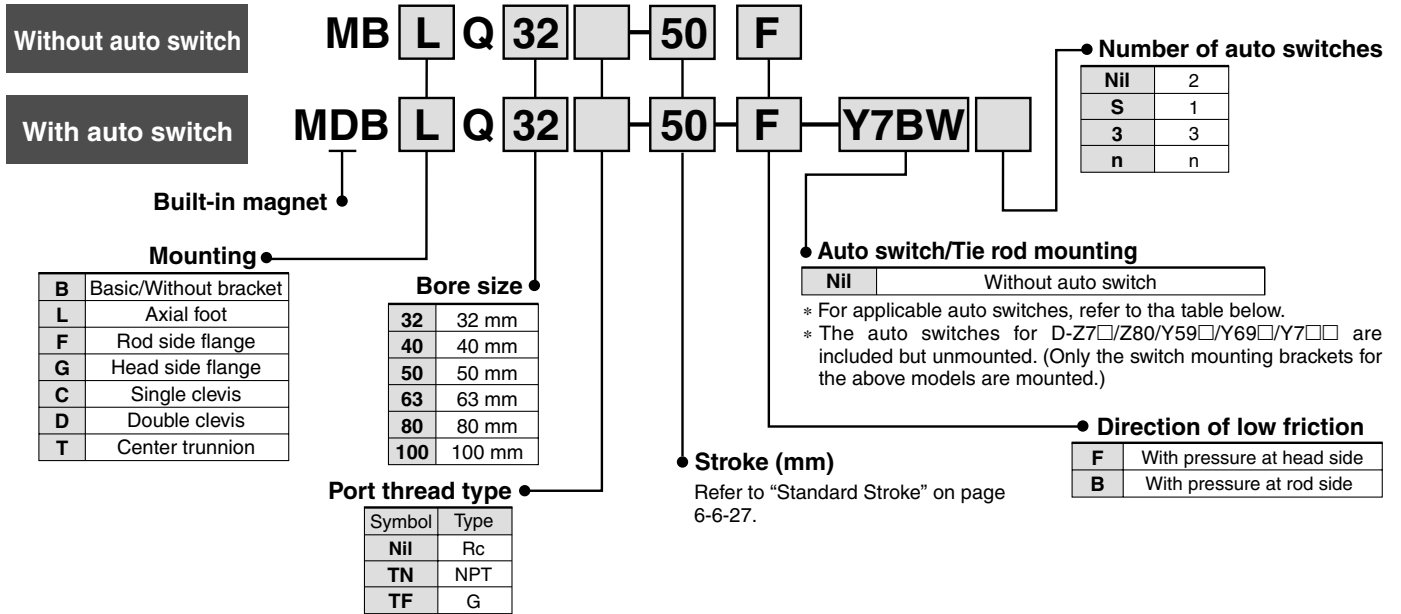
Bore (mm)	Stroke range	Effective thread length	Width across flats	A	□B	□C	E	F	G	H	MA	MB	J	MM	N	P	S*	V	W	ZZ*
32	up to 500	19.5	12.2	22	46	32.5	30	13	13	47	16	4	M6 x 1.0	M10 x 1.25	27	1/8	84	4	6.5	135
40	up to 500	27	14.2	30	52	38	35	13	14	51	16	4	M6 x 1.0	M14 x 1.5	27	1/4	84	4	9	139
50	up to 600	32	19	35	65	46.5	40	14	15.5	58	16	5	M8 x 1.25	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 x 1.25	M18 x 1.5	31.5	3/8	94	9	12	156
80	up to 800	37	23	40	95	72	45	20	19	72	16	5	M10 x 1.5	M22 x 1.5	38	3/8	114	11.5	14	190
100	up to 800	37	27	40	114	89	55	20	19	72	16	5	M10 x 1.5	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).

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

Air Cylinder: Low Friction Type Double Acting, Single Rod Series **MB□Q** ø32, ø40, ø50, ø63, ø80, ø100

How to Order



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

Type	Special function	Electrical entry	Indicator	Wiring (Output)	Load voltage		Auto switch model		Lead wire length*(m)			Pre-wire connector	Applicable load		
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	3 (L)	5 (Z)		IC circuit	Relay PLC	
Reed switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	—	5 V	—	Z76	—	●	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	—	Z73	—	●	●	●	—	—
	100 V, 200 V	—					A54	—	●	●	●				
	—	—					A33	—	—	—	—				
Diagnostic indication (2-color indication)	Grommet	—	—	—	—	A34	—	—	—	—	—	Relay PLC			
—	—	—	—	—	—	A44	—	—	—	—					
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	Y59A	—	●	●	○	○	IC circuit	Relay PLC
				3-wire (PNP)				Y7P	—	●	●	○	○		
	2-wire	—		100 V, 200 V	J51	—	●	●	○	○	—				
					Y59B	—	●	●	○	○					
	3-wire (NPN)	—		5 V, 12 V	—	G39	—	—	—	—	IC circuit				
					2-wire	—	K39	—	—	—		—			
	3-wire (NPN)	—		5 V, 12 V	Y7NW	—	●	●	○	○	IC circuit				
					3-wire (PNP)	Y7PW	—	●	●	○		○			
	Diagnostic indication (2-color indication)	Grommet		24 V	12 V	—	—	—	—	—	—	—	—	—	
	Water resistant (2-color indication)					Y7BW	—	●	●	○	○				
Diagnostic output (2-color indication)	Y7BA		—			—	●	○	○	—					
Magnetic field resistant	F59F		—			●	●	○	○	IC circuit					
—	—	—	—	—	—	—	—	—	—	—	—	—			

* Lead wire length symbols: 0.5 m Nil (Example) A54
3 m L (Example) A54L
5 m Z (Example) A54Z

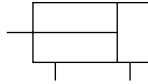
** Solid state switches marked with a "○" are produced upon receipt of order.

• Besides the above models, there are some other auto switches that are applicable. For detailed information, please refer to page 6-6-14.

Air Cylinder: Low Friction Type Double Acting, Single Rod **Series MB□Q**



JIS Symbol
Double acting



Made to Order Specifications
(For details, refer to 6-6-39.)

Symbol	Specifications
-XA□	Change of rod end shape
-XC3	Special port position
-XC6	Piston rod and rod end nut made of stainless steel
-XC7	Tie rod, cushion valve, tie rod nut, etc. made of stainless steel
-XC9	Adjustable stroke cylinder/Adjustable retract stroke
-XC14	Change of trunnion bracket mounting position
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC29	Double knuckle joint with spring pin
-XC30	Front trunnion

Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting single rod					
Direction of low friction	One direction ^{Note 1)}					
Fluid	Air					
Proof pressure	1.05 MPa					
Max. operating pressure	0.7 MPa					
Min. operating pressure	0.01 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)					
Cushion	None					
Thread tolerance	JIS Class 2					
Port size (Rc, NPT, G)	1/8	1/4	1/4	3/8	3/8	1/2
Mounting	Basic, Foot, Rod side flange, Head side flange, Single clevis, Double clevis, Center trunnion					
Allowable leakage	0.5 ℓ/min (ANR) or less					

Note 1) Please refer to Selection Guide for the Low Friction Side.

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. (No spacer is used.)

Accessory

Mounting		Basic	Foot	Rod side flange	Head side flange	Single clevis	Double clevis	Center trunnion
Standard	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (With pin)	●	●	●	●	●	●	●

Mounting Bracket Part No.

Bore size (mm)	32	40	50	63	80	100
Foot ^{Note 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.

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

Foot, Flange, Single clevis: Mounting bolts

Double clevis: Clevis pin, Cotter pin

→ Refer to page 6-6-11 for details.

CJ1

CJP

CJ2

CM2

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Data

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 each 50 mm stroke	All mounting bracket	0.11	0.16	0.26	0.27	0.42	0.56
Accessory	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

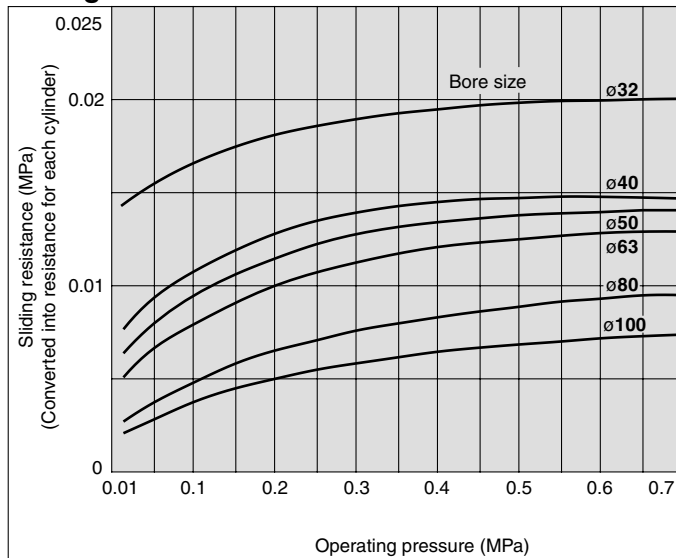
Calculation example: MBBQ32-100 (Basic, ø32, 100 st)

- 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

- 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.

Sliding Resistance on Low Friction Side



Auto Switch Mounting Bracket Part No.

(mm)

Auto switch	Bore size					
	32	40	50	63	80	100
D-A3□/A44 D-G39/K39	BMB2-032	BMB2-040	BMB1-050	BMB1-063	BMB1-080	BMB1-100
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W/J59W D-F59F D-F5BAL D-F5NTL	BT-03	BT-03	BT-05	BT-05	BT-06	BT-06
D-P5DWL	BMB3T-040	BMB3T-040	BMB3T-050	BMB3T-050	BMB3T-080	BMB3T-080
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W D-Y7□WV D-Y7BAL	BMB4-032	BMB4-032	BMB4-050	BMB4-050	BA4-063	BA4-063

[A set of stainless steel mounting screws]

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

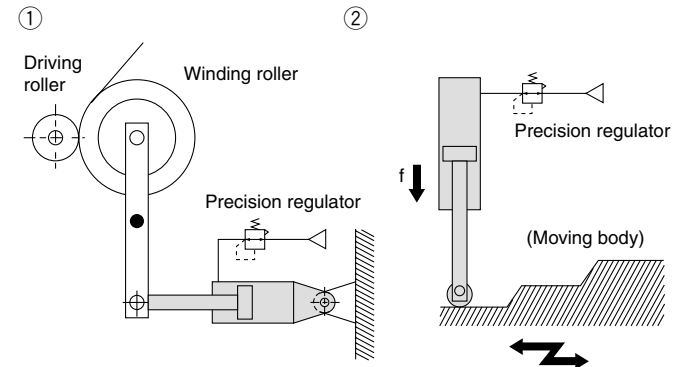
BBA1: D-A5/A6/F5/J5 types

* "D-F5BAL" switch is set on the cylinder with the screws above when shipped.

When a switch only is shipped, "BBA1" screws are attached.

Application Example

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



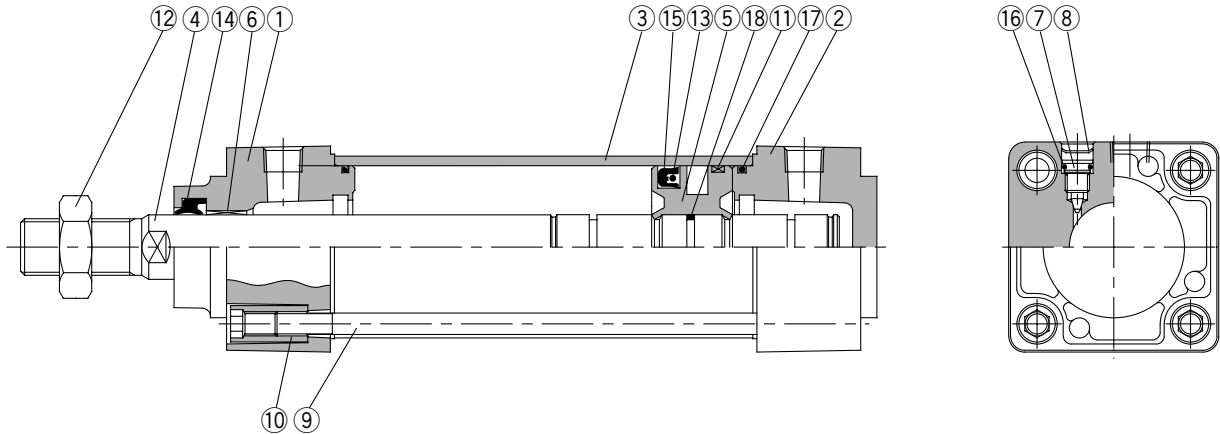
Caution on Use

Warning

- In the direction of low friction operation, speed control must be effected by the meter-in system.

With meter-out control, the exhaust pressure will increase and create a greater sliding resistance.

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	Carbon steel	Hard chrome plated
⑤	Piston	Aluminum alloy	Chromated
⑥	Bushing	Lead bronze cast	
⑦	Cushion valve	Steel wire	Nickel plated
⑧	Snap ring	Steel for spring	ø40 to ø100
⑨	Tie rod	Carbon steel	Uni-chromated
⑩	Tie rod nut	Carbon steel	Nickel plated
⑪	Wear rod	Resin	
⑫	Rod end nut	Carbon steel	Nickel plated
⑬*	Back up O ring	NBR	
⑭*	Rod seal	NBR	
⑮*	Piston seal	NBR	
⑯	Cushion valve seal	NBR	
⑰*	Cylinder tube gasket	NBR	
⑱	Piston gasket	NBR	

Replacement Parts: Seal Kit

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	

* Seal kits consist of items ⑬, ⑭, ⑮ and ⑰, and can be ordered by using the seal kit number corresponding to each bore size.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

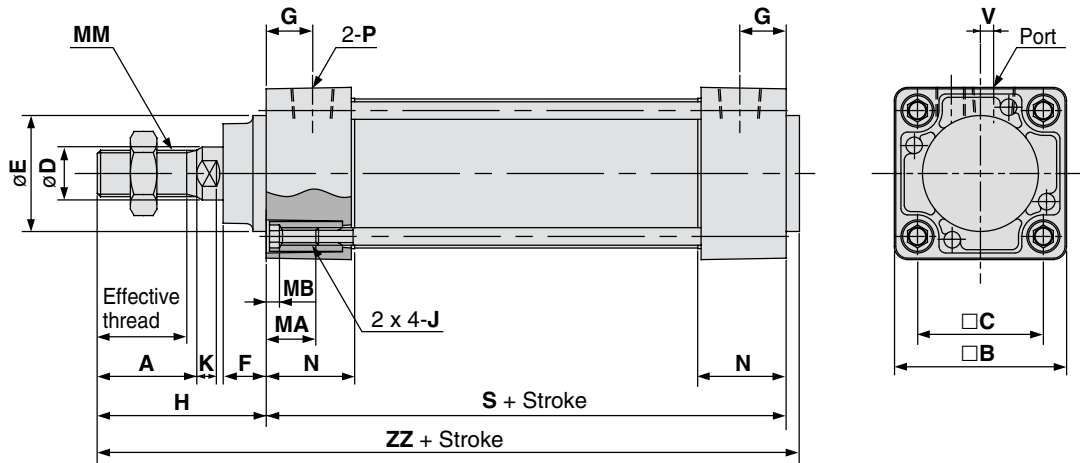
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Data

Series MB□Q

Basic: (B)

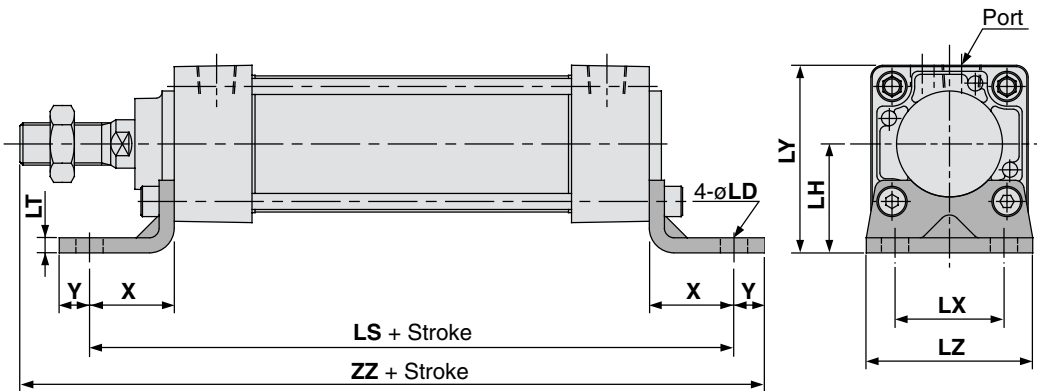


																					(mm)
Bore (mm)	Stroke range	Effective thread length	Width across flats	A	B	C	D	Ee11	F	G	H	MA	MB	J	K	MM	N	P	S	V	ZZ
32	up to 500	19.5	10	22	46	32.5	12	30	13	13	47	16	4	M6 x 1	6	M10 x 1.25	27	1/8	84	4	135
40	up to 500	27	14	30	52	38	16	35	13	14	51	16	4	M6 x 1	6	M14 x 1.5	27	1/4	84	4	139
50	up to 600	32	18	35	65	46.5	20	40	14	15.5	58	16	5	M8 x 1.25	7	M18 x 1.5	31.5	1/4	94	5	156
63	up to 600	32	18	35	75	56.5	20	45	14	16.5	58	16	5	M8 x 1.25	7	M18 x 1.5	31.5	3/8	94	9	156
80	up to 800	37	22	40	95	72	25	45	20	19	72	16	5	M10 x 1.5	10	M22 x 1.5	38	3/8	114	11.5	190
100	up to 800	37	26	40	114	89	30	55	20	19	72	16	5	M10 x 1.5	10	M26 x 1.5	38	1/2	114	17	190

With Mounting Bracket

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

Foot: (L)

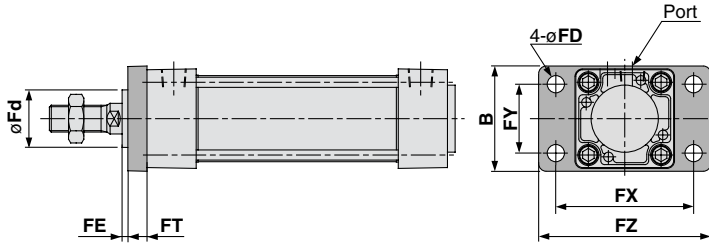


												(mm)
Bore size (mm)	Stroke range	X	Y	LD	LH	LS	LT	LX	LY	LZ	ZZ	
32	to 700	22	9	7	30	128	3.2	32	53	50	162	
40	to 800	24	11	9	33	132	3.2	38	59	55	170	
50	to 1000	27	11	9	40	148	3.2	46	72.5	70	190	
63	to 1000	27	14	12	45	148	3.6	56	82.5	80	193	
80	to 1000	30	14	12	55	174	4.5	72	102.5	100	230	
100	to 1000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

Air Cylinder: Low Friction Type Double Acting, Single Rod **Series MB□Q**

With Mounting Bracket

Front flange: (F)

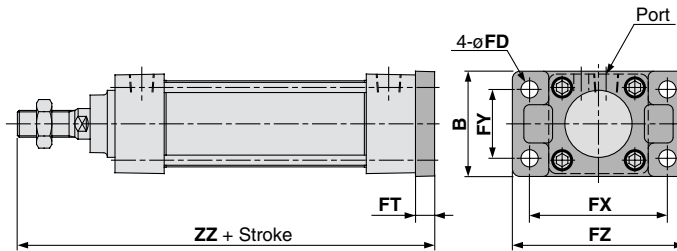


Front Flange

(mm)

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

Rear flange: (G)

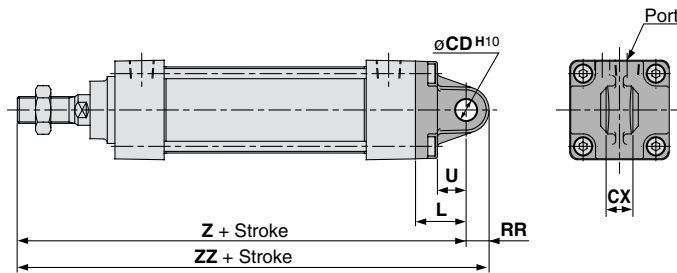


Rear Flange

(mm)

Bore size (mm)	Stroke range	B	FD	FT	FX	FY	FZ	ZZ
32	to 500	50	7	10	64	32	79	141
40	to 500	55	9	10	72	36	90	145
50	to 600	70	9	12	90	45	110	164
63	to 600	80	9	12	100	50	120	164
80	to 750	100	12	16	126	63	153	202
100	to 750	120	14	16	150	75	178	202

Single clevis: (C)

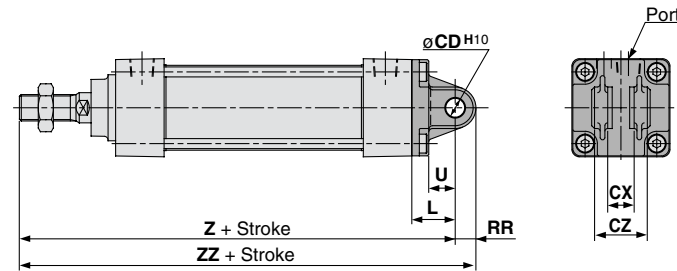


Single Clevis

(mm)

Bore size (mm)	Stroke range	L	RR	U	CD ^{H10}	CX ^{-0.1} _{-0.3}	Z	ZZ
32	to 500	23	10.5	13	10	14	154	164.5
40	to 500	23	11	13	10	14	158	169
50	to 600	30	15	17	14	20	182	197
63	to 600	30	15	17	14	20	182	197
80	to 750	42	23	26	22	30	228	251
100	to 750	42	23	26	22	30	228	251

Double clevis: (D)

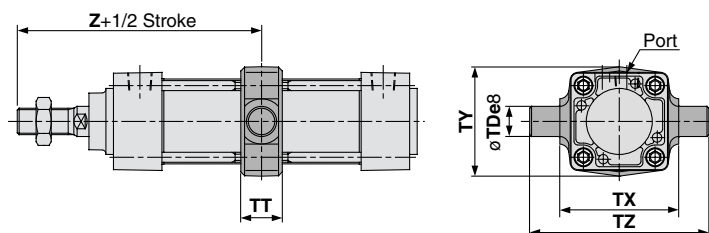


Double Clevis

(mm)

Bore size (mm)	Stroke range	L	RR	U	CD ^{H10}	CX ^{+0.3} _{-0.1}	CZ	Z	ZZ
32	to 500	23	10.5	13	10	14	28	154	164.5
40	to 500	23	11	13	10	14	28	158	169
50	to 600	30	15	17	14	20	40	182	197
63	to 600	30	15	17	14	20	40	182	197
80	to 750	42	23	26	22	30	60	228	251
100	to 750	42	23	26	22	30	60	228	251

Center trunnion: (T)



Center Trunnion

(mm)

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

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

20-

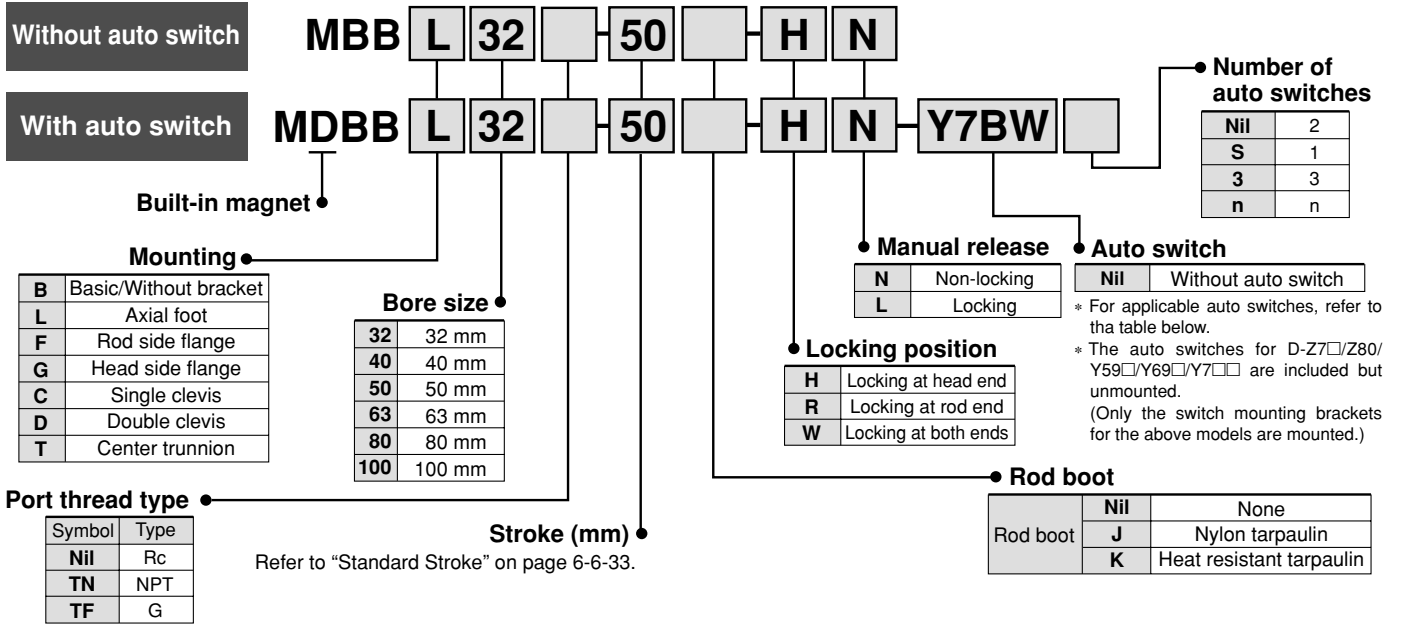
Data

Air Cylinder: With End Lock

Series **MBB**

ø32, ø40, ø50, ø63, ø80, ø100

How to Order



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

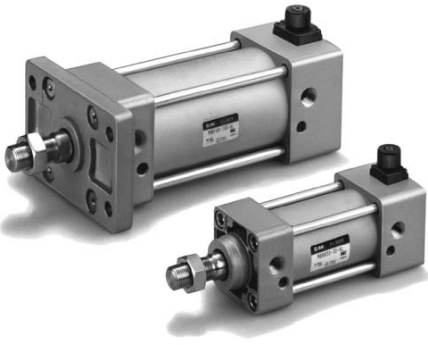
Type	Special function	Electrical entry	Indicator	Wiring (Output)	Load voltage		Auto switch model		Lead wire length*(m)			Pre-wire connector	Applicable load			
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	3 (L)	5 (Z)		IC circuit	Relay PLC		
Reed switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	—	5 V	—	Z76	—	●	●	—	—	IC circuit	—	
				2-wire	24 V	12 V	100 V	—	Z73	—	●	●	●	—	—	Relay PLC PLC
							100 V, 200 V	—	A54	—	●	●	●	—		
	—	—	—	—	—	—	A33	—	—	—	—	—	—	Relay PLC		
—	—	—	—	—	—	A34	—	—	—	—	—					
—	Diagnostic indication (2-color indication)	Grommet	—	—	—	—	A44	—	—	—	—	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	Y59A	—	●	●	○	○	IC circuit	Relay PLC	
				3-wire (PNP)				Y7P	—	●	●	○	○			
	2-wire	—	100 V, 200 V	J51	—	●	●	○	○	—						
				Y59B	—	●	●	○	○							
	3-wire (NPN)	—	5 V, 12 V	—	G39	—	—	—	—	IC circuit						
				2-wire	—	K39	—	—	—	—	—					
	3-wire (NPN)	—	5 V, 12 V	Y7NW	—	●	●	○	○	IC circuit						
				3-wire (PNP)	Y7PW	—	●	●	○	○	IC circuit					
	2-wire	—	—	Y7BW	—	●	●	○	○	—						
	2-wire	—	—	Y7BA	—	—	●	○	○	—						
4-wire (NPN)	—	—	F59F	—	●	●	○	○	IC circuit							
2-wire	—	—	P5DW	—	—	●	●	○	—							

* Lead wire length symbols: 0.5 m Nil (Example) A54
3 m L (Example) A54L
5 m Z (Example) A54Z

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

• Besides the above models, there are some other auto switches that are applicable. For detailed information, please refer to page 6-6-14.

Air Cylinder: With End Lock Series MBB



Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting, Single rod					
Fluid	Air					
Proof pressure	1.5 MPa					
Max. operating pressure	1.0 MPa					
Min. operating pressure	0.15 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)					
Operating piston speed	50 to 1000 mm/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, NPT, G)	1/8	1/4	1/4	3/8	3/8	1/2
Mounting	Basic, Foot, Rod side flange, Head side flange, Single clevis, Double clevis, Center trunnion					

* 0.05 MPa except locking parts.



Made to Order Specifications
(For details, refer to 6-6-39.)

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

Locking Specifications

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

Accessory

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

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. (No spacer is used.)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

20-

Data

Series MBB

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 each 50 mm stroke	All mounting bracket	0.11	0.16	0.26	0.27	0.42	0.56
Accessory	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

Additional Weight of Locking Part

(kg)

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 0.68
 - Additional weight 0.11/50 stroke
 - Cylinder stroke 100 stroke
 - Locking weight 0.08 (Locking at head end, manual release non-locking type)
- $0.68 + 0.11 \times 100/50 + 0.08 = 0.98 \text{ kg}$

Auto Switch Mounting Bracket Part No.

(mm)

Auto switch	Bore size					
	32	40	50	63	80	100
D-A3□/A44 D-G39/K39	BMB2-032	BMB2-040	BMB1-050	BMB1-063	BMB1-080	BMB1-100
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W/J59W D-F59F D-F5BAL D-F5NTL	BT-03	BT-03	BT-05	BT-05	BT-06	BT-06
D-P5DWL	BMB3T-040	BMB3T-040	BMB3T-050	BMB3T-050	BMB3T-080	BMB3T-080
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W D-Y7□WV D-Y7BAL	BMB4-032	BMB4-032	BMB4-050	BMB4-050	BA4-063	BA4-063

[A set of stainless steel mounting screws]

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,

Mounting Bracket Part No.

Bore size (mm)	32	40	50	63	80	100
Foot ^{Note 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.

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

Foot, Flange, Single clevis: Mounting bolts

Double clevis: Clevis pin, Cotter pin

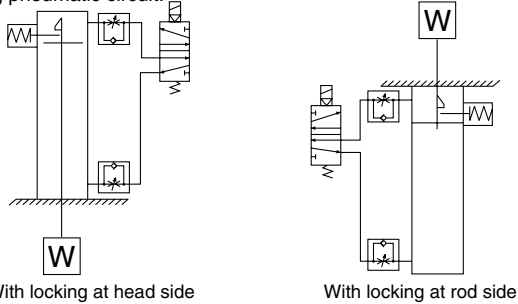
→ Refer to page 6-6-11 for details.

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 to 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 0.15 MPa at port with locking mechanism.

3. Exhaust speed

⚠ Caution

When pressures at port with locking mechanism is decrease to 0.05 MPa or less, it is automatically locked. When exhaust pipe at port with locking mechanism is thin and long or speed controller is 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

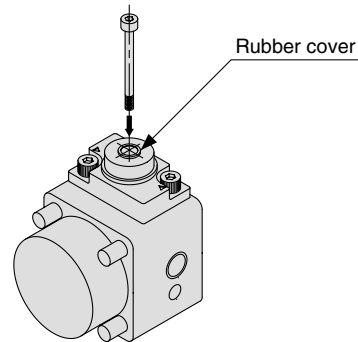
⚠ Caution

Non-locking type

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.

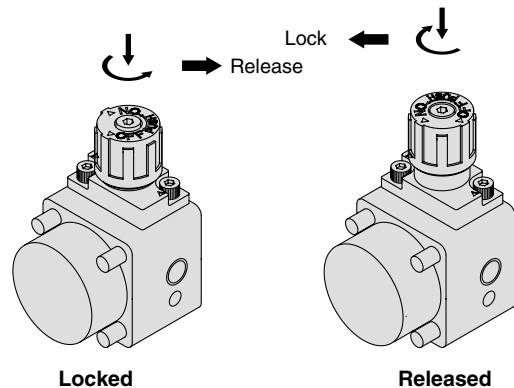
Bore size (mm)	Thread size	Pulling force	Stroke (mm)
32	≥ M2.5 x 0.45 x 25 ℓ	4.9 N	2
40, 50, 63	≥ M3 x 0.5 x 30 ℓ	10 N	3
80, 100	≥ M5 x 0.8 x 40 ℓ	24.5 N	3

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



Locking 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.



CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

20-

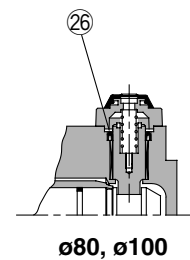
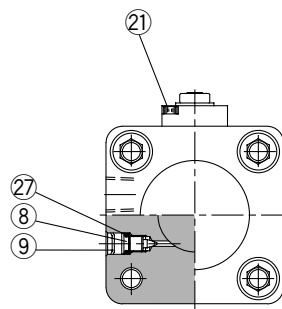
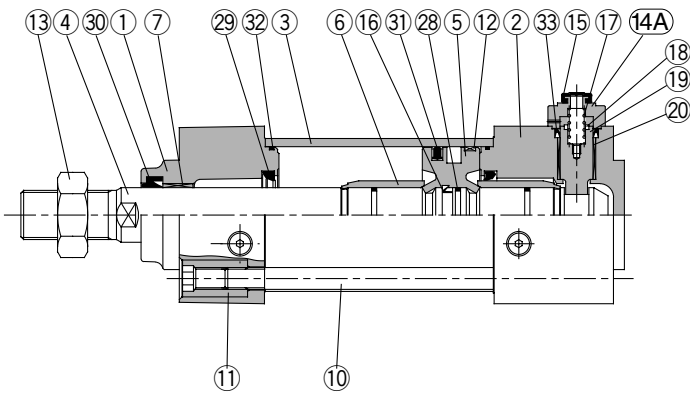
Data

Series MBB

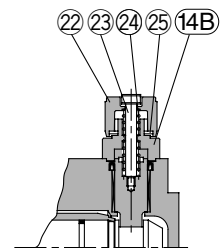
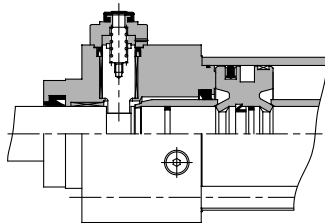
Construction

Locking at head end

Manual release non-locking type: N



Locking at rod end



Manual release non-locking type: L

Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Metallic painted
②	Head cover	Aluminum alloy	Metallic painted
③	Cylinder tube	Aluminum alloy	Hard anodized
④	Piston rod	Carbon steel	Hard chrome 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	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	Tuffride
⑮	Rubber cover	Synthetic rubber	
⑯	Piston holder	Urethane	

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

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

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

Replacement Parts: Seal Kit (Locking at both ends)

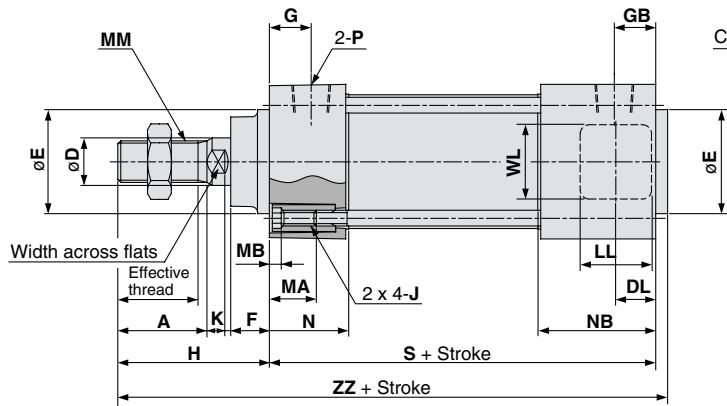
Bore size (mm)	Kit no.	Contents
32	MBB32-PS-W	Set of the No. ㉙, ㉚, ㉛, ㉜ and ㉝.
40	MBB40-PS-W	
50	MBB50-PS-W	
63	MBB63-PS-W	
80	MBB80-PS-W	
100	MBB100-PS-W	

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

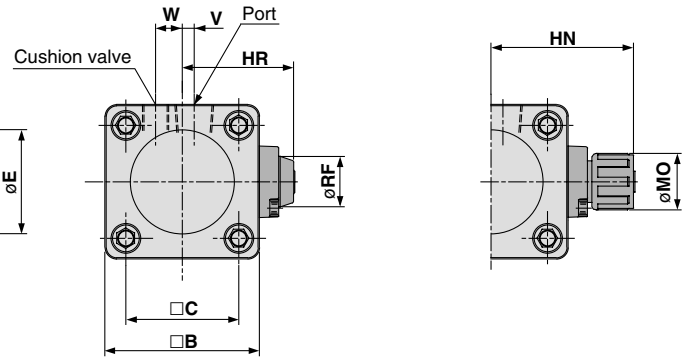
Air Cylinder: With End Lock Series MBB

Basic: (B)

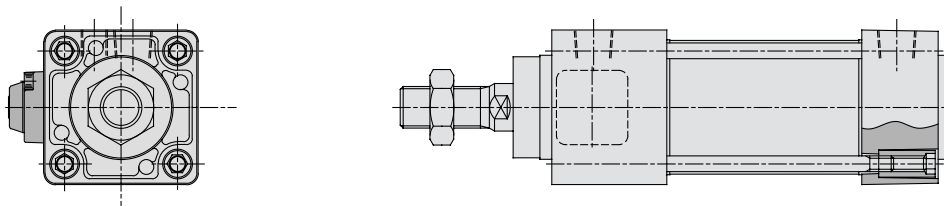
Locking at head end: MBBB - H



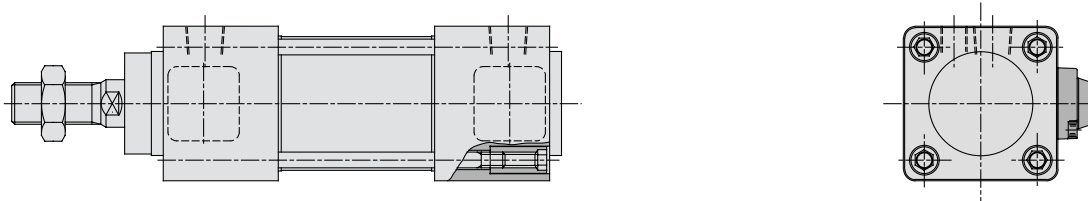
Manual release non-locking type: N Manual release locking type: L



Locking at rod end: MBBB - R



Locking at both ends: MBBB - W



-H -R

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	to 500	19.5	10	22	46	32.5	12	9	30	13	13	21	47	33.5	45	M6 x 1.0	6	15	16	4	M10 x 1.25
40	to 500	27	14	30	52	38	16	12	35	13	14	27	51	38.5	52.5	M6 x 1.0	6	21	16	4	M14 x 1.5
50	to 600	32	18	35	65	46.5	20	13	40	14	15.5	27.5	58	45	59	M8 x 1.25	7	21	16	5	M18 x 1.5
63	to 600	32	18	35	75	56.5	20	13	45	14	16.5	28.5	58	50	64	M8 x 1.25	7	21	16	5	M18 x 1.5
80	to 800	37	22	40	95	72	25	16	45	20	19	37	72	62	76.5	M10 x 1.5	10	30	16	5	M22 x 1.5
100	to 800	37	26	40	114	89	30	16	55	20	19	37	72	71.5	86	M10 x 1.5	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	to 500	19	27	35	1/8	11	92	4	6.5	24	143	100	151
40	to 500	19	27	40	1/4	11	97	4	9	24	152	110	165
50	to 600	19	31.5	43.5	1/4	11	106	5	10.5	24	168	118	180
63	to 600	19	31.5	43.5	3/8	11	106	9	12	24	168	118	180
80	to 800	23	38	56	3/8	21	132	11.5	14	40	208	150	226
100	to 800	23	38	56	1/2	21	132	17	15	40	208	150	226

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

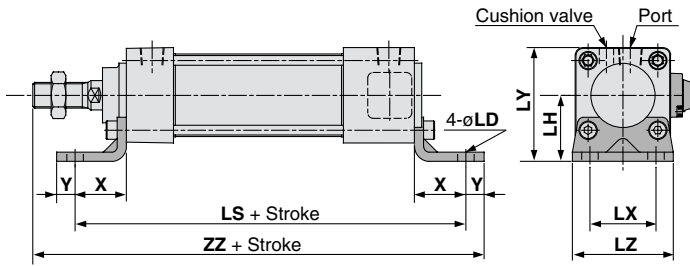
20-

Data

Series MBB

With Mounting Bracket

Foot(L)/Locking at head end (-H□)

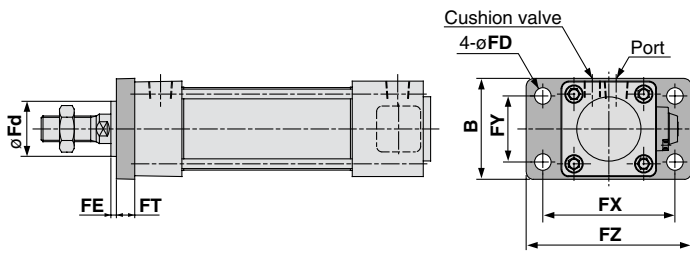


-H□/ -R□

(mm) -W□

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

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

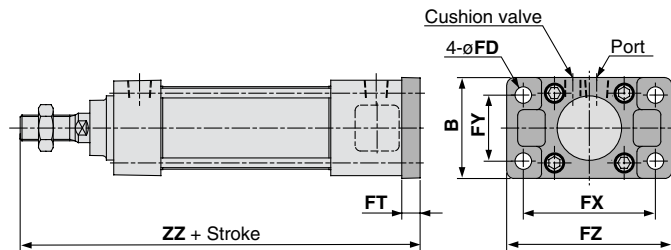


-H□/ -R□/ -W□

(mm)

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

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



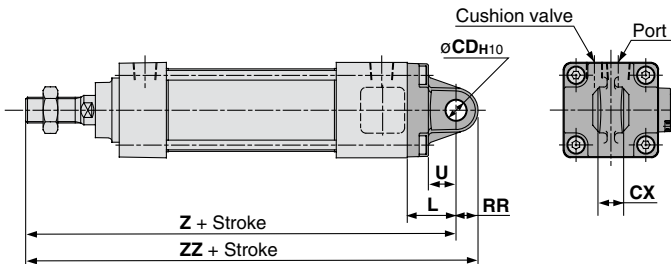
-H□/ -R□

(mm)

-W□

Bore size (mm)	Stroke range	B	FD	FT	FX	FY	FZ	ZZ	ZZ
32	to 500	50	7	10	64	32	79	149	157
40	to 500	55	9	10	72	36	90	158	171
50	to 600	70	9	12	90	45	110	176	188
63	to 600	80	9	12	100	50	120	176	188
80	to 800	100	12	16	126	63	153	220	238
100	to 800	120	14	16	150	75	178	220	238

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



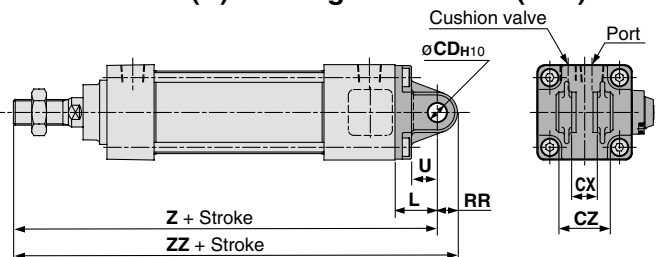
-H□/ -R□

(mm)

-W□

Bore size (mm)	Stroke range	L	RR	U	CDH10	CX ^{+0.1} _{-0.3}	Z	ZZ	Z	ZZ
32	to 500	23	10.5	13	10	14	162	172.5	170	180.5
40	to 500	23	11	13	10	14	171	182	184	195
50	to 600	30	15	17	14	20	194	209	206	221
63	to 600	30	15	17	14	20	194	209	206	221
80	to 800	42	23	26	22	30	246	269	264	287
100	to 800	42	23	26	22	30	246	269	264	287

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



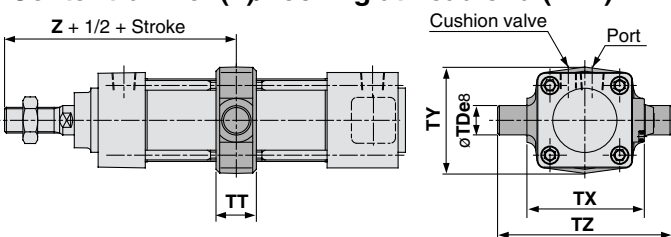
-H□/ -R□

(mm)

-W□

Bore size (mm)	Stroke range	L	RR	U	CDH10	CX ^{+0.3} _{-0.1}	CZ	Z	ZZ	Z	ZZ
32	to 500	23	10.5	13	10	14	28	162	172.5	170	180.5
40	to 500	23	11	13	10	14	28	171	182	184	195
50	to 600	30	15	17	14	20	40	194	209	206	221
63	to 600	30	15	17	14	20	40	194	209	206	221
80	to 800	42	23	26	22	30	60	246	269	264	287
100	to 800	42	23	26	22	30	60	246	269	264	287

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



-H□

(mm)

-R□/ -W□

Bore size (mm)	Stroke range	TDe8	TT	TX	TY	TZ	Z	Z
32	to 500	12	17	50	49	74	89	97
40	to 500	16	22	63	58	95	93	106
50	to 600	16	22	75	71	107	105	117
63	to 600	20	28	90	87	130	105	117
80	to 800	20	34	110	110	150	129	147
100	to 800	25	40	132	136	182	129	147



Series MB

Simple Specials

Made to Order Specifications

Simple Specials The following special products are treated in the simple order made system. Dedicated simple special specification information and CD-ROM's are available. Please contact SMC sales representatives.

Symbol	Descriptions	Single rod MB	Double rod MBW	Non-rotating rod MBK	Low friction MB□Q	Enk lock MBB	Page
1 -XA0 to XA30	Change of rod end shape	●	●	●	●	●	6-6-40
2 -XC14	Change of trunnion bracket mounting position	●	●	●	●	●	6-6-41

Made to Order Specifications

Symbol	Descriptions	Single rod MB	Double rod MBW	Non-rotating rod MBK	Low friction MB□Q	Enk lock MBB	Page
1 -XB5	Oversized rod cylinder	●					6-6-42
2 -XB6	Heat resistant cylinder (150°C)	●	●				
3 -XB13	Low speed cylinder (5 to 50 mm/s)	●	●				
4 -XC3	Special port position	●	●	●	●		
5 -XC4	With heavy duty scraper	●	●				6-6-43
6 -XC5	Heat resistant cylinder (110°C)	●	●				
7 -XC6	Piston rod and rod end nut made of stainless steel	●	●	●	●		
8 -XC7	Tie rod, cushion valve, tie rod nut, etc. made of stainless steel	●	●	●	●	●	
9 -XC8	Adjustable stroke cylinder/Adjustable extend stroke	●		●			6-6-44
10 -XC9	Adjustable stroke cylinder/Adjustable retract stroke	●		●	●		
11 -XC10	Dual stroke cylinder/Double rod	●		●		●	
12 -XC11	Dual stroke cylinder/Single rod	●					
13 -XC12	Tandem cylinder	●					6-6-45
14 -XC22	Fluorine rubber seals	●	●				
15 -XC27	Double clevis pin and double knuckle pin made of stainless steel	●	●	●	●	●	
16 -XC29	Double knuckle joint with spring pin	●	●	●	●	●	
17 -XC30	Front trunnion	●	●	●	●	●	6-6-45
18 -XC35	With coil scraper	●	●				

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

20-

Data

Simple Specials

1 Change of Rod End Shape -XA0 to XA30

Rod end shape except standard style for actuator is provided in patterns.

Series		Action	Applicable pattern symbols	
MB	Standard	MB	Double acting, Single rod	XA0-30
		MBW	Double acting, Double rod	XA0-30
	Non-rotating rod	MBK	Double acting, Single rod	XA0, 1, 6, 10, 11, 13, 14, 17, 19, 21
	Low friction	MB□Q	Double acting, Single rod	XA0-30
	End lock	MBB	Double acting, Single rod	XA0-30

1) SMC will make appropriate arrangements if no dimensional, tolerance, or finish instructions are given in the diagram.

2) The standard dimensions marked with "*" can be obtained from the rod diameter (D) as follows. Please specify any dimensions that are to be different.

$D \leq 6 \rightarrow D - 1 \text{ mm}$ $6 < D \leq 25 \rightarrow D - 2 \text{ mm}$ $D > 25 \rightarrow D - 4 \text{ mm}$

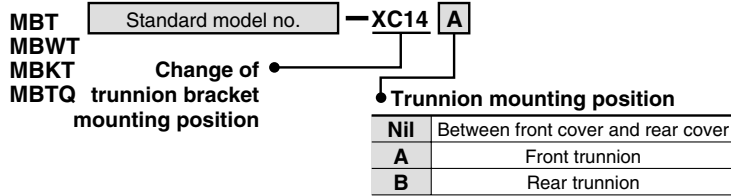
3) In case of a double rod type and a single acting retraction type, enter the dimension with the rod retracted.

4) In case of a double rod type, the change is applicable to a single side only.

Symbol: A0 	Symbol: A1 	Symbol: A2 	Symbol: A3
Symbol: A4 	Symbol: A5 	Symbol: A6 	Symbol: A7
Symbol: A8 	Symbol: A9 	Symbol: A10 	Symbol: A11
Symbol: A12 	Symbol: A13 	Symbol: A14 	Symbol: A15
Symbol: A16 	Symbol: A17 	Symbol: A18 	Symbol: A19
Symbol: A20 	Symbol: A21 	Symbol: A22 	Symbol: A23
Symbol: A24 	Symbol: A25 	Symbol: A26 	Symbol: A27
Symbol: A28 	Symbol: A29 	Symbol: A30 	

2 Change of Trunnion Bracket Mounting Position -XC14

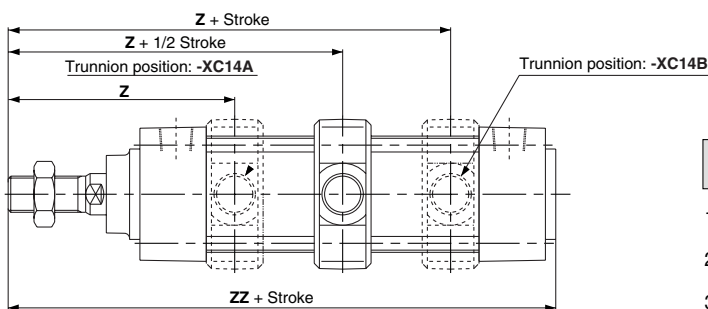
An air cylinder on which the position for mounting the trunnion bracket can be moved from the standard mounting position to a desired position.



Specifications

Action	Double acting, Single rod
Mounting	T bracket only

All specifications except for the above are the same as those of the standard type.



⚠ Precautions

- 1) Enter "Z + 1/2 stroke" when ordering with the model no. except -XC14A/B and Center trunnion.
- 2) SMC will make appropriate arrangements if no dimensional, tolerance, or finish instructions are given in the diagram.
- 3) The possible ranges for the trunnion bracket mounting position are indicated in the table below.
- 4) Please consult with SMC when one of the auto switches cannot be mounted because of trunnion mounting position.

Symbol Bore size	Z + 1/2 stroke					Reference: Standard (Center trunnion)	Minimum stroke
	-XC14A	-XC14B	-XC14				
			Min	Max			
32	82.5	95.5 + Stroke	84	94 + Stroke	89 + 1/2 stroke	0	
40	89	97 + Stroke	90	96 + Stroke	93 + 1/2 stroke	0	
50	100.5	109.5 + Stroke	102	108 + Stroke	105 + 1/2 stroke	0	
63	103.5	106.5 + Stroke	105	105 + Stroke	105 + 1/2 stroke	0	
80	127	131 + Stroke	128	130 + Stroke	129 + 1/2 stroke	0	
100	130	128 + Stroke	131	217 + Stroke	129 + 1/2 stroke	0	

(mm)

Made to Order Specifications

Please contact SMC for the detailed specifications, delivery and prices.

1 -XB5

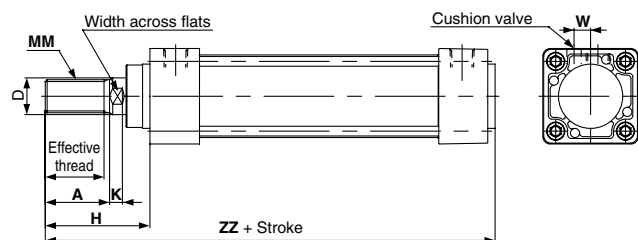
A cylinder that has been made stronger through the use of a piston rod with a larger diameter. It is used for long stroke applications that pose the risk of bending or buckling of the piston rod. (Consult with SMC if a lateral load must be applied to it.)

MB Standard model no. — **XB5**
 • Strong rod cylinder

Specifications

Action	Double acting, Single rod
Bore size (mm)	32, 40, 50, 63, 80, 100
Auto switch	Available for mounting

Dimensions



Bore size (mm)	Effective thread length	Width across flats	A	D	H	K	MM	W	ZZ
32	27	14	30	16	51	6	M14 x 1.5	7.2	139
40	32	18	35	20	58	7	M18 x 1.5	9.7	146
50	37	22	40	25	68	10	M22 x 1.5	10.5	166
63	37	22	40	25	68	10	M22 x 1.5	12	166
80	37	26	40	30	74	10	M26 x 1.5	14	192
100	47	31	50	36	90	16	M30 x 1.5	15	208

2 -XB6

An air cylinder in which the materials of the seals and the grease have been changed so that the cylinder can be operated at high ambient temperatures of up to 150°C.

MB Standard model no. — **XB6**
 • Heat resistant cylinder (150°C)

Specifications

Action	Double acting, Single/Double rod
Ambient temp.	-10°C to 150°C
Auto switch	Unavailable for mounting
Cushion	Air cushion
Material	Fluorine rubber
Grease	Heat resistant grease

The specifications and dimensions other than the above are the same as those of the standard type.

3 -XB13

Operates smoothly without sticking or slipping even at low speeds of 5 to 50 mm/s.

Note 1) Do not lubricate this cylinder.

MB Standard model no. — **XB13**
 MBW
 • Low speed cylinder

Specifications

Action	Double acting, Single/Double rod
Piston speed	5 to 50 mm/sec

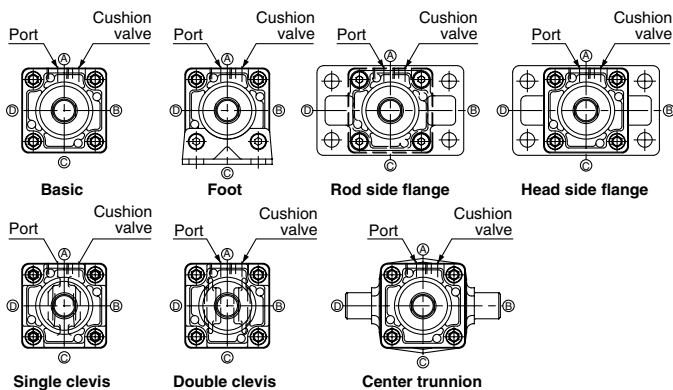
The specifications and dimensions other than the above are the same as those of the standard type.

4 -XC3

Cylinder changed connecting port position of rod/head cover and position of cushion valve.

MB Standard model no. — **XC3** **A** **C**
 MBW
 MBK
 MB□Q
 Special port position
 Port position seen from the front
 Cushion valve position seen from the front

Relation between Port Position and Cushion Valve Position



- As shown in the above diagram, the symbols for the positions of the ports and cushion valves are as follows: viewed from the rod side, the top position is rendered A; then, B, C, and D, in the clockwise direction.
- The style in which the ports and the cushion valves are combined is applicable only when the rod cover and the head cover are changed to the same positions.
- The part number "XC3AA" does not exist with regard to the port and cushion valve positions, because this is the standard specification.

5 -XC4

As it uses a powerful scraper for the wiper ring, this cylinder is suitable for use in an area that is dusty, or in an environment in which mud splashes on the cylinder, such as when operating casting equipment, construction equipment, or an industrial vehicle.

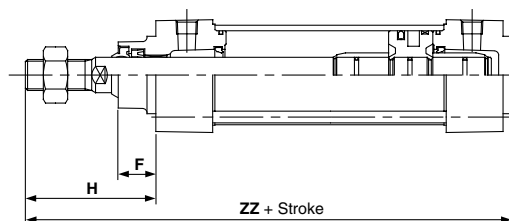
MB Standard model no. — **XC4**
 MBW
 • With heavy duty scraper

Specifications

Action	Double acting, Single Double rod
Cushion	Air cushion/Rubber bumper
Wiper ring	SCB scraper

The specifications other than the above are the same as those of the standard type.

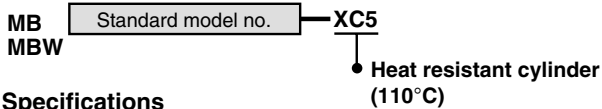
Dimensions



Bore size (mm)	F	H	ZZ	Bore size (mm)	F	H	ZZ
32	15	47	135	63	19	67	165
40	17	58	146	80	25	81	199
50	19	67	165	100	25	81	199

6 -XC5 Heat Resistant Cylinder (110°C)

A cylinder in which the material of the seals has been changed to a heat resistant style (for up to 110°C) so that it can be operated under extreme ambient temperatures that exceed the standard specifications of between -10°C and +70°C.



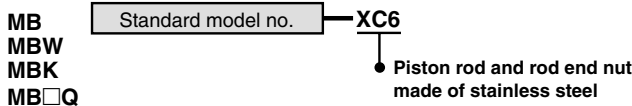
Specifications

Action	Double acting, Single/Double rod
Ambient temp.	-10°C to 110°C
Auto switch	Unavailable for mounting
Cushion	Air cushion
Material	Fluorine rubber

The specifications and dimensions other than the above are the same as those of the standard type.

7 -XC6 Piston Rod and Rod End Nut Made of Stainless Steel

It is used in case there is the risk of rust or corrosion, such as when the end of the piston rod becomes immersed in water as it moves forward.



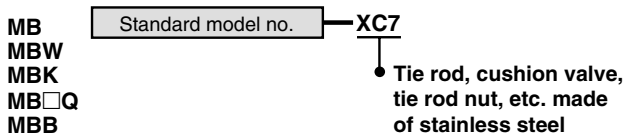
Specifications

Action	Double acting, Single/Double rod
Cushion	Air cushion

The specifications and dimensions other than the above are the same as those of the standard type.

8 -XC7 Tie Rod, Cushion Valve, Tie Rod Nut, etc. Made of Stainless Steel

A portion of the materials of the standard parts has been changed to stainless steel to enable the cylinder to be used in an area that poses the risk of rust or corrosion.



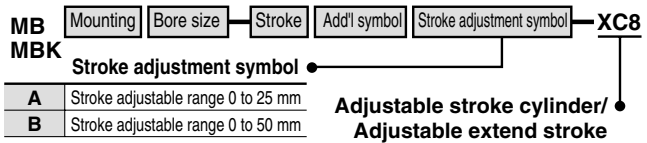
Specifications

Action	Double acting, Single/Double rod
Cushion	Air cushion

The specifications and dimensions other than the above are the same as those of the standard type.

9 -XC8 Adjustable Stroke Cylinder/Adjustable Extend Stroke

The stroke at return of the cylinder can be adjusted from full stroke (0 to 25)mm or (0 to 50)mm. A stroke adjustment mechanism has been provided in the head portion to adjust the extend stroke.

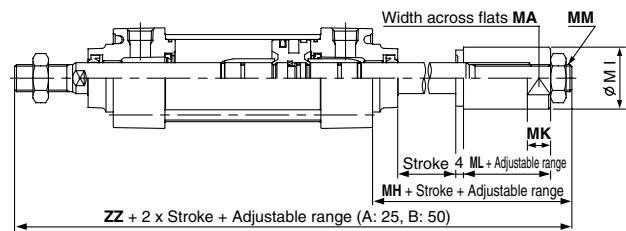


Specifications

Action	Double acting, Single rod
Mounting	B, L, F, T type (G, C, D not available)
Stroke adjustment system	Stopper adjustment
Stroke adjustment range	A: 0 to 25 mm, B: 0 to 50 mm

The specifications other than the above are the same as those of the standard type.

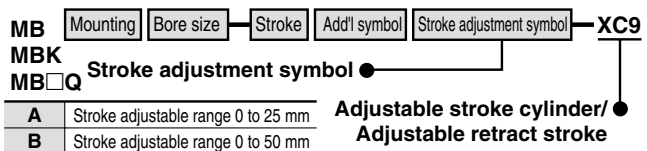
Dimensions



Bore size (mm)	MA	MK	MI	MH	ML	MM	ZZ
32	21	10	24	44	18	10	175
40	27	12	32	48	20	14	183
50	32	15	38	53	21	18	205
63	32	15	38	53	21	18	205
80	36	20	45	72	32	22	258
100	46	20	55	75	32	26	261

10 -XC9 Adjustable Stroke Cylinder/Adjustable Retract Stroke

The retract stroke of the cylinder can be adjusted from (0 to 25)mm or (0 to 50)mm by the adjusting bolt.

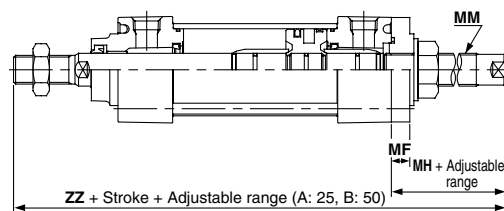


Specifications

Action	Double acting, Single rod
Mounting	B, L, F, T type (G, C, D not available)
Stroke adjustment system	Adjusting bolt
Stroke adjustment range	A: 0 to 25 mm, B: 0 to 50 mm

The specifications other than the above are the same as those of the standard type.

Dimensions



Bore size (mm)	MH	MF	MM	ZZ
32	41.5	9.5	M12 x 1.25	172
40	41.5	9.5	M12 x 1.25	176
50	52.5	11.5	M20 x 1.5	204
63	52.5	11.5	M20 x 1.5	204
80	62.5	15.5	M24 x 1.5	248
100	62.5	15.5	M24 x 1.5	248

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

20-

Data

Series MB

Made to Order Specifications

Please contact SMC for the detailed specifications, delivery and prices.

Dual Stroke Cylinder/Double Rod

11-XC10

Two cylinders are constructed as one cylinder in a back-to-back configuration allowing the cylinder stroke to be controlled in three steps.

MB [Mounting] [Bore size] [Stroke A] [Add'l symbol] + [Stroke B] [Add'l symbol] -XC10
MBK

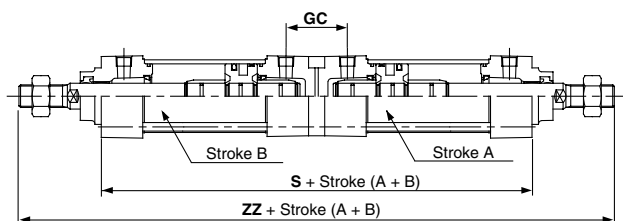
Dual stroke cylinder/
Double rod

Specifications

Action	Double acting, Single rod
Cushion	Air cushion, Rubber bumper
Mounting	B, L, F, G type (C, D, T not available)
Manufacturable max. stroke (A+B)	ø32: to 600, ø40: to 700, ø50 to ø100: to 900

The specifications other than the above are the same as those of the standard type.

Dimensions



Bore size (mm)	GC	S	ZZ
32	36	178	272
40	38	178	280
50	41	198	314
63	43	198	314
80	52	242	386
100	52	242	386

Dual Stroke Cylinder/Single Rod

12-XC11

Two cylinders can be integrated by connecting them in line, and the cylinder stroke can be controlled in two stages in both directions.

MB [Mounting] [Bore size] [Stroke A] [Add'l symbol] + [Stroke B] [Add'l symbol] -XC11

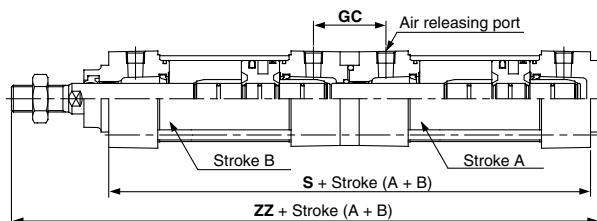
Dual stroke cylinder/
Single rod

Specifications

Action	Double acting, Single rod
Cushion	Air cushion, Rubber bumper
Mounting	B, L, F, G, C, D type (T not available)

The specifications other than the above are the same as those of the standard type.

Dimensions



Bore size (mm)	GC	S	ZZ
32	36	179	230
40	38	179	234
50	41	199	261
63	43	199	261
80	52	243	319
100	52	243	319

Tandem Cylinder

13-XC12

This is a cylinder produced with two air cylinders in line allowing double the output force.

MB [Standard model no.] -XC12

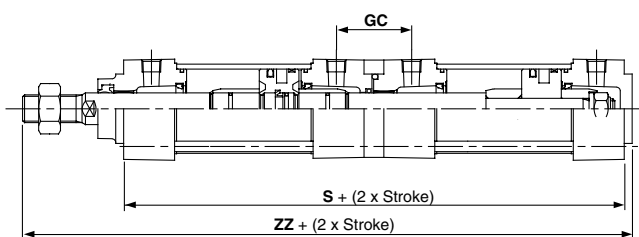
Tandem cylinder

Specifications

Action	Double acting, Single rod
Min. operating pressure	0.1MPa
Cushion	Air cushion
Mounting	B, L, F, G, C, D type (T not available)

The specifications other than the above are the same as those of the standard type.

Dimensions



Bore size (mm)	GC	S	ZZ	Bore size (mm)	GC	S	ZZ
32	36	180	231	63	43	200	262
40	38	180	235	80	52	244	320
50	41	200	262	100	52	244	320

Fluorine Rubber Seals

14-XC22

Material for seals is changed to fluorine rubber excellent in chemical resistance.

MB [Standard model no.] -XC22

MBW

Fluorine rubber seals

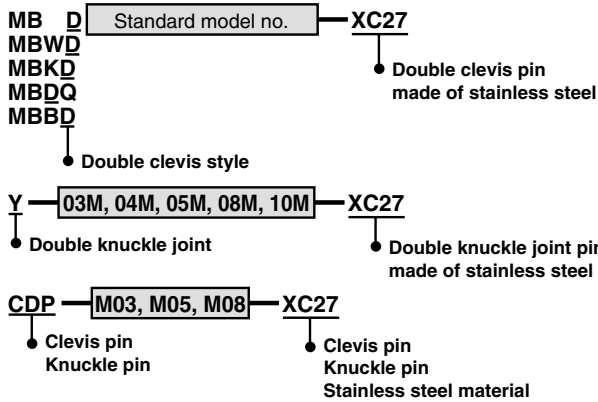
Specifications

Action	Double acting, Single/Double rod
Seal	Fluorine rubber

The specifications and dimensions other than the above are the same as those of the standard type.

15-XC27 Double Clevis Pin and Double Knuckle Pin Made of Stainless Steel

To prevent the oscillating portion of the double clevis or the double knuckle joint from rusting, the material of the pin and the snap ring (split pin) has been changed to stainless steel. The double clevis style is one way of installation support for standard air cylinders and the double knuckle joint is one of the pieces of hardware that are provided.



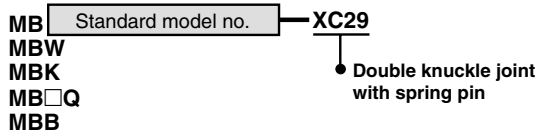
Specifications

Mounting	Only double clevis style (D)
Pin material	Stainless steel 304

The specifications other than the above are the same as those of the standard type. Cotter pin, clevis pin and knuckle joint pin are attached to mounting bracket.

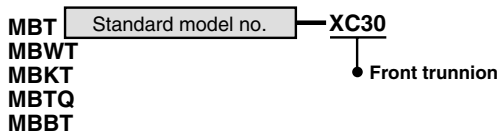
16-XC29 Double Knuckle Joint with Spring Pin

To prevent loosening of the double knuckle joint of standard air cylinder.



17-XC30 Front Trunnion

When a standard double acting single rod cylinder with a front trunnion bracket has a long stroke, the distance from the fulcrum to the rod end is reduced by mounting the trunnion on the front of the cylinder's rod cover.

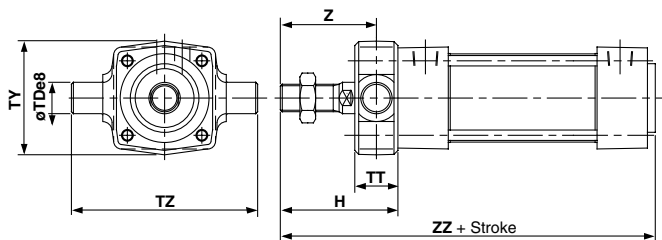


Specifications

Action	Double acting, Single/Double rod
Mounting	T bracket only

The specifications other than the above are the same as those of the standard type.

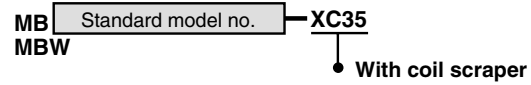
Dimensions



Bore size (mm)	TDe8	TT	TY	TZ	H	Z	ZZ
32	12 ^{-0.032} _{-0.059}	17	49	74	47	38.5	135
40	16 ^{-0.032} _{-0.059}	22	58	95	60	49	148
50	16 ^{-0.032} _{-0.059}	22	71	107	66	55	164
63	20 ^{-0.040} _{-0.073}	28	87	130	72	58	170
80	20 ^{-0.040} _{-0.073}	34	110	150	86	69	204
100	25 ^{-0.040} _{-0.073}	40	136	182	92	72	210

18-XC35 With Coil Scraper

Scraper removes frost, weld spatter, cutting dust, and etc., and it protects the seals.

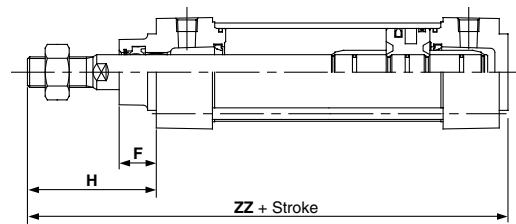


Specifications

Action	Double acting, Single/Double rod
Cushion	Air cushion, Rubber bumper
Scraper	Coil scraper (Metal)

The specifications other than the above are the same as those of the standard type.

Dimensions



Bore size (mm)	F	H	ZZ	Bore size (mm)	F	H	ZZ
32	15	47	135	63	19	67	165
40	17	58	146	80	25	81	199
50	19	67	165	100	25	81	199

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

20-

Data



Series MB

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 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
125	MB-A2-10-Y1088	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		
125	Foot	M12 x 1.75 x 25 (brazier head cap screw)	8	30
	Other	M12 x 1.75 x 28 (brazier head cap screw)		

4. There is no mounting interchangeability with serie CA2.

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. valve may shoot out from the cover.

Mounting and 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.

