

Air Cylinder

Series MB

ø32, ø40, ø50, ø63, ø80, ø100, ø125



Variations

Standard/Double acting	Single rod Series MB		Standard stroke (mm)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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* ø125 is not included in MBK, MB□Q and MBB.
Note 1) Standard stroke for MBK series is below 700.

CJ1

CJP

CJ2
-Z

CJ2

CM2
-Z

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

CS2

D-□

-X□

Technical
data

Combinations of Standard Products and Made

Series MB

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

Symbol	Specification	Applicable bore size	Series MB (Standard)					
			Double acting					
			Single rod			Double rod		
			Air		Rubber	Air		
			ø32 to ø100	ø125	ø32 to ø100	ø125	ø32 to ø100	ø125
Standard	Standard	ø32 to ø125	●	●	●	●	●	●
Long st	Long stroke		●	●	●	●	●	○
D	Built-in magnet		●	●	●	●	●	●
MB□-□ ^J _K	With rod boot		●	●	●	●	●	●
10-	Clean series		○	○	○	○	○	○
25-	Copper (Cu) -free ^{Note 4)}	ø32 to ø100	●	○	○	○	○	○
25A	Copper (Cu) and zinc (Zn) -free ^{Note 4)}		●	○	○	○	○	○
20-	Copper ^{Note 3)} and Fluorine-free	ø32 to ø125	●	○	●	○	●	○
MB□ ^R _V	Water resistant		●	○	●	○	●	○
XA□	Change of rod end shape	ø32 to ø125	○	○	○	○	○	○
XB5	Oversized rod cylinder		○	○	○	○	○	○
XB6	Heat-resistant cylinder (-10 to 150°C)		○	○	○	○	○	○
XB13	Low-speed cylinder (5 to 50 mm/s)		○	○	○	○	○	○
XC3	Special port position		○	○	○	○	○	○
XC4	With heavy duty scraper		○	○	○	○	○	○
XC5	Heat-resistant cylinder (-10 to 110°C)		○	○	○	○	○	○
XC6	Made of stainless steel		○	○	○	○	○	○
XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel		○	○	○	○	○	○
XC8	Adjustable stroke cylinder/Adjustable extension type		○	○	○	○	—	—
XC9	Adjustable stroke cylinder/Adjustable retraction type		○	○	○	○	—	—
XC10	Dual stroke cylinder/Double rod type		○	○	○	○	—	—
XC11	Dual stroke cylinder/Single rod type		○	○	○	○	—	—
XC12	Tandem cylinder		○	○	○	○	○	○
XC14	Change of trunnion bracket mounting position		○	○	○	○	○	○
XC22	Fluororubber seal		○	○	○	○	○	○
XC27	Double clevis pins made of stainless steel (Stainless steel 304)		○	○	○	○	—	—
XC29	Double knuckle joint with spring pin		○	○	○	○	○	○
XC30	Rod side trunnion		○	○	○	○	○	○
XC35	With coil scraper		○	○	○	○	○	○
XC59	Fluororubber seal, Built-in hard plastic magnet		○	○	○	○	○	○
XC65	XC6 + XC7 specifications		○	○	○	○	○	○
X1184	Cylinder with reed, heat-resistant auto switch		○	○	○	○	○	○

Note 1) Simple specials except XC14A and XC14B.

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

to Order Specifications

Series MB

MB (Standard)		MBK (Non-rotating)				MB□Q (Low friction)	MBB (End lock)
Double acting							
Double rod		Single rod		Double rod		Single rod	Single rod
	Rubber	Air	Rubber	Air	Rubber	—	Air
ø32 to ø100	ø125	ø32 to ø100					
	●	●	●	●	●	●	●
	●	○	●	●	●	○	○
	●	●	●	●	●	●	●
	●	●	●	●	●	○	●
	○	○	○	○	○	○	○
	○	○	—	—	—	—	○
	○	○	—	—	—	—	○
	●	○	—	—	—	—	○
	●	○	—	—	—	○	○
	◎	◎	◎	◎	○	○	◎
	○	○	○	○	○	○	○
	○	○	○	○	○	—	○
	○	○	○	○	○	—	○
	◎	○	◎	◎	◎	◎	○
	◎	○	—	—	—	—	○
	○	○	○	○	○	—	○
	◎	○	◎	◎	◎	◎	○
	◎	○	◎	◎	◎	◎	◎
	—	—	◎	◎	—	—	○
	—	—	◎	◎	—	—	○
	—	—	◎ <small>Note 2)</small>	◎ <small>Note 2)</small>	—	—	○
	—	—	○	○	—	—	○
	○	○	○	○	○	○	○
	◎	◎	◎	◎	○	○	◎ <small>Note 1)</small>
	◎	○	○	○	○	—	○
	—	—	◎	◎	○	○	◎
	○	○	○	○	○	○	◎
	◎	○	◎	◎	◎	◎	◎
	◎	○	—	—	—	○	○
	○	○	○	○	○	○	○
	○	○	○	○	○	○	○
	○	○	—	—	—	—	○

Note 3) Copper-free for the externally exposed part.
Note 4) For details, refer to the SMC website.

CJ1

CJP

CJ2
-Z

CJ2

CM2
-Z

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

CS2

D-□

-X□

Technical
data

Series MB, MBW, MBK, MBKW, MB

Double acting,
Single rod

Double acting,
Double rod

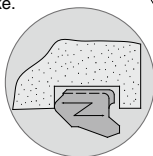
Double acting,
Non-rotating rod

Double acting,
Non-rotating rod,
Double rod

Low friction

Improved cushion capacity

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



Increased kinetic energy absorption

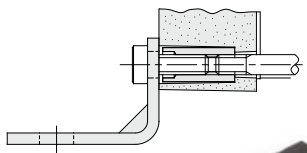
Elevated cushion volume and the adoption of a new cushion seal design permit about 30% more allowable kinetic energy over the CA1 series. In addition, service life of cushion seal is about 5 times greater.

Compact and lightweight design

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

Accurate mounting

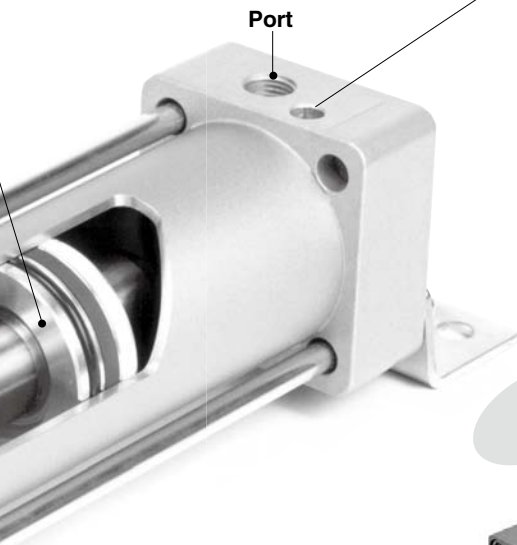
The cylinder cover and mounting bracket with high dimensional accuracy simplifies installation and extends service life.



Minimal rod deflection

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

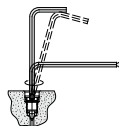
End lock type Q, MBB ø32, ø40, ø50, ø63, ø80, ø100, ø125



Port

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.



Compact type auto switches can be fitted.



Compact type auto switch

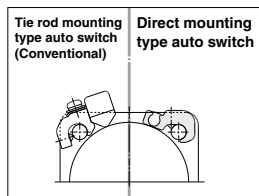
Reed auto switch: D-A9□
Solid state auto switch: D-M9□
D-M9□W

Auto switch mounting bracket

A direct mounting type auto switch is secured on the tie rod with a dedicated switch bracket.

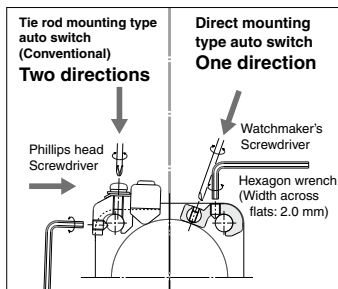
Miniaturization

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.

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

D-□
-X□
Technical data

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

ø32, ø40, ø50, ø63, ø80, ø100, ø125

Series MB standard type double acting, single rod ø32 to ø100 products have been remodeled for a lightweight design. When selecting this model, please consider the new MB-Z series.

How to Order

MB L 32 - 50 -

With auto switch **MDB L 32 - 50 - M9BW -**

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

NII	Rc
TN	NPT
TF	G

Cylinder stroke (mm)

Refer to page 409 for standard strokes.

Auto switch

NII	Without auto switch
-----	---------------------

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

Number of auto switches

NII	2
S	1
3	3
n	n

Rod boot/Cushion

Rod boot	NII	None
	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	NII	Both ends
	N*	None

* 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 Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch. (Example) MDBB40-100

Applicable Auto Switches

Refer to pages 1559 to 1673 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)				Pre-wired connector	Applicable load					
					DC		AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)			5 (Z)				
Solid state auto switch	—	Grommet	No	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC			
				3-wire (PNP)				M9P	—	●	●	●	○	○					
		Terminal conduit	Yes	2-wire				—	—	100 V, 200 V	M9B	—	●	●			●	○	○
				—				J51	—	●	—	●	○	—					
	Diagnostic indication (2-color indication)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	—	G39	—	—	—	—	—	—				
				2-wire				—	K39	—	—	—	—	—					
				3-wire (NPN)				M9NW	—	●	●	●	○	○					
				3-wire (PNP)				M9PW	—	●	●	●	○	○					
				2-wire				M9BW	—	●	●	●	○	○					
				3-wire (NPN)				M9NA**	—	○	○	●	○	○					
				3-wire (PNP)				M9PA**	—	○	○	●	○	○					
Water resistant (2-color indication)	Grommet	Yes	2-wire	24 V	12 V	—	M9BA**	—	○	○	●	○	○	—					
			4-wire (NPN)				F59F	—	●	—	●	○	○						
			Diagnostic output (2-color indication)				Grommet	Yes	2-wire (Non-polar)	—	P3DW	—	●		—	●	●	○	—
											P4DW	—	—		—	●	●	○	
Reed auto switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	24 V	12 V	—	A96	—	●	—	●	—	—	IC circuit	Relay, PLC			
				No				100 V	A93	—	●	—	●	●			—		
				Yes				100 V or less	A90	—	●	—	●	—			—		
				No				100 V, 200 V	A54	—	●	—	●	●			—		
		Terminal conduit	Yes	2-wire	200 V or less	A64	—	●	—	●	—	—	—						
						—	A33	—	—	—	—	—							
		DIN terminal	Yes	2-wire	100 V, 200 V	—	A34	—	—	—	—	—	—						
						—	A44	—	—	—	—	—							
		Diagnostic indication (2-color indication)	Grommet	Yes	2-wire	—	—	A59W	—	●	—	●	—	—	Relay, PLC				

** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. A water resistant type cylinder is recommended for use in an environment which requires water resistance. Consult with SMC regarding water resistant types for ø125.

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

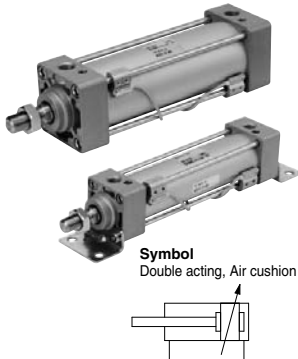
* Solid state auto switches marked with a "○" are produced upon receipt of order.

* Besides the above models, there are some other auto switches that are applicable. For detailed information, please refer to page 449.

* Solid state auto switches are also available with a pre-wired connector. Refer to pages 1626 and 1627 for details. Refer to pages 1614 and 1615 for D-P3DW□.

* D-A9□/M9□□□/P3DW□ auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled for D-A9□/M9□□□ when being shipped.)

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



Made to Order
Made to Order: Individual Specifications
(For details, refer to page 450.)

Symbol	Specifications
-X1184	Cylinder with reed, heat-resistant auto switch

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

Symbol	Specifications
-XA□	Change of rod end shape
-XB5	Oversized rod cylinder
-XB6	Heat resistant cylinder (150°C)
-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	Fluororubber seals
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC29	Double knuckle joint with spring pin
-XC30	Rod side trunnion
-XC35	With coil scraper
-XC59	Fluororubber seal, Built-in hard plastic magnet
-XC65	XC6 + XC7 specifications

Refer to pages 444 and 449 for cylinders with auto switches.

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

Specifications

Bore size (mm)	32	40	50	63	80	100	125
Action	Double acting, Single rod						
Fluid	Air						
Proof pressure	1.5 MPa						
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)						
Port size (Rc, NPT, G)	1/8	1/4	3/8	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	1000
63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600	1000
80	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800	1000
100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800	1000
125	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 1000	1400

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.

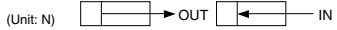
Bore size (mm)	32	40	50	63	80	100	125
Foot ^{Note 1)}	MB-L03	MB-L04	MB-L05	MB-L06	MB-L08	MB-L10	MB-L12
Flange	MB-F03	MB-F04	MB-F05	MB-F06	MB-F08	MB-F10	MB-F12
Single clevis	MB-C03	MB-C04	MB-C05	MB-C06	MB-C08	MB-C10	MB-C12
Double clevis	MB-D03	MB-D04	MB-D05	MB-D06	MB-D08	MB-D10	MB-D12

Note 1) Two foot brackets required for one cylinder.

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

Foot, flange, single clevis/body mounting bolt, double clevis/body mounting bolt, clevis pins, flat washer and cotter pins. → Refer to page 416 for details.

Theoretical Force



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)

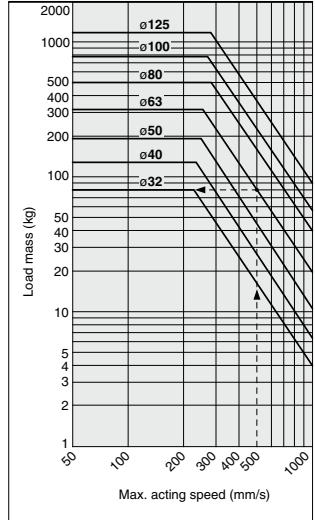
Weight/Aluminum Tube

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

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

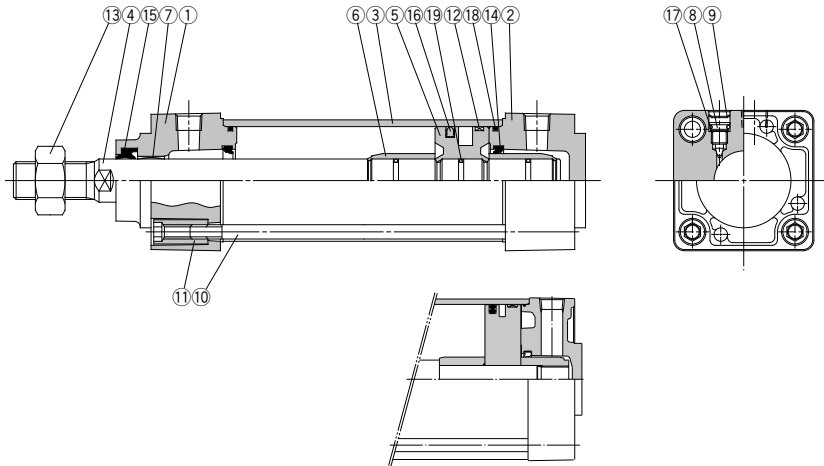
- Basic weight 0.50 (Basic, ø32)
- Additional weight 0.11/50 stroke
- Cylinder stroke 100 stroke
- 0.50 + 0.11 x 100/50 = 0.72 kg

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.

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	Aluminum alloy	Anodized
7	Bushing	Bearing alloy	
8	Cushion ring	Steel wire	Nickel plated
9	Retaining ring	Steel for spring	ø40 to ø100
10	Tie rod	Carbon steel	Zinc chromated
11	Tie rod nut	Carbon steel	Nickel plated
12	Wear ring	Resin	
13	Rod end nut	Carbon steel	Nickel plated

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

Replacement Parts/Seal Kit

Bore size (mm)	Kit no.	Contents
32	MB32-PS	Set of the 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.

* Trunnion type should not be disassembled. (Refer to page 451.)

* Seal kit includes a grease pack (ø32 to 50: 10 g, ø63, 80: 20 g, ø100, 125: 30 g).

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

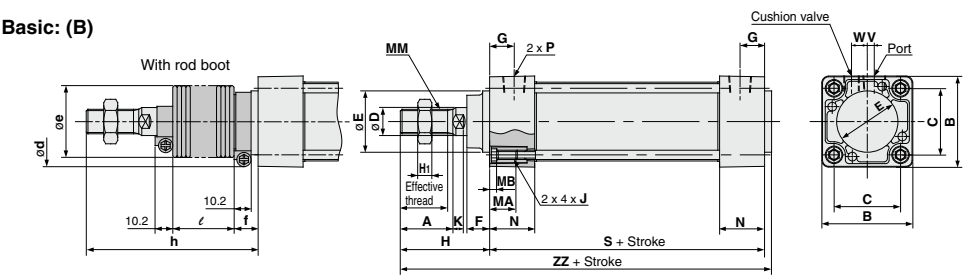
Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

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 refer to page 1121 for more information.

Without Mounting Bracket

Basic: (B)



Bore size (mm)	Stroke range (mm)	Effective thread length	Width across flats	A	B	C	D	Ee11	F	G	H1	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	6	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	8	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	11	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	11	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	13	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	16	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	16	97	20	6	M12 x 1.75	13	M27 x 2	38	1/2	120	17	15	223

With Rod Boot

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

Bore size (mm)	h (mm)											
	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	73	86	98	111	136	161	186	—	—	—	—	—
40	81	94	106	119	144	169	194	—	—	—	—	—
50	89	102	114	127	152	177	202	227	—	—	—	—
63	89	102	114	127	152	177	202	227	—	—	—	—
80	101	114	126	139	164	189	214	239	264	289	—	—
100	101	114	126	139	164	189	214	239	264	289	—	—
125	120	130	140	150	170	190	210	230	250	270	290	310

* 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

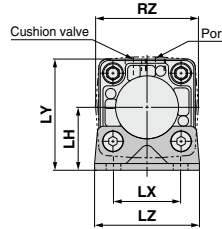
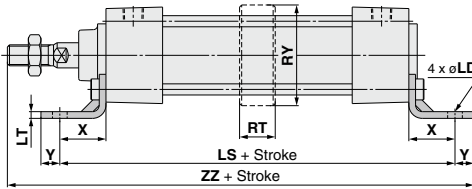
Without Air Cushion

Bore size (mm)	S	ZZ
32	90	141
40	90	145
50	102	164
63	102	164
80	124	200
100	124	200
125	132	235

With Mounting Bracket

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

Foot: (L)



Foot

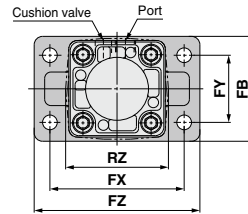
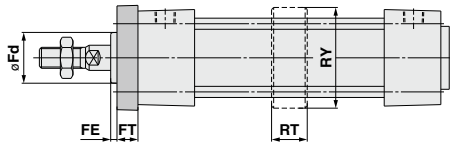
Foot		(mm)												
Bore size (mm)	Stroke range	X	Y	LD	LH	LS*	LT	LX	LY	RZ	RY	RZ	ZZ*	
32	to 700	22	9	7	30	128	3.2	32	53	50	—	—	162	
40	to 800	24	11	9	33	132	3.2	38	59	55	—	—	170	
50	to 1000	27	11	9	40	148	3.2	46	72.5	70	—	—	190	
63	to 1000	27	14	12	45	148	3.6	56	82.5	80	—	—	193	
80	to 1000	30	14	12	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	50	148	160	282

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

* 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

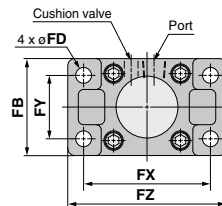
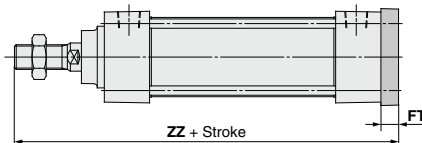
Rod side flange: (F)



Rod Side Flange

Bore size (mm)	Stroke range	FB	FD	FE	FT	FX	FY	FZ	Fd	RY	RT	RY	RZ
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	—	—	—	—
100	to 1000	120	14	4	16	150	75	178	54	—	—	—	—
125	to 1400	138	14	7	20	180	102	216	57.5	50	148	160	—

Head side flange: (G)



Head Side Flange

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

* Rod/Head side flange
 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

CG1

CJP

CG2
-Z

CG2

CG2
-Z

CG2

CG3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

CS2

D-□

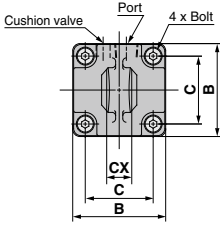
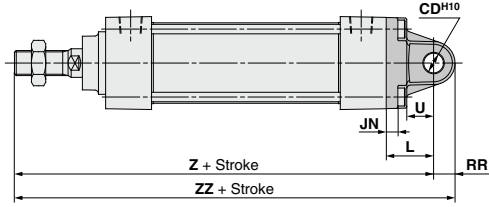
-X□

Technical data

With Mounting Bracket

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

Single clevis: (C)



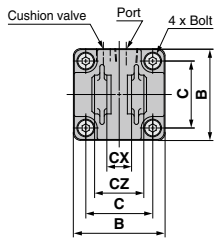
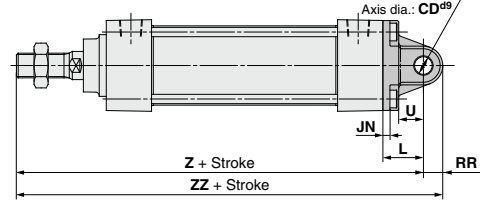
Without Air Cushion			
Bore size (mm)	Z	ZZ	
32	160	170.5	
40	164	175	
50, 63	190	205	
80, 100	238	261	
125	279	307	

Single Clevis

Bore size (mm)	Stroke range	B	C	JN	L	RR	U	CDH10	CX ¹¹ ₃₃	Z ⁸	ZZ ⁸	Bolt
32	to 500	46	32.5	5	23	10.5	13	10	14	154	164.5	MB-32-48-C1247
40	to 500	52	38	5	23	11	13	10	14	158	169	(M6 x 1 x 16L, Low head)
50	to 600	65	46.5	6	30	15	17	14	20	182	197	MB-50-48-C1249
63	to 600	75	56.5	6	30	15	17	14	20	182	197	(M8 x 1.25 x 18L, Low head)
80	to 800	95	72	8	42	23	26	22	30	228	251	MB-80-48BC1251
100	to 800	114	89	8	42	23	26	22	30	228	251	(M10 x 1.5 x 22L, Low head)
125	to 1000	136	110	10	50	28	30	25	32	267	295	M12 x 1.75 x 28L, Low head

* **Single 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

Double clevis: (D)



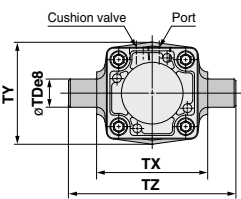
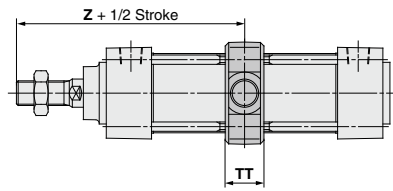
Without Air Cushion			
Bore size (mm)	Z	ZZ	
32	160	170.5	
40	164	175	
50, 63	190	205	
80, 100	238	261	
125	279	307	

Double Clevis

Bore size (mm)	Stroke range	B	C	JN	L	RR	U	CDH10	CX ¹¹ ₃₃	CZ	Z ⁸	ZZ ⁸	Bolt
32	to 500	46	32.5	5	23	10.5	13	10	14	28	154	164.5	MB-32-48-C1247
40	to 500	52	38	5	23	11	13	10	14	28	158	169	(M6 x 1 x 16L, Low head)
50	to 600	65	46.5	6	30	15	17	14	20	40	182	197	MB-50-48-C1249
63	to 600	75	56.5	6	30	15	17	14	20	40	182	197	(M8 x 1.25 x 18L, Low head)
80	to 800	95	72	8	42	23	26	22	30	60	228	251	MB-80-48BC1251
100	to 800	114	89	8	42	23	26	22	30	60	228	251	(M10 x 1.5 x 22L, Low head)
125	to 1000	136	110	10	50	28	30	25	32	64	267	295	M12 x 1.75 x 28L, Low head

* **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

Center trunnion: (T)



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 ⁸
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

** **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

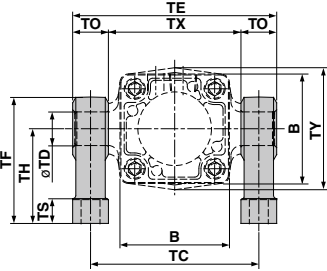
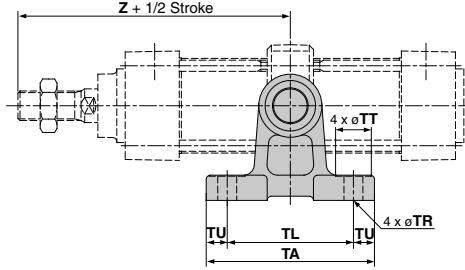
Trunnion/Double Clevis Pivot Bracket

Part No.

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

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

Trunnion pivot bracket

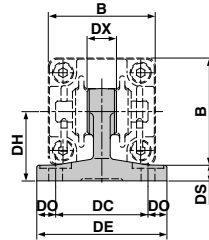
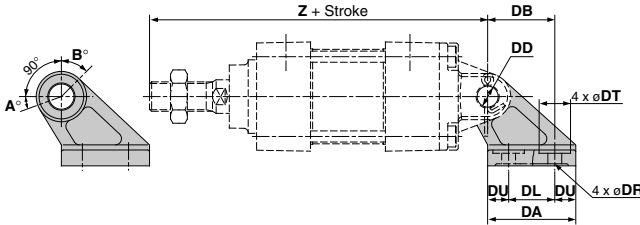


Part no.	Bore size (mm)	B	TA	TL	TU	TC	TX	TE	TO	TR	TT	TS	TH	TF	Z**	TDH10
MB-S03	32	46	62	45	8.5	62	50	74	12	7	13	10	35	47	89	12 ^{+0.070} ₀
MB-S04	40	52	80	60	10	80	63	97	17	9	17	12	45	60	93	16 ^{+0.070} ₀
	50	65	80	60	10	92	75	109	17	9	17	12	45	60	105	16 ^{+0.070} ₀
MB-S06	63	75	100	70	15	110	90	130	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

Without Air Cushion

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

Double clevis pivot bracket



Part no.	Bore size (mm)	B	DA	DB	DL	DU	DC	DX	DE	DO	DR	DT	DS	DH	Z*	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

Without Air Cushion

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°
32, 40	25°	45°	160°
50, 63	40°	60°	190°
80, 100	30°	55°	175°
125	30°	50°	170°

** Trunnion pivot bracket

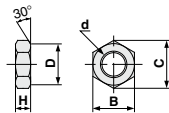
Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston; ø32, ø40: +3 mm, ø50, ø63: +4 mm, ø80, ø100: +5 mm, ø125: +6 mm

* 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

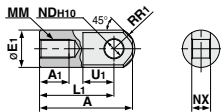
Dimensions for Accessories

Rod end nut
(Standard)



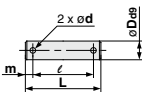
Part no.	Bore size (mm)	d	H	B	C	D
NT-03	32	M10 x 1.25	6	17	19.6	16.5
NT-04	40	M14 x 1.5	8	22	25.4	21
NT-05	50, 63	M18 x 1.5	11	27	31.2	26
NT-08	80	M22 x 1.5	13	32	37.0	31
NT-10	100	M26 x 1.5	16	41	47.3	39
NT-12M	125	M27 x 2	16	41	47.3	39

I type
Single knuckle joint



Part no.	Bore size (mm)	A	A ₁	E ₁	L ₁	MM	R ₁	U ₁	NDH10	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}

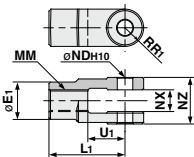
Knuckle joint pin
Clevis pin



Part no.	Bore size (mm) Clevis Knuckle	Dø8	L	ℓ	m	d (Through hole diameter)	Applicable cotter pin
CD-M03 ^{Note 1)}	32, 40	10 ^{+0.040} _{-0.076}	44	36	4	3	ø3 x 18 ℓ
CD-M05 ^{Note 1)}	50, 63	14 ^{+0.050} _{-0.093}	60	51	4.5	4	ø4 x 25 ℓ
CD-M08 ^{Note 1)}	80, 100	22 ^{+0.065} _{-0.117}	82	72	5	4	ø4 x 35 ℓ
IY-12 ^{Note 2)}	125	25 ^{+0.065} _{-0.117}	79.5	69.5	5	4	ø4 x 40 ℓ

Note 1) A cotter pin and a flat washer are equipped as standard. Note 2) Only pins are included when shipped.

Y type
Double knuckle joint



Part no.	Bore size (mm)	E ₁	L ₁	MM	R ₁	U ₁	NDH10	NX	NZ
Y-03M ^{Note 1)}	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 ^{Note 1)}	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 ^{Note 1)}	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 ^{Note 1)}	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 ^{Note 1)}	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 ^{Note 2)}	125	46	100	M27 x 2	27	42	25 ^{+0.084} ₋₀	32 ^{+0.30} _{+0.10}	64 ^{+0.10} _{-0.30}

Note 1) A pin, cotter pin and a flat washer are equipped as standard. Note 2) A pin and a cotter pin are equipped as standard.

Combinations of Support Brackets

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

Bracket for work	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

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

ø32, ø40, ø50, ø63, ø80, ø100, ø125

Series MBW standard type double acting, double rod ø32 to ø100 products have been remodeled for a lightweight design. When selecting this model, please consider the new MB-Z series.

How to Order

MBW L 32 150

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

With auto switch
(Built-in magnet)

Mounting

B	Basic/Without bracket
L	Axial 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

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)

Refer to page 418 for standard strokes.

Auto switch

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

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

Number of auto switches

Nil	2
S	1
3	3
n	n

Made to Order

Rod boot/Cushion

	Nil	
Rod boot	J	None
	Nil	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*	None

* 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

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch. (Example) MDBWB40-100

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

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage			Auto switch model		Lead wire length (m)					Pre-wired connector	Applicable load	
					DC		AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)	5 (Z)				
Solid state auto switch	—	Grommet	No	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	○	○	IC circuit	Relay, PLC		
				3-wire (PNP)		12 V		M9P	—	●	●	○	○				
		Terminal conduit	Yes	2-wire		—		100 V, 200 V	M9B	—	●	●	○			○	
				3-wire (NPN)		5 V, 12 V		J51	—	●	●	○	○				
	Diagnostic indication (2-color indication)	Grommet	Yes	2-wire	24 V	12 V	—	G39	—	—	—	—	IC circuit				
				3-wire (NPN)		5 V, 12 V	—	K39	—	—	—	—					
				3-wire (PNP)		12 V	M9NW	—	●	●	○	○					
				2-wire		5 V, 12 V	M9PW	—	●	●	○	○					
				3-wire (NPN)		12 V	M9BW	—	○	●	○	○					
				3-wire (PNP)		5 V, 12 V	M9NA*	—	○	○	○	○					
				2-wire		12 V	M9PA**	—	○	○	○	○					
				4-wire (NPN)		5 V, 12 V	M9BA**	—	○	○	○	○					
Water resistant (2-color indication)	Grommet	Yes	2-wire (Non-polar)	—	—	F59F	—	●	—	○	○	IC circuit					
			—	—	P3DW	—	—	●	●	○							
			—	—	P4DW	—	—	—	●	○							
			—	—	—	—	—	—	—	—							
Reed auto switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	24 V	5 V	—	A96	—	●	—	●	—	IC circuit	Relay, PLC		
				No		12 V		100 V	A93	—	●	—	●			●	—
				Yes				100 V or less	A90	—	●	—	●			—	IC circuit
				No				100 V, 200 V	A54	—	●	—	●			●	
	—	Terminal conduit	No	2-wire	24 V	12 V	—	A64	—	●	—	●	—	—	PLC		
				—		—		A33	—	—	—	—	—				
				—		—		A34	—	—	—	—	—				
				—		—		A44	—	—	—	—	—				
	Diagnostic indication (2-color indication)	Grommet	Yes	—	24 V	100 V, 200 V	—	A59W	—	●	—	●	—	Relay, PLC			
				—		—		—	—	—	—	—	—				
				—		—		—	—	—	—	—	—				
				—		—		—	—	—	—	—	—				

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

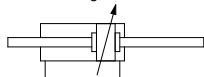
- * Lead wire length symbols: 0.5 m Nil (Example) M9NW
1 m M (Example) M9NWM
3 m L (Example) M9NWL
5 m Z (Example) M9NWX
- * Solid state auto switches marked with a "○" are produced upon receipt of order.

* Besides the above models, there are some other auto switches that are applicable. For detailed information, please refer to page 449.
* Solid state auto switches are also available with a pre-wired connector. Refer to pages 1626 and 1627 for details. Refer to pages 1614 and 1615 for D-P3DW□.
* D-A9□/M9□□□/P3DW□ auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled for D-A9□/M9□□□ when being shipped.)



Symbol

Double acting, Air cushion



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

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat resistant cylinder (150°C)
-XC3	Special port 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	Fluororubber seals
-XC30	Rod side trunnion
-XC35	With coil scraper

Refer to pages 444 and 449 for cylinders with auto switches.

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

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 refer to page 1121 for more information.

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: $+1.4_0$						
Cushion ^{Note)}	Both ends (Air cushion)						
Port size (Rc, NPT, G)	1/8	1/4		3/8			1/2
Mounting	Basic, Foot, Flange, Center trunnion						

Note) Absorbable kinetic energy by cushion mechanism is identical to double acting single rod. In case of types with no air cushion, a rubber bumper is used.

Standard Stroke

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

Intermediate strokes are available.
(No spacer is used)

Accessory

Mounting		Basic	Foot	Flange	Center trunnion
Standard	Rod end nut	●	●	●	●
	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	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.

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

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	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

(kg)

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	0.6	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
Additional weight per each 50 mm stroke	All mounting bracket	0.15	0.24	0.34	0.35	0.61	0.84	1.02
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

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 x 100/50 = 0.86 kg

CJ1

CJP

CJ2
-Z

CJ2

CM2
-Z

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

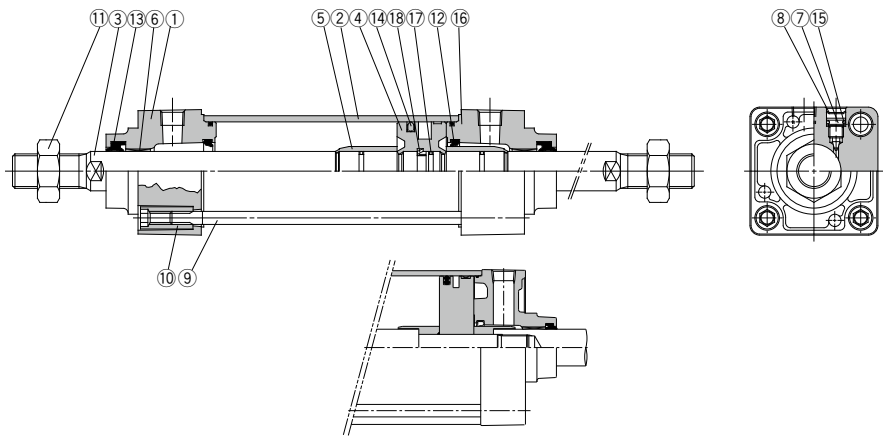
CS2

D-□

-X□

Technical
data

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	Aluminum alloy	Anodized
6	Bushing	Bearing alloy	
7	Cushion valve	Steel wire	Nickel plated
8	Retaining ring	Steel for spring	ø40 to ø100
9	Tie rod	Carbon steel	Zinc-chromated
10	Tie rod nut	Carbon steel	Nickel plated
11	Rod end nut	Carbon steel	Nickel plated

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

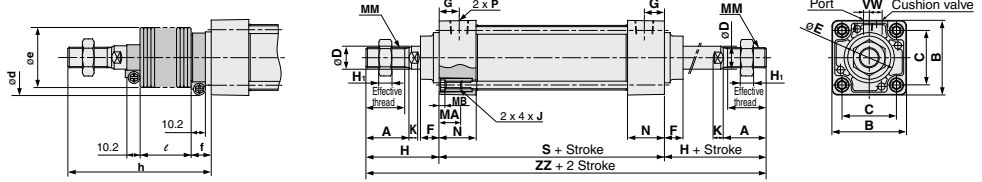
Replacement Parts: Seal Kit

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	

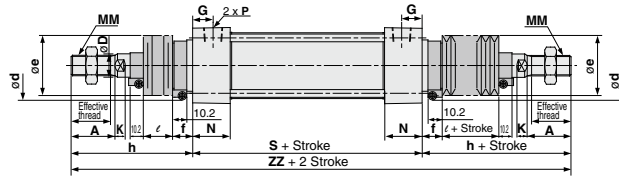
* Seal kits consist of items 12, 13, 14 and 16, and can be ordered by using the seal kit number corresponding to each bore size.
* Trunnion type should not be disassembled. (Refer to page 451.)
* Seal kit includes a grease pack (ø32 to 50: 10 g, ø63, 80: 20 g, ø100, 125: 30 g).
Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

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	E _{eff}	F	G	H ₁	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	6	47	16	4	M6 x 1	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	8	51	16	4	M6 x 1	6	M14 x 1.5	2	1/4	84	4	9	186	90	192
50	to 600	32	18	35	65	46.5	20	40	14	15.5	11	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	11	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	13	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	16	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	16	97	20	6	M12 x 1.75	13	M27 x 2.0	38	1/2	120	17	15	314	132	326

With Rod Boot

Bore (mm)	d	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	1 to 50	51 to 100
32	54	36	23	12.5	25	37.5	50	75	100	125	—	—	—	—	—	73	86	98	111	136	161	186	—	—	—	—	—	—	—
40	56	41	23	12.5	25	37.5	50	75	100	125	—	—	—	—	—	81	94	106	119	144	169	194	—	—	—	—	—	—	—
50	64	51	25	12.5	25	37.5	50	75	100	125	150	—	—	—	—	89	102	114	127	152	177	202	227	—	—	—	—	—	—
63	64	51	25	12.5	25	37.5	50	75	100	125	150	—	—	—	—	89	102	114	127	152	177	202	227	—	—	—	—	—	—
80	68	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	76	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	82	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	—	—

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

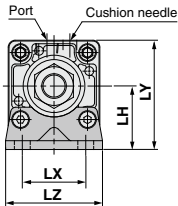
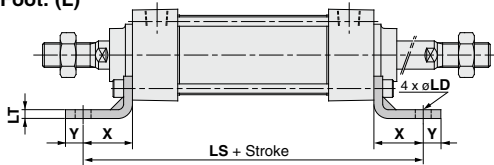
Bore (mm)	ZZ Note)															
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000	1 to 50	51 to 100	101 to 150	151 to 200
32	230	256	280	306	356	406	456	—	—	—	—	—	230	256	280	306
40	246	272	296	322	372	422	472	—	—	—	—	—	246	272	296	322
50	272	298	322	348	398	448	498	548	—	—	—	—	272	298	322	348
63	272	298	322	348	398	448	498	548	—	—	—	—	272	298	322	348
80	316	342	366	392	442	492	542	592	642	692	—	—	316	342	366	392
100	316	342	366	392	442	492	542	592	642	692	—	—	316	342	366	392
125	340	360	380	400	440	480	520	560	600	640	680	720	340	360	380	400

* 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

With Mounting Bracket

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

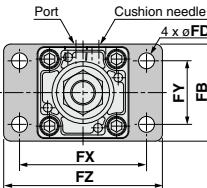
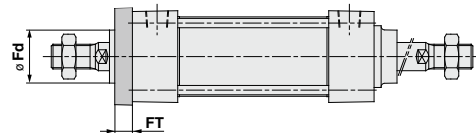
Foot: (L)



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

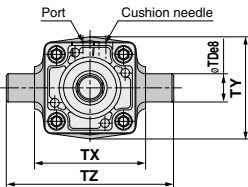
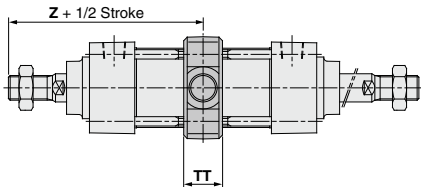
Front flange: (F)



Front Flange

Bore (mm)	Stroke range	FB	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
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)

Air Cylinder: Non-rotating Rod Type

Double Acting, Single Rod

Series MBK

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

MBK **L** **32** **50** **M9BW**

With auto switch **MDBK** **L** **32** **50** **M9BW**

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

Nil	Rc
TN	NPT
TF	G

Auto switch

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

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

Number of auto switches

Nil	2
S	1
3	3
n	n

Made to Order
For details, refer to page 424.

Rod boot/Cushion

Rod boot	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	Nil	Both ends
	N*	None

* 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

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) MDBKB40-100

Cylinder stroke (mm)
Refer to page 424 for standard strokes.

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

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)				Pre-wired connector	Applicable load					
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)	5 (Z)							
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC			
				3-wire (PNP)				M9P	—	●	●	●	○	○					
		Terminal conduit		2-wire				—	—	100 V, 200 V	M9B	—	●	●			●	○	○
				—				—	—	J51	—	●	—	●			○	—	
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	24 V	5 V, 12 V	—	—	G39	—	—	—	—	—	—				
				2-wire				—	K39	—	—	—	—	—					
				3-wire (NPN)				M9NW	—	●	●	●	○	○			IC circuit		
				3-wire (PNP)				M9PW	—	●	●	●	○	○					
	Water resistant (2-color indication)	Grommet		2-wire				12 V	M9BW	—	●	●	●	○	○		—		
				3-wire (NPN)				M9NA**	—	○	○	●	○	○	IC circuit				
				3-wire (PNP)				M9PA**	—	○	○	●	○	○					
				2-wire				M9BA**	—	○	○	●	○	○	—				
Diagnostic output (2-color indication)	4-wire (NPN)	5 V, 12 V	F59F	—	●	—	●	○	○	IC circuit									
Magnetic field resistant (2-color indication)	2-wire (Non-polar)	—	P3DW	—	●	—	●	●	○	—									
P4DW	—	—	—	●	●	○	—	—											
Reed auto switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	24 V	5 V	—	A96	—	●	—	●	—	—	IC circuit	—			
				No				100 V	A93	—	●	—	●	●	—		—		
				Yes				100 V or less	A90	—	●	—	●	—	—		IC circuit		
				No				100 V, 200 V	A54	—	●	—	●	●	—		—		
		No		200 V or less				A64	—	●	—	●	—	—	—				
		Terminal conduit		—				—	A33	—	—	—	—	—	—		—		
	DIN terminal	—		—	A34	—	—	—	—	—	—								
		Grommet		—	—	A44	—	—	—	—	—	—							
	Diagnostic indication (2-color indication)			—	—	A59W	—	●	—	●	—	—	—						

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

Consult with SMC regarding water resistant types with the above model numbers.

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

* Solid state auto 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 449.

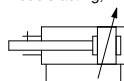
* Solid state auto switches are also available with a pre-wired connector. Refer to pages 1626 and 1627 for details. Refer to pages 1614 and 1615 for D-P3DW□.

* D-A9□/M9□□□/P3DW□ auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled for D-A9□/M9□□□ when being shipped.)



Symbol

Double acting, Air cushion



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

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
-XC30	Rod side 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 <small>Note 1)</small>	Both ends (Air cushion)					
Port size (Rc, NPT, G)	1/8	1/4	3/8	1/2		
Mounting	Basic, Foot, Rod side flange, Head side flange, Single clevis, Double clevis, Center trunnion					
Non-rotating accuracy	$\pm 0.5^\circ$		$\pm 0.5^\circ$		$\pm 0.3^\circ$	
Allowable rotating torque N-m max.	0.25	0.45	0.64	0.79	0.93	

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
	Foot	0.62	0.83	1.41	1.75	3.23
	Flange	0.79	1.03	1.64	2.30	4.03
	Single clevis	0.75	0.89	1.55	2.14	3.69
	Double clevis	0.76	0.93	1.64	2.30	3.98
	Trunnion	0.79	1.02	1.69	2.31	4.13
Add'l weight per each 50 mm stroke	All mounting bracket	0.11	0.15	0.26	0.27	0.40
Accessory	Single knuckle	0.15	0.23	0.26	0.26	0.60
	Double knuckle (with pin)	0.22	0.37	0.43	0.43	0.87

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

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

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

Refer to pages 444 to 449 for cylinders with auto switches.

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

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)

Mounting Bracket Part No.

Bore size (mm)	32	40	50	63	80	100
Foot <small>Note 1)</small>	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/body mounting bolt, double clevis/body mounting bolt, clevis pins, flat washer and cotter pins. → Refer to page 416 for details.

CJ1

CJP

CJ2
-Z

CJ2

CM2
-Z

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

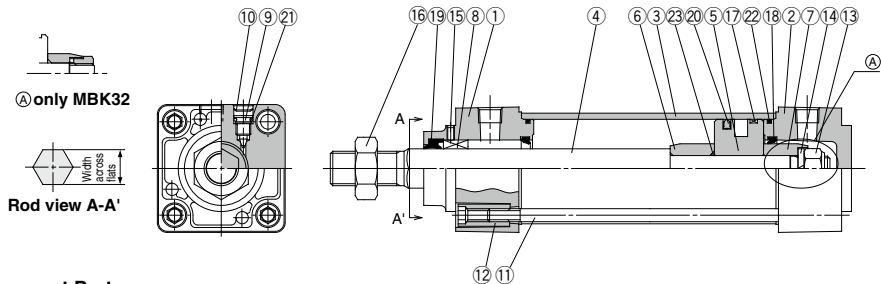
CS2

D-□

-X□

Technical
data

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	Retaining ring	Steel for spring	ø40 to ø100
11	Tie rod	Carbon steel	Zinc-chromated
12	Tie rod nut	Carbon steel	Nickel plated

No.	Description	Material	Note
13	Piston nut	Rolled steel	
14	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

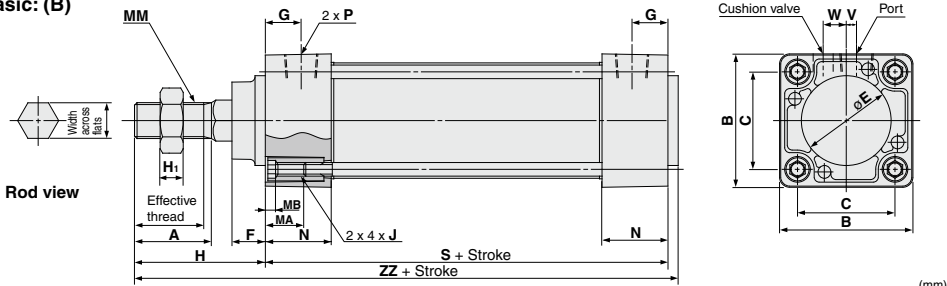
Bore size (mm)	Kit no.	Contents
32	MBK32-PS	Set of the No. 18, 19, 20 and 22.
40	MBK40-PS	
50	MBK50-PS	
63	MBK63-PS	
80	MBK80-PS	
100	MBK100-PS	

* Seal kits consist of items 18, 19, 20 and 22, and can be ordered by using the seal kit number corresponding to each bore size.
* Seal kit includes a grease pack (ø32 to 50: 10 g, ø63, 80: 20 g, ø100, 125: 30 g).
Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

* Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows:
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 ₁	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	6	47	16	4	M6 x 1	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	8	51	16	4	M6 x 1	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	11	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	11	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	13	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	16	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).

Air Cylinder: Non-rotating Rod Type

Double Acting, Double Rod

Series MBKW

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Non-rotating Rod Type

With auto switch

MBKW L 32 - 50 -

MDBKW L 32 - 50 - M9BW -

With auto switch
(Built-in magnet)

Non-rotating Rod Type
Double rod
Mounting

B	Basic/Without bracket
L	Axial foot
F	Rod side flange
G	Head side flange
T	Center trunnion

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

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)

Refer to page 428 for standard strokes.

Made to Order

For details, refer to page 428.

Auto switch

Nil	Without auto switch
S	1
3	3
n	n

Number of auto switches

Nil	2
S	1
3	3
n	n

Rod boot/Cushion

Rod boot	Nil	None
	J	Nylon tarpaulin (head or rod end)
	JJ	Nylon tarpaulin (both ends)
	K	Heat resistant tarpaulin (head or rod end)
	KK	Heat resistant tarpaulin (both ends)
Cushion	Nil	Both ends
	N*	None

* 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

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch. (Example) MDBKB40-100

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

Type	Special function	Electrical entry	Indication light	Wiring (Output)	Load voltage			Auto switch model		Lead wire length (m)			Pre-wired connector	Applicable load						
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)	5 (Z)								
Solid state auto switch	—	Grommet		3-wire(NPN)	24V	5V,12V	—	M9N	—	●	●	●	○	IC circuit	Relay, PLC					
				3-wire(PNP)				M9P	—	●	●	○	○							
		Terminal conduit	2-wire	—	—	100V,200V	J51	—	●	—	●	○	—	—						
			3-wire(NPN)	—	5V,12V	—	G39	—	—	—	—	—	—							
	Diagnostic indication (2-color indication)	Yes	Grommet	2-wire	24V	12V	—	—	K39	—	—	—	—	IC circuit						
				3-wire(NPN)				M9NW	—	●	●	●	○			○				
				3-wire(PNP)				M9PW	—	●	●	●	○			○				
				2-wire				M9BW	—	●	●	○	○			—				
	Water resistant (2-color indication)	Grommet	3-wire(NPN)	24V	5V,12V	—	M9NA**	—	○	○	●	○	○	IC circuit						
			3-wire(PNP)				M9PA**	—	○	○	●	○	○							
			2-wire				M9BA**	—	○	○	●	○	○			—				
			4-wire(NPN)				F59F	—	●	—	●	○	○			IC circuit				
Diagnostic output (2-color indication)	Grommet		2-wire	24V	12V	—	P3DW	—	●	—	●	○	○	—						
			4-wire(NPN)				P4DW	—	—	●	—	●	○		○					
Reed auto switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	—	5V	—	A96	—	●	—	●	—	IC circuit	Relay, PLC					
				No				24V	12V	100V	A93	—	●			—	●	●	—	IC circuit
				Yes						100V or less	A90	—	●			—	●	—	—	
				No						100V,200V	A54	—	●			—	●	●	—	
	Terminal conduit	Yes	Grommet	2-wire	24V	12V	—			200V or less	A64	—	●	—		●	—	—		
				—				—	A33	—	—	—	—	—		PLC Relay, PLC				
				DIN terminal				—	—	A34	—	—	—	—			—			
				—				—	100V,200V	—	—	A44	—	—			—		—	
	Diagnostic indication (2-color indication)	Grommet		—	24V	—	—	A59W	—	●	—	●	—	—						

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

Consult with SMC regarding water resistant types with the above model numbers.

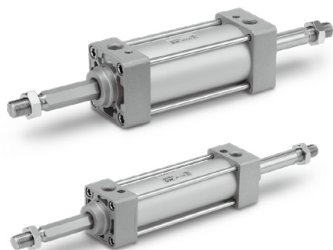
* Lead wire length symbols: 0.5 m.....Nil (Example) M9NW (Example) M9NWM (Example) M9NWL (Example) M9NWZ

* Solid state auto 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 449.

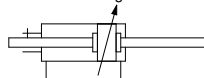
* Solid state auto switches are also available with a pre-wired connector. Refer to pages 1626 and 1627 for details. Refer to pages 1614 and 1615 for D-P3DW□.

* D-A9□/M9□□/P3DW□ auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled for D-A9□/M9□□ when being shipped.)



Symbol

Double acting



Made to Order Specifications (For details, refer to pages 1699 to 1818.)

Symbol	Specifications
-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
-XC30	Rod side trunnion

Refer to pages 444 to 449 for cylinders with auto switches.

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

Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting, Single rod					
Fluid	Air					
Proof pressure	1.5 MPa					
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	Non-lube					
Operating piston speed	50 to 1000 mm/s					
Allowable stroke tolerance	Up to 250: $^{+1.0}_0$, 251 to 800: $^{+1.4}_0$					
Cushion <small>(Note)</small>	Both ends (Air cushion)					
Port size (Rc, NPT, G)	1/8	1/4	3/8	1/2		
Mounting	Basic, Foot, Rod side flange, Head side flange, Center trunnion					
Non-rotating accuracy	$\pm 0.5^\circ$		$\pm 0.5^\circ$		$\pm 0.3^\circ$	
Allowable rotating torque N-m or less	0.25	0.45	0.64	0.79	0.93	

(Note) Absorbable kinetic energy by cushion mechanism is identical to double acting single rod.
In case of types with no air cushion, a rubber bumper is used.

Standard Strokes

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

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

Accessory

Mounting		Basic	Foot	Flange	Center trunnion
Standard	Rod end nut	●	●	●	●
	Single knuckle joint	●	●	●	●
Option	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.

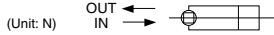
Mounting Bracket Part No.

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

(Note) Two foot brackets required for one cylinder.

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

Theoretical Force



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

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

Weights/Aluminum Tube

Bore size (mm)		32	40	50	63	80	100
Basic weight	Basic	0.54	0.77	1.37	1.67	3.06	4.00
	Foot	0.58	0.91	1.59	1.95	3.56	4.66
	Flange	0.83	1.14	1.82	2.46	4.51	7.31
	Trunnion	0.83	1.13	1.85	2.47	4.61	7.67
Additional weight per 50 mm of stroke	All mounting brackets	0.12	0.19	0.30	0.32	0.48	0.68
	Single knuckle	0.15	0.23	0.26	0.26	0.46	0.83
Accessories	Double knuckle (with pin)	0.22	0.37	0.43	0.43	0.87	1.27

Calculation example:

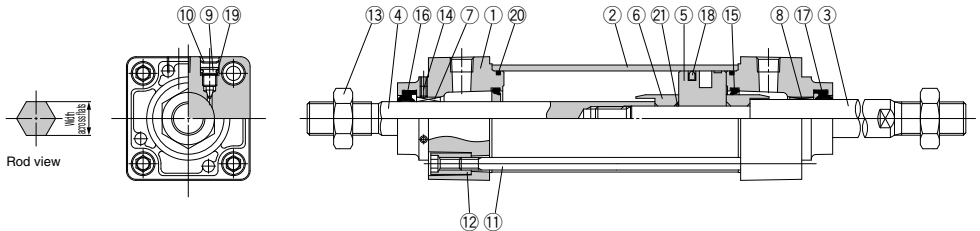
MBKW32-100 (Basic, ø32, 100 st)

●Basic weight ...0.54 (Basic, ø32)

▲Additional weight ...0.12/50 stroke

0.54 + 0.12 x 100/50 = 0.78 kg

Construction



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum die-cast	Metallic painted
2	Cylinder tube	Aluminum alloy	Hard anodized
3	Piston rod A	Carbon steel	Hard chrome plated
4	Piston rod B	Stainless steel	
5	Piston	Aluminum alloy	Chromated
6	Cushion ring	Aluminum alloy	Anodized
7	Non-rotating guide bearing	Oil-impregnated sintered alloy	
8	Bushing	Bearing alloy	
9	Cushion valve	Steel wire	Zinc chromated
10	Retaining ring	Steel for spring	ø40 to ø100
11	Tie rod	Carbon steel	Zinc chromated
12	Tie rod nut	Carbon steel	Zinc chromated
13	Rod end nut	Carbon steel	Zinc chromated
14	Lock nut	Steel wire	
15*	Cushion seal	Urethane	
16*	Rod seal A	NBR	
17*	Rod seal B	NBR	
18*	Piston seal	NBR	
19	Cushion valve seal	NBR	
20*	Cylinder tube gasket	NBR	
21	Piston gasket	NBR	

Replacement Parts/Seal Kit

Bore size (mm)	Kit no.	Contents
32	MBKW32-PS	Set of the No. 15, 16, 17, 18 and 20
40	MBKW40-PS	
50	MBKW50-PS	
63	MBKW63-PS	
80	MBKW80-PS	
100	MBKW100-PS	

* Seal kits consist of items 15, 16, 17, 18 and 20, and can be ordered by using the seal kit number corresponding to each bore size.

* Trunnion type should not be disassembled. (Refer to page 451.)

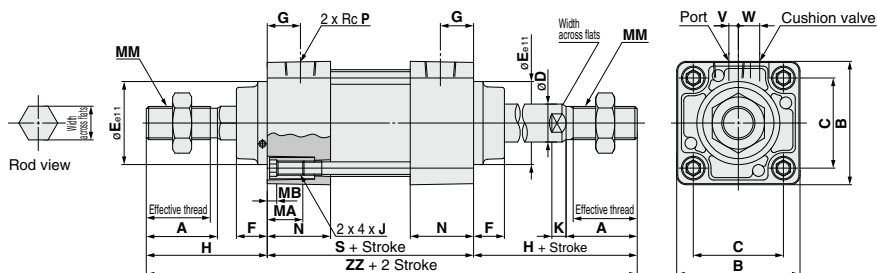
* Seal kit includes a grease pack (ø32 to 50: 10 g, ø63, 80: 20 g, ø100, 125: 30 g).

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

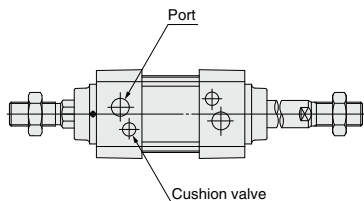
Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

Without Mounting Bracket

Basic: (B)



Positional relationship between port and cushion valve



Bore size (mm)	Stroke range	Effective thread length	Width across flats	Width across flats	A	B	C	D	E	F	G	H ₁	H	MA	MB	J
32	to 500	19.5	12.2	10	22	46	32.5	12	30	13	13	6	47	16	4	M6 x 1
40	to 500	27	14.2	14	30	52	38	16	35	13	14	8	51	16	4	M6 x 1
50	to 600	32	19	18	35	65	46.5	20	40	14	15.5	11	58	16	5	M8 x 1.25
63	to 800	32	19	18	35	75	56.5	20	45	14	16.5	11	58	16	5	M8 x 1.25
80	to 800	37	23	22	40	95	72	25	45	20	19	13	72	16	5	M10 x 1.5
100	to 800	37	27	26	40	114	89	30	55	20	19	16	72	16	5	M10 x 1.5

(mm)								
Bore size (mm)	K	MM	N	P	S ^a	V	W	ZZ ^b
32	6	M10 x 1.25	27	1/8	84	4	6.5	178
40	6	M14 x 1.5	27	1/4	84	4	9	186
50	7	M18 x 1.5	31.5	1/4	94	5	10.5	210
63	7	M18 x 1.5	31.5	3/8	94	9	12	210
80	10	M22 x 1.5	38	3/8	114	11.5	14	258
100	10	M26 x 1.5	38	1/2	114	17	15	258

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

The dimensions for each mounting type are the same as those for the standard double acting double rod model. Refer to pages 421 and 422.

Air Cylinder: Low Friction Type

Series **MB□Q**

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

With auto switch **MB L Q 32 □ - 50 F - □**

With auto switch **MDB L Q 32 □ - 50 F - M9BW □ - □**

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

Auto switch

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

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

Direction of low friction

F	With pressure at head side
B	With pressure at rod side

Number of auto switches

Nil	2
S	1
3	3
n	n

Made to Order
For details, refer to page 432.

Cylinder stroke (mm)
Refer to page 432 for standard strokes.

Port thread type

Nil	Rc
TN	NPT
TF	G

Built-in Magnet Cylinder Model
If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) MDBBQ40-100

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

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage			Auto switch model		Lead wire length (m)				Pre-wired connector	Applicable load			
					DC		AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)	5 (Z)					
Solid state auto switch	—	Grommet	No	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC		
				3-wire (PNP)				M9P	—	●	●	●	○	○				
		Terminal conduit		2-wire		—		—	100 V, 200 V	M9B	—	●	●	●			○	○
				3-wire (NPN)		—		—	J51	—	●	—	●	○			—	
	Diagnostic indication (2-color indication)	Grommet		Yes	2-wire	24 V	5 V, 12 V	—	—	G39	—	—	—	—	—		—	
					2-wire				—	K39	—	—	—	—				
					3-wire (NPN)		5 V, 12 V		M9NW	—	●	●	●	○	○			IC circuit
					3-wire (PNP)				M9PW	—	●	●	●	○	○			
					2-wire	M9BW	—		●	●	●	○	○	—				
					3-wire (NPN)	M9NA**	—		○	○	●	○	○	IC circuit				
					3-wire (PNP)	M9PA**	—		○	○	●	○	○					
					2-wire	M9BA**	—		○	○	●	○	○	—				
Diagnostic output (2-color indication)	4-wire (NPN)	5 V, 12 V	F59F	—	●	—	●	○	○	IC circuit								
Magnetic field resistant (2-color indication)	2-wire (Non-polar)	—	P3DW	—	●	—	●	—	○	—								
	—	P4DW	—	—	—	●	●	●	○	—								
Reed auto switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	24 V	5 V	—	A96	—	●	—	●	—	—	IC circuit	—		
				No				100 V	A93	—	●	—	●	●	—		—	
				Yes				100 V or less	A90	—	●	—	●	—	—		IC circuit	
				Yes				100 V, 200 V	A54	—	●	—	●	●	—		—	
		Terminal conduit		Yes	2-wire	24 V	12 V	200 V or less	A64	—	●	—	●	—	—	—		
									—	A33	—	—	—	—	—			
									—	A34	—	—	—	—	—			
									—	A44	—	—	—	—	—			
		DIN terminal		Grommet	Yes	2-wire	24 V	100 V, 200 V	—	A59W	—	●	—	●	—	—	PLC	
									—	—	A59W	—	●	—	●	—	—	Relay, PLC
Diagnostic indication (2-color indication)	Grommet	Yes	2-wire	24 V	12 V	200 V or less	—	A59W	—	●	—	●	—	—	Relay, PLC			
							—	—	A59W	—	●	—	●	—	—	Relay, PLC		

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

- * Lead wire length symbols: 0.5 m Nil (Example) M9NW
1 m M (Example) M9NWM
3 m L (Example) M9NWL
5 m Z (Example) M9NWL
- * Solid state auto 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 449.
* Solid state auto switches are also available with a pre-wired connector. Refer to pages 1626 and 1627 for details. Refer to pages 1614 and 1615 for D-P3DW□.
* D-A9□/M9□□□/P3DW□ auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled for D-A9□/M9□□□ when being shipped.)

CJ1

CJP

CJ2
-Z

CJ2

CM2
-Z

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

CS2

CS2

CS2

CS2

CS2

CS2

CS2

CS2

CS2

CS2

CS2

CS2

CS2

CS2

CS2

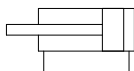
CS2

CS2



Symbol

Double acting, Without cushion



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

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
-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	Rod side trunnion

Refer to pages 444 to 449 for cylinders with auto switches.

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

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	0.025 MPa (ø32)	0.01 MPa (ø40 to ø100)				
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					
Port size (Rc, NPT, G)	1/8	1/4	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/body mounting bolt, double clevis/body mounting bolt, clevis pins, flat washer and cotter pins. → Refer to page 416 for details.

Weight/Aluminum Tube

Bore size (mm)		32	40	50	63	80	100
Basic weight	Basic	0.50	0.69	1.19	1.47	2.73	3.7
	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
	Single rod clevis	0.15	0.23	0.26	0.26	0.60	0.83
Accessory	Double rod clevis (with pin)	0.22	0.37	0.43	0.43	0.87	1.27

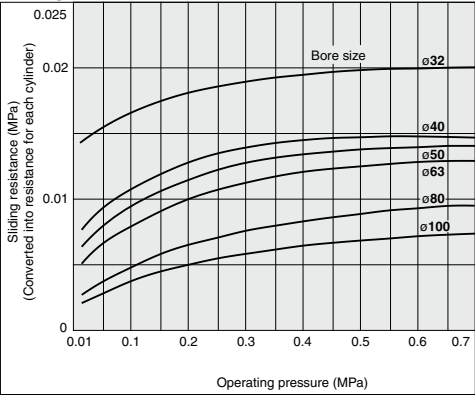
Calculation example: **MBBQ32-100** (Basic, ø32, 100 st)

- 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

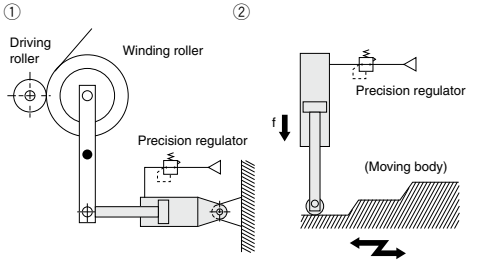
1. When used as a balancer etc., follow the example of the application mentioned earlier applying pressure at one port while leaving the other port open to atmosphere.
- With pressure at rod cover port
..... Low friction side B (Example of application ①)
- With pressure at head cover port
..... Low friction side F (Example of application ②)
- In both cases, as long as the outside pressure moves the piston rod, low friction can result in the direction of extension and retraction.

Sliding Resistance on Low Friction Side



Application Example

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



Caution on Use

Warning

1. 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.

CJ1

CJP

CJ2
-Z

CJ2

CM2
-Z

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

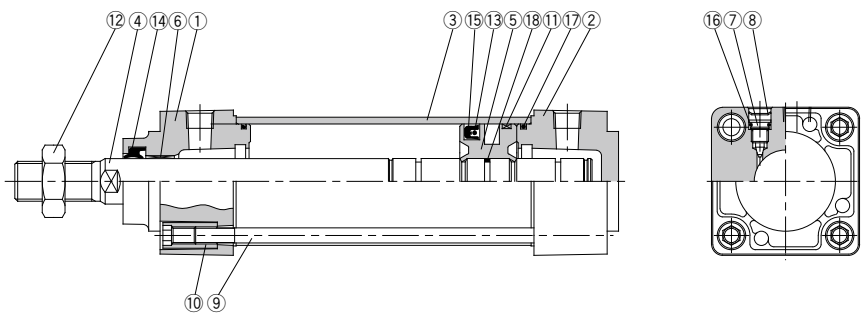
CS2

D-□

-X□

Technical
data

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	Bearing alloy	
7	Cushion valve	Steel wire	Nickel plated
8	Retaining ring	Steel for spring	ø40 to ø100
9	Tie rod	Carbon steel	Zinc chromated
10	Tie rod nut	Carbon steel	Nickel plated
11	Wear ring	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	

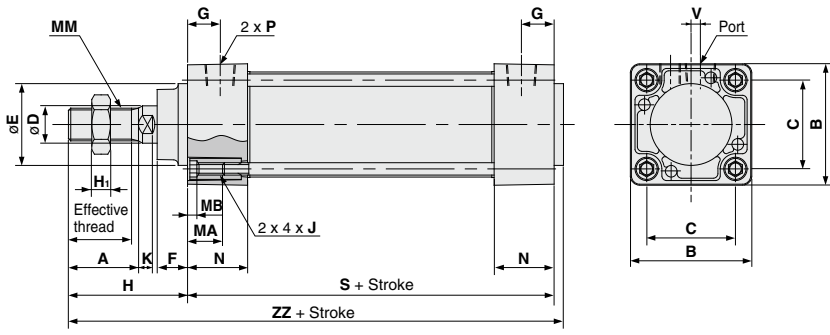
* Seal kits consist of items 13, 14, 15 and 17, and can be ordered by using the seal kit number corresponding to each bore size.

* Trunnion type should not be disassembled. (Refer to page 451.)

* Since the seal kit does not include a grease pack, order it separately.

Grease pack part number: GR-L-005 (5 g), GR-L-010 (10 g), GR-L-150 (150 g),

Basic: (B)

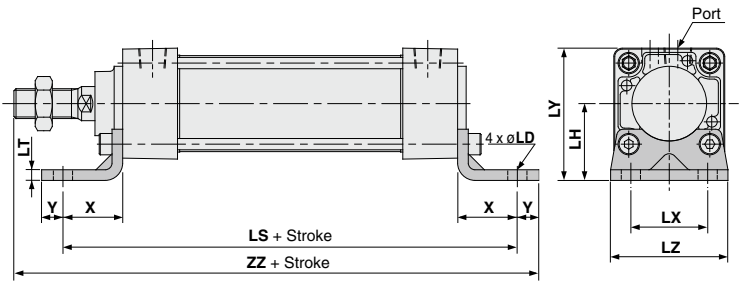


(mm)																						
Bore (mm)	Stroke range	Effective thread length	Width across flats	A	B	C	D	Ee11	F	G	H ₁	H	MA	MB	J	K	MM	N	P	S	V	ZZ
32	up to 500	19.5	10	22	46	32.5	12	30	13	13	6	47	16	4	M6 x 1	6	M10 x 1.25	27	1/8	84	4	135
40	up to 500	27	14	30	52	38	16	35	13	14	8	51	16	4	M6 x 1	6	M14 x 1.5	27	1/4	84	4	139
50	up to 600	32	18	35	65	46.5	20	40	14	15.5	11	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	11	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	13	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	16	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.

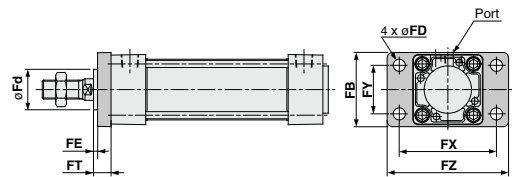
Foot: (L)



(mm)													
Bore size (mm)	Stroke range	X	Y	LD	LH	LS	LT	LY	LX	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		

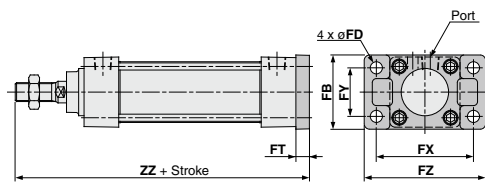
With Mounting Bracket

Front flange: (F)



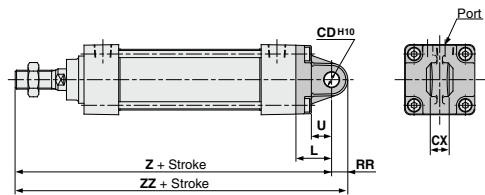
Front Flange		(mm)							
Bore size (mm)	Stroke range	B	FD	FE	FT	FX	FY	FZ	Fd
32	to 700	50	7	3	10	64	32	79	25
40	to 800	55	9	3	10	72	36	90	31
50	to 1000	70	9	2	12	90	45	110	38.5
63	to 1000	80	9	2	12	100	50	120	39.5
80	to 1000	100	12	4	16	126	63	153	45
100	to 1000	120	14	4	16	150	75	178	54

Rear flange: (G)



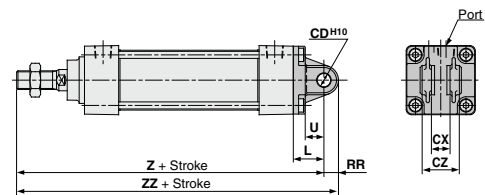
Rear Flange		(mm)							
Bore size (mm)	Stroke range	B	FD	FT	FX	FY	FZ	ZZ	
32	to 500	50	7	10	64	32	79	141	
40	to 500	55	9	10	72	36	90	145	
50	to 600	70	9	12	90	45	110	164	
63	to 600	80	9	12	100	50	120	164	
80	to 750	100	12	16	126	63	153	202	
100	to 750	120	14	16	150	75	178	202	

Single clevis: (C)



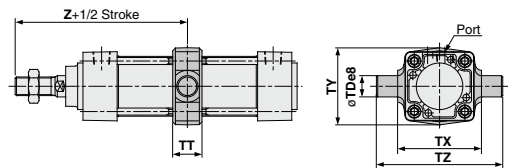
Single Clevis		(mm)								
Bore size (mm)	Stroke range	L	RR	U	CDH10	CX ^{+0.3 -0.1}	Z	ZZ		
32	to 500	23	10.5	13	10	14	154	164.5		
40	to 500	23	11	13	10	14	158	169		
50	to 600	30	15	17	14	20	182	197		
63	to 600	30	15	17	14	20	182	197		
80	to 750	42	23	26	22	30	228	251		
100	to 750	42	23	26	22	30	228	251		

Double clevis: (D)



Double Clevis		(mm)								
Bore size (mm)	Stroke range	L	RR	U	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 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	74	89
40	to 500	16	22	63	58	95	93	93
50	to 600	16	22	75	71	107	105	105
63	to 600	20	28	90	87	130	105	105
80	to 750	20	34	110	110	150	129	129
100	to 750	25	40	132	136	182	129	129

Air Cylinder: With End Lock

Series MBB

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

With auto switch MBB L 32 - 50 - H N -

With auto switch (Built-in magnet) MDBB L 32 - 50 - H N - M9BW -

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

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)

Refer to "Standard Stroke" on page 438.

Manual release

N	Non-locking
L	Locking

Locking position

H	Locking at head end
R	Locking at rod end
W	Locking at both ends

Number of auto switches

Nil	2
S	1
3	3
n	n

Auto switch

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

Made to Order
For details, refer to page 438.

Rod boot

Nil	None
J	Nylon tarpaulin
K	Heat resistant tarpaulin

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) MDBBB40-100

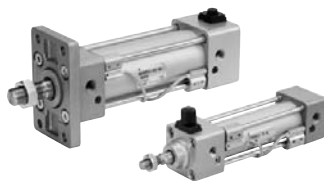
Applicable Auto Switches/Refer to pages 1559 to 1673 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage			Auto switch model		Lead wire length (m)				Pre-wired connector	Applicable load				
					DC		AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)	5 (Z)						
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC			
				3-wire (PNP)				M9P	—	●	●	●	○	○					
		2-wire		—				—	●	●	●	○	○						
		—		—				100 V, 200 V	J51	—	●	—	●	○			—		
	Terminal conduit	3-wire (NPN)		24 V	5 V, 12 V	—	—	G39	—	—	—	—	—	—					
		2-wire					—	—	—	—	—	—							
	Grommet	3-wire (NPN)					24 V	5 V, 12 V	—	M9NW	—	●	●		●		○	○	IC circuit
		3-wire (PNP)								M9PW	—	●	●		●		○	○	
		2-wire		M9BW	—	●				●	●	○	○	—					
		3-wire (NPN)		M9NA**	—	○				○	●	○	○		IC circuit				
		3-wire (PNP)		M9PA**	—	○				○	●	○	○						
		2-wire		M9BA**	—	○				○	●	○	○						
4-wire (NPN)	F59F	—	●	—	●	○	○	IC circuit											
2-wire (Non-polar)	P3DW	—	●	—	●	●	—	—											
P4DW	—	—	—	●	●	○	—												
Reed auto switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	—	5 V	—	A96	—	●	—	●	—	—	IC circuit	—			
				No				100 V	A93	—	●	—	●	●	—		—		
				Yes				100 V or less	A90	—	●	—	●	—	—		IC circuit		
				No				100 V, 200 V	A54	—	●	—	●	●	—		—		
		Terminal conduit		2-wire	24 V	12 V	—	200 V or less	A64	—	●	—	●	—	—	—			
				—				—	A33	—	—	—	—	—					
				—				—	A34	—	—	—	—	—					
				100 V, 200 V				—	A44	—	—	—	—	—					
DIN terminal	—	—	—	—	A59W	—	●	—	●	—	—	—	PLC						
Grommet	—	—	—	—	—	—	—	—	—	—	—	—	Relay, PLC						
Diagnostic indication (2-color indication)	—	—	—	—	—	—	—	—	—	—	—	—	—						

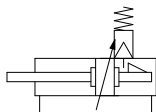
** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.
Consult with SMC regarding water resistant types with the above model numbers.

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

* Solid state auto 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 449.
* Solid state auto switches are also available with a pre-wired connector. Refer to pages 1626 and 1627 for details. Refer to pages 1614 and 1615 for D-P3DW□.
* D-A9□/M9□□□/P3DW□ auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled for D-A9□/M9□□□ when being shipped.)



Symbol
Air cushion



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

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	Rod side trunnion

Refer to pages 444 to 449 for cylinders with an auto switch.

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

Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting, Single rod					
Fluid	Air					
Proof pressure	1.5 MPa					
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)					
Port size (Rc, NPT, G)	1/8	1/4	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.

Locking Specifications

Locking position	Head end, rod end, both ends					
Holding force (Max.) N	ø32	ø40	ø50	ø63	ø80	ø100
	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.)

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	3.7
	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	1.1
	Locking at rod end (R)	0.08	0.13	0.20	0.29	0.71	1.03
	Locking at both ends (W)	0.16	0.26	0.41	0.59	1.46	2.13
Manual release locking (L)	Locking at head end (H)	0.09	0.15	0.23	0.32	0.78	1.13
	Locking at rod end (R)	0.09	0.15	0.22	0.31	0.74	1.06
	Locking at both ends (W)	0.18	0.30	0.45	0.63	1.52	2.19

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

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

Mounting Bracket Part No.

Bore size (mm)	32	40	50	63	80	100
Foot <small>Note 1)</small>	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/body mounting bolt, double clevis/body mounting bolt, clevis pins, flat washer and cotter pins. → Refer to page 416 for details.

CJ1

CJP

CJ2
-Z

CJ2

CM2
-Z

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

CS2

D-☐

-X☐

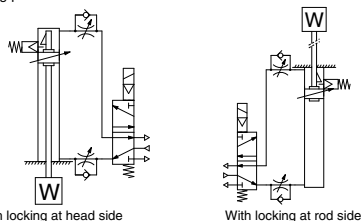
Technical data

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

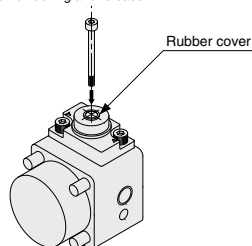
⚠ Caution

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

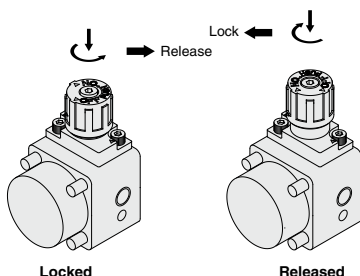
* Remove bolt under normal operations.
It may cause malfunction of locking and release.



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".

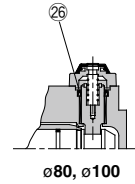
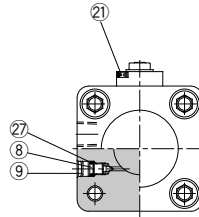
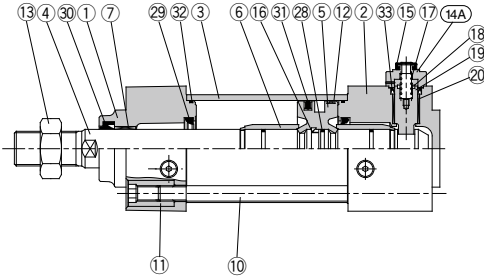
If not confirmed, locking is not done.



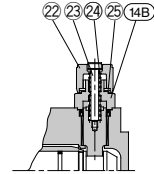
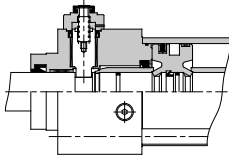
Construction

Locking at head end

Manual release non-locking type: N



Locking at rod end



Manual release locking type: L

Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Metallic painted
2	Head cover	Aluminum alloy	Metallic painted
3	Cylinder tube	Aluminum alloy	Hard anodized
4	Piston rod	Carbon steel	Hard chrome plated
5	Piston	Aluminum alloy	Chromated
6	Cushion ring	Aluminum alloy	Anodized
7	Bushing	Bearing alloy	
8	Cushion valve	Steel wire	Nickel plated
9	Retaining ring	Steel for spring	$\phi 40$ to $\phi 100$
10	Tie rod	Carbon steel	Chromated
11	Tie rod nut	Carbon steel	Nickel plated
12	Wear ring	Resin	
13	Rod end nut	Carbon steel	Nickel plated
14A	Cover A	Aluminum alloy	Painted black
14B	Cover B	Carbon steel	Tufftride
15	Rubber cover	Synthetic rubber	
16	Piston holder	Urethane	

Component Parts

No.	Description	Material	Note
17	Lock spring	Steel wire	
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	$\phi 80, \phi 100$ 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	

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

* Trunnion type should not be disassembled. (Refer to page 451.)

* Seal kit includes a grease pack ($\phi 32$ to 50: 10 g, $\phi 63, 80$: 20 g, $\phi 100$: 30 g).

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

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

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	

CJ1

CJP

CJ2-Z

CJ2

CM2-Z

CM2

CM3

CG1-Z

CG1

CG3

MB-Z

MB

MB1

CA2-Z

CA2

CS1

CS2

D-□

-X□

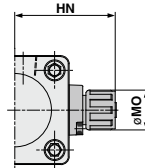
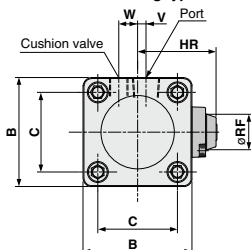
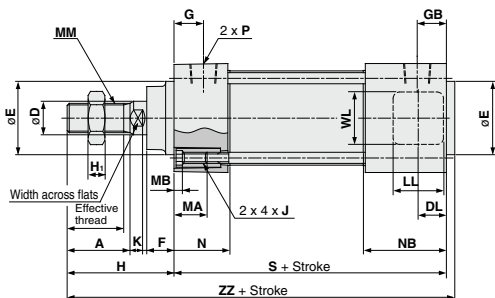
Technical data

Basic: (B)

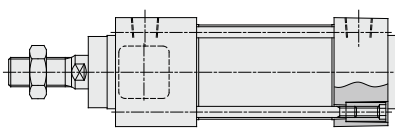
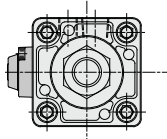
Locking at head end: MBBB – – H

Manual release non-locking type: N

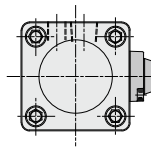
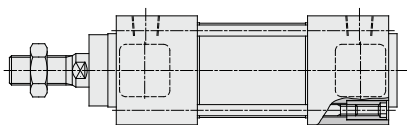
Manual release locking type: L



Locking at rod end: MBBB Bore size Port thread type - Stroke - R



Locking at both ends: MBBB — — W



-H□/-R□

(mm)

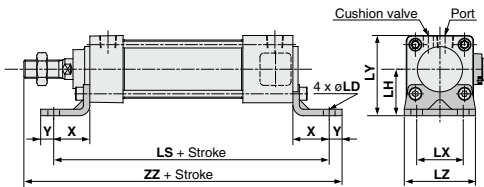
Bore size (mm)	Stroke range (mm)	Effective thread length	Width across flats	A	B	C	D	DL	E	F	G	GB	H	H	HR	HN	J	K	LL	MA	MB
32	to 500	19.5	10	22	46	32.5	12	9	30	13	13	21	6	47	33.5	45	M6 x 1	6	15	16	4
40	to 500	27	14	30	52	38	16	12	35	13	14	27	8	51	38.5	52.5	M6 x 1	6	21	16	4
50	to 600	32	18	35	65	46.5	20	13	40	14	15.5	27.5	11	58	45	59	M8 x 1.25	7	21	16	4
63	to 600	32	18	35	75	56.5	20	13	45	14	16.5	28.5	11	58	50	64	M8 x 1.25	7	21	16	5
80	to 800	37	22	40	95	72	25	16	45	20	19	37	13	72	62	76.5	M10 x 1.5	10	30	16	5
100	to 800	37	26	40	114	89	30	16	55	20	19	37	16	72	71.5	86	M10 x 1.5	10	30	16	5

-W□

Bore size (mm)	Stroke range (mm)	MM	MO	N	NB	P	RF	S	V	W	WL	ZZ	S	ZZ
32	to 500	M10 x 1.25	15	27	35	1/8	11	92	4	6.5	24	143	100	151
40	to 500	M14 x 1.5	19	27	40	1/4	11	97	4	9	24	152	110	165
50	to 600	M18 x 1.5	19	31.5	43.5	1/4	11	106	5	10.5	24	168	118	180
63	to 600	M18 x 1.5	19	31.5	43.5	3/8	11	106	9	12	24	168	118	180
80	to 800	M22 x 1.5	23	38	56	3/8	21	132	11.5	14	40	208	150	226
100	to 800	M26 x 1.5	23	38	56	1/2	21	132	17	15	40	208	150	226

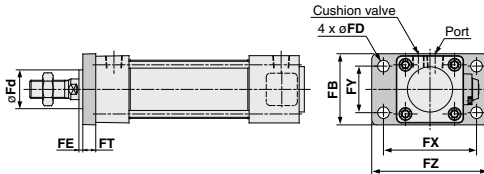
With Mounting Bracket

Foot(L)/Locking at head end (-H□)



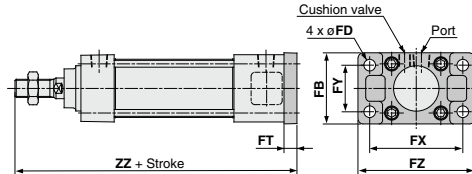
H□/R□		(mm)											-W□	
Bore size (mm)	Stroke range	X	Y	LD	LH	LS	LT	LX	LY	LZ	ZZ	LS	ZZ	
32	to 700	22	9	7	30	136	3.2	32	53	50	170	144	178	
40	to 800	24	11	9	33	145	3.2	38	59	55	183	158	196	
50	to 1000	27	11	9	40	160	3.2	46	72.5	70	202	172	214	
63	to 1000	27	14	12	45	160	3.6	56	82.5	80	205	172	217	
80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



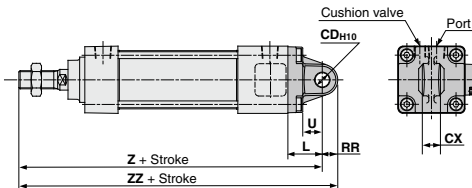
-H□/-R□/-W□		(mm)									
Bore size (mm)	Stroke range	FB	FD	FE	FT	FX	FY	FZ	Fd		
32	to 700	50	7	3	10	64	32	79	25		
40	to 800	55	9	3	10	72	36	90	31		
50	to 1000	70	9	2	12	90	45	110	38.5		
63	to 1000	80	9	2	12	100	50	120	39.5		
80	to 1000	100	12	4	16	126	63	153	45		
100	to 1000	120	14	4	16	150	75	178	54		

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



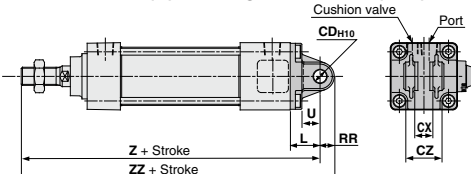
-H□/-R□		(mm)									
Bore size (mm)	Stroke range	FB	FD	FT	FX	FY	FZ	ZZ	ZZ		
32	to 500	50	7	10	64	32	79	149	157		
40	to 500	55	9	10	72	36	90	158	171		
50	to 800	70	9	12	90	45	110	176	188		
63	to 800	80	9	12	100	50	120	176	188		
80	to 800	100	12	16	126	63	153	220	238		
100	to 800	120	14	16	150	75	178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

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



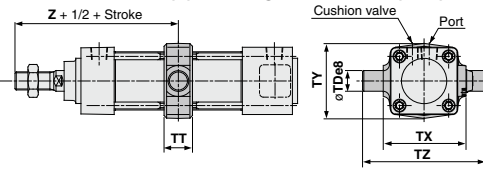
H□ / -R□		(mm)								-W□	
Bore size (mm)	Stroke range	L	RR	U	CDH10	CX ^{3/8,1}	Z	ZZ	Z	ZZ	
32	to 500	23	10.5	13	10	14	162	172.5	170	180.5	
40	to 500	23	11	13	10	14	171	182	184	195	
50	to 600	30	15	17	14	20	194	209	206	221	
63	to 800	30	15	17	14	20	194	209	206	221	
80	to 800	42	23	26	22	30	246	269	264	287	
100	to 800	42	23	26	22	30	246	269	264	287	

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



-H□/-R□		(mm)									
Bore size (mm)	Stroke range	L	RR	U	CDH10	CX ^{3/8,1}	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 800	30	15	17	14	20	40	194	209	206	221
63	to 800	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)							
Bore size (mm)	Stroke range	TDø8	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	

CJ1

CJP

CJ2-Z

CJ2

CM2-Z

CM2

CM3

CG1-Z

CG1

CG3

MB-Z

MB

MB1

CA2-Z

CA2

CS1

CS2

D-□

-X□

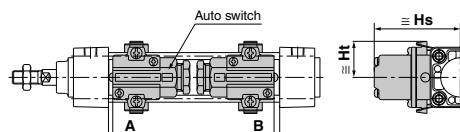
Technical data

Auto Switch Mounting 1

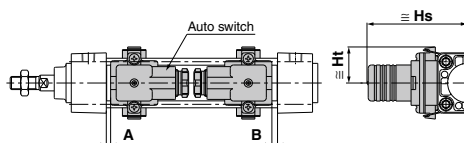
Proper Auto Switch Mounting Position (Detection at stroke end) and Mounting Height

Band mounting

D-A3□/G39/K39



D-A44



Tie-rod mounting

D-A9□/A9□V

D-M9□/M9□V

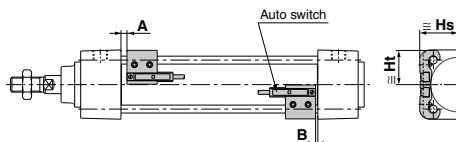
D-M9□W/M9□WV

D-M9□A/M9□AV

D-Z7□/Z80

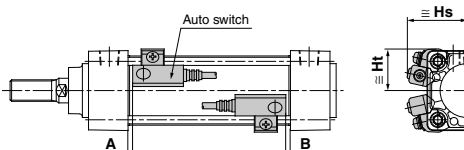
D-Y59□/Y69□/Y7P/Y7PV

D-Y7□W/Y7□WV/Y7BA



D-A5□/A6□

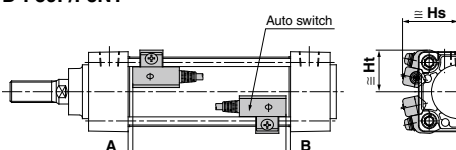
D-A59W



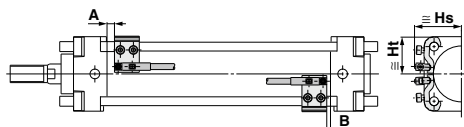
D-F5□/J5□

D-F5□W/J59W/F5BA

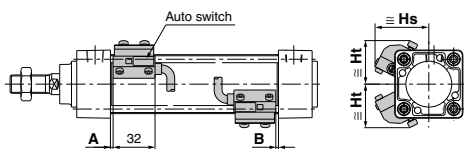
D-F59F/F5NT



D-P3DW



D-P4DW



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

(mm)

Auto switch model	D-A9□ D-A9□V		D-M9□ D-M9□V D-M9□WV D-M9□A D-M9□AV		D-A5□ D-A6□		D-A59W		D-F5□W D-J59W D-F5□ D-J5□ D-F5BA D-F59F		D-F5NT		D-A3□ D-A44 D-G39 D-K39		D-Z7□ D-Z80 D-Y59□ D-Y69□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV D-Y7BA		D-P3DW		D-P4DW	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
32	6.5	4	10.5	8	0.5	0	4.5	2	7	4.5	12	9.5	0.5	0	4	1.5	6	3	3.5	1
40	6.5	4	10.5	8	0.5	0	4.5	2	7	4.5	12	9.5	0.5	0	4	1.5	6	3	3.5	1
50	7	4.5	11	8.5	1	0	5	2.5	7.5	5	12.5	10	1	0	4.5	2	6	4	4	1.5
63	7	4.5	11	8.5	1	0	5	2.5	7.5	5	12.5	10	1	0	4.5	2	6	4	4	1.5
80	10	8.5	14	12.5	4	2.5	8	6.5	10.5	9	15.5	14	4	2.5	7.5	6	4	2.5	7	5.5
100	10	8.5	14	12.5	4	2.5	8	6.5	10.5	9	15.5	14	4	2.5	7.5	6	4	2.5	7	5.5
125	12	12	16	16	6	6	10	10	12.5	12.5	17.5	17.5	6	6	9.5	9.5	6.5	6.5	9	9

* Cylinders without an air cushion have different dimensions for proper auto switch mounting positions (A and B). Add the following values to both A and B: 3 mm (ø 32 and 40), 4 mm (ø50 and 63), 5 mm (ø80 and 100), 6 mm (ø125).

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

Proper Auto Switch Mounting Height

(mm)

Auto switch model	D-A9□ D-M9□ D-M9□W D-M9□A		D-A9□V		D-M9□V D-M9□WV D-M9□AV		D-A5□ D-A6□ D-A59W		D-F5□ D-J5□ D-F59F D-F5□W D-J59W D-F5BA D-F5NT		D-A3□ D-G39 D-K39		D-A44		D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7PV D-Y7□W D-Y7BA		D-Y69□ D-Y7PV D-Y7□WV		D-P3DW		D-P4DW	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
32	24.5	23	27.5	23	30.5	23	35	24.5	32.5	25	67	27.5	77	27.5	25.5	23	26.5	23	34	23	38	31
40	28.5	25.5	31.5	25.5	34	25.5	38.5	27.5	36.5	27.5	71.5	27.5	81.5	27.5	29.5	26	30	26	38	26	42	33
50	33.5	31	36	31	38.5	31	43.5	34.5	41	34	77	—	87	—	33.5	31	34.5	31	42	31	46.5	39
63	38.5	36	40.5	36	43	36	48.5	39.5	46	39	83.5	—	93.5	—	39	36	40	36	50	36	51.5	44
80	46.5	45	49	45	52	45	55	46.5	52.5	46.5	92.5	—	103	—	47.5	45	48.5	45	56	45	58	51.5
100	54	53.5	57	53.5	59.5	53.5	62	55	59.5	55	103	—	113.5	—	55.5	53.5	56.5	53.5	63.5	53.5	65.5	60.5
125	65.5	64.5	68.5	64.5	71	64.5	71.5	66.5	70.5	66.5	115	—	125	—	67.5	65	68.5	65	74.5	64.5	76.5	72

Operating Range

(mm)

Auto switch model	Bore size						
	32	40	50	63	80	100	125
D-A9□/A9□V	7	7.5	8.5	9.5	9.5	10.5	12
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	4	4.5	5	6	6	6	7
D-Z7□/Z80	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 D-Y7BA	5.5	5.5	7	7.5	6.5	5.5	7
D-F5□/J5□ D-F5□W/J59W D-F5BA/F5NT D-F59F	3.5	4	4	4.5	4.5	4.5	5
D-G39/K39	9	9	9	10	10	11	11
D-P3DW	4.5	5	5	5.5	4	6.5	8.5
D-P4DW	4	4	4	4.5	4	4.5	4.5

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

CJ1

CJP

CJ2
-Z

CJ2

CM2
-Z

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

CS2

D-□

-X□

Technical
data

Auto Switch Mounting 2

Minimum Auto Switch Mounting Stroke: Mounting Brackets Except Center Trunnion Type

		n: No. of auto switches (mm)		
Auto switch model	No. of auto switches	Mounting brackets except center trunnion type		
		ø32, ø40, ø50, ø63	ø80, ø100	ø125
D-A9□	2 (Different surfaces, same surface) 1	15		
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)		
D-A9□V	2 (Different surfaces, same surface) 1	10		
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)		
D-M9□ D-M9□W	2 (Different surfaces, same surface) 1	15		
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)		
D-M9□V D-M9□WV	2 (Different surfaces, same surface) 1	10		
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)		
D-M9□A	2 (Different surfaces, same surface) 1	15		
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)		
D-M9□AV	2 (Different surfaces, same surface) 1	15		
	n	$15 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)		
D-A3□ D-G39 D-K39	2 (Different surfaces)	35		
	2 (Same surface)	100		
	n (Different surfaces)	$35 + 30 (n-2)$ (n = 2, 3, 4...)		
	n (Same surface)	$100 + 100 (n-2)$ (n = 2, 3, 4...)		
	1	10		
D-A44	2 (Different surfaces)	35		
	2 (Same surface)	55		
	n (Different surfaces)	$35 + 30 (n-2)$ (n = 2, 3, 4...)		
	n (Same surface)	$55 + 50 (n-2)$ (n = 2, 3, 4...)		
	1	10		
D-A5□ D-A6□	2 (Different surfaces, same surface) 1	15	20	20
	n (Same surface)	$15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$20 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$20 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)
D-A59W	2 (Different surfaces, same surface)	20	25	25
	n (Same surface)	$20 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$25 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$25 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)
	1	15	25	25
D-F5□ D-J5□ D-F5□W D-J59W D-F5BA D-F59F	2 (Different surfaces, same surface)	15	25	25
	n (Same surface)	$15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$25 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$25 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)
	1	10	25	25
D-F5NT	2 (Different surfaces, same surface)	15	25	30
	n (Same surface)	$15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$25 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$30 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)
	1	10	25	30
D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W	2 (Different surfaces, same surface) 1	15		
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)		

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

Minimum Auto Switch Mounting Stroke: Mounting Brackets Except Center Trunnion Type

Auto switch model	No. of auto switches	n: No. of auto switches (mm)			
		Mounting brackets except center trunnion type			
		ø32, ø40	ø50, ø63	ø80, ø100	ø125
D-Y69□ D-Y7PV D-Y7□WV	2 (Different surfaces, same surface)	10			
	1				
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)			
D-Y7BA	2 (Different surfaces, same surface)	20			
	1				
	n	$20 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)			
D-P3DW	2 (Different surfaces) 1	15	15		
	2 (Same surface)	40	15		
	n (Different surfaces)	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)		
	n (Same surface)	$40 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)		
D-P4DW	2 (Different surfaces, same surface)	15			20
	1				
	n	$15 + 65 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)			$20 + 65 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)

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

CJ1

CJP

CJ2
-Z

CJ2

CM2
-Z

CM2

CM3

CG1
-Z

CG1

CG3

MB
-Z

MB

MB1

CA2
-Z

CA2

CS1

CS2

D-□

-X□

Technical
data

Auto Switch Mounting 3

Minimum Auto Switch Mounting Stroke: Center Trunnion Type

n: No. of auto switches (mm)

Auto switch model	No. of auto switches	Center trunnion						
		ø32	ø40	ø50	ø63	ø80	ø100	ø125
D-A9□	2 (Different surfaces, same surface) 1	70	75		80	85	95	100
	n	$70 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$75 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)
D-A9□V	2 (Different surfaces, same surface) 1	45	50		55	60	70	75
	n	$45 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$50 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)
D-M9□ D-M9□W	2 (Different surfaces, same surface) 1	75	80		85	90	95	105
	n	$75 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)
D-M9□V D-M9□WV	2 (Different surfaces, same surface) 1	50	55		60	65	70	80
	n	$50 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)
D-M9□A	2 (Different surfaces, same surface) 1	80	85		90	95	100	110
	n	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)
D-M9□AV	2 (Different surfaces, same surface) 1	55	60		65	70	75	85
	n	$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)
D-A3□ D-G39 D-K39	2 (Different surfaces)	60	65		75	80	85	90
	2 (Same surface)	90	95		100	105	110	125
	n (Different surfaces)	$60 + 30 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)	$65 + 30 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)		$75 + 30 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)	$80 + 30 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)	$85 + 30 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)	$90 + 30 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)
	n (Same surface)	$90 + 100 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)	$95 + 100 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)		$100 + 100 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)	$105 + 100 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)	$110 + 100 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)	$125 + 100 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)
D-A44	1	60	65		75	80	85	90
	2 (Different surfaces)	70	75		80		85	90
	2 (Same surface)							
	n (Different surfaces)	$70 + 30 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)	$75 + 30 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)		$80 + 30 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)		$85 + 30 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)	$90 + 30 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)
	n (Same surface)	$70 + 50 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)	$75 + 50 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)		$80 + 50 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)		$85 + 50 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)	$90 + 50 (n - 2)$ (n = 2, 4, 6, 8...) Note 2)
D-A5□ D-A6□	1	70	75		80		85	90
	2 (Different surfaces, same surface) 1	60	80		105	110	115	
	n (Same surface)	$60 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$80 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$105 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$115 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	
	2 (Different surfaces, same surface) 1	60	70	85	110	115	120	120
D-A59W	n (Same surface)	$60 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$70 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$85 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$115 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)
	1	60	70	85	110	115	120	120
D-F5□/J5□ D-F5□W D-J59W D-F5BA D-F59F	2 (Different surfaces, same surface) 1	90	95		110	115	120	130
	n (Same surface)	$90 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$95 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$115 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$130 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)
	1	90	95		110	115	120	130
	2 (Different surfaces, same surface) 1	100	105		120	125	130	140
D-F5NT	n (Same surface)	$100 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$105 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$125 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$130 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)
	1	100	105		120	125	130	140
D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W	2 (Different surfaces, same surface) 1	80	85		90	95	100	105
	n	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)
	2 (Different surfaces, same surface) 1	60	65		70	75	85	85
	n	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)
D-Y69□ D-Y7PV D-Y7□WV	2 (Different surfaces, same surface) 1	60	65		70	75	85	85
	n	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)

Note 1) When "n" is an odd number, a multiple of 4 that is larger than this odd number is used for the calculation. Note 2) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation.

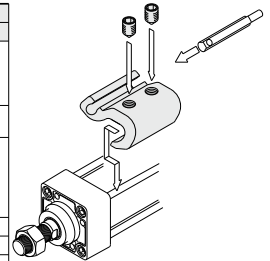
Minimum Auto Switch Mounting Stroke: Center Trunnion Type

n: No. of auto switches (mm)								
Auto switch model	No. of auto switches	Center trunnion						
		ø32	ø40	ø50	ø63	ø80	ø100	ø125
D-Y7BA	2 (Different surfaces, same surface)	85	90		100	105	110	115
	1							
	n	$85 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$90 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$100 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$105 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$110 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$115 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)
D-P3DW	2 (Different surfaces, same surface)	80	85		90		95	100
	1							
	n	$80 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$85 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$90 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$95 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)	$100 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)
D-P4DW	2 (Different surfaces, same surface)	120		130		140		150
	1							
	n	$120 + 65 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$130 + 65 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$140 + 65 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)		$150 + 65 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 1)

Note 1) When "n" is an odd number, a multiple of 4 that is larger than this odd number is used for the calculation.

Auto Switch Mounting Bracket: Part No.

Auto switch model	Bore size (mm)						
	ø32	ø40	ø50	ø63	ø80	ø100	ø125
D-A9□/A9□V D-M9□/M9□V D-M9□W/M9□WV D-M9□/M9□AV	BMB5-032	BMB5-032	BA7-040	BA7-040	BA7-063	BA7-063	BA7-080
D-A3□/A44 D-G39/K39	BMB2-032	BMB2-040	BMB1-050	BMB1-063	BMB1-080	BMB1-100	BS1-125
D-A5□/A6□/A59W D-F5□/J5□ D-F5□W/J59W D-F59F/F5BA D-F5NT	BT-03	BT-03	BT-05	BT-05	BT-06	BT-06	BT-08
D-P3DW	BMB9-032S	BMB9-032S	BMB9-050S	BMB9-050S	BA9T-063S	BA9T-063S	BA9T-080S
D-P4DW	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/Y7□WV D-Y7BA	BMB4-032	BMB4-032	BMB4-050	BMB4-050	BA4-063	BA4-063	BA4-080



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

[Stainless Steel Mounting Screw Kit]

The following set of stainless steel mounting screws (including set screws) is available. Use them in accordance with the operating environment. (Since auto switch brackets are not included, order them separately.)

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

Note 1) Refer to page 1663 for the details of BBA1.

The above stainless steel screws are used when a cylinder is shipped with D-F5BA type auto switches.

When only a switch is shipped independently, BBA1 is attached.

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

In addition to the auto switches listed above, the following auto switches are also available.
Refer to pages 1559 to 1673 for the detailed specifications.

Auto switch type	Part no.	Electrical entry (Entry direction)	Features
Reed auto switch	D-A93V, A96V	Grommet (perpendicular)	—
	D-A90V		Without indicator light
	D-A53, A56, Z73, Z76	Grommet (in-line)	—
	D-A67, Z80		Without indicator light
Solid state auto switch	D-M9NV, M9PV, M9BV	Grommet (perpendicular)	—
	D-Y69A, Y69B, Y7PV		—
	D-M9NWV, M9PWV, M9BWV		Diagnostic indication (2-color)
	D-Y7NWV, Y7PWV, Y7BWV		Water resistant (2-color indication)
	D-M9NAV, M9PAV, M9BAV		—
	D-F59, F5P, J59	Grommet (in-line)	—
	D-Y59A, Y59B, Y7P		—
	D-F59W, F5PW, J59W		Diagnostic indication (2-color)
	D-Y7NW, Y7PW, Y7BW		Water resistant (2-color indication)
	D-F5BA, Y7BA		With timer
	D-F5NT		Magnetic field resistant (2-color indication)
	D-P5DW		—

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

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

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

Symbol

-X1184

MDB Standard model no. — Heat resistant reed auto switch — **X1184**

Switch model

Symbol	Description
Nil	Without switch
B30	D-B30
B30J	D-B30J
B31	D-B31
B31J	D-B31J
B35	D-B35
B35J	D-B35J

For heat resistant auto switches (D-B3□)
(with built-in magnet)

No. of switches

Symbol	Description
S	1 pc.
Nil	2 pcs.
n	n pcs.

* Refer to page 1559 for details of auto switches.

Specifications

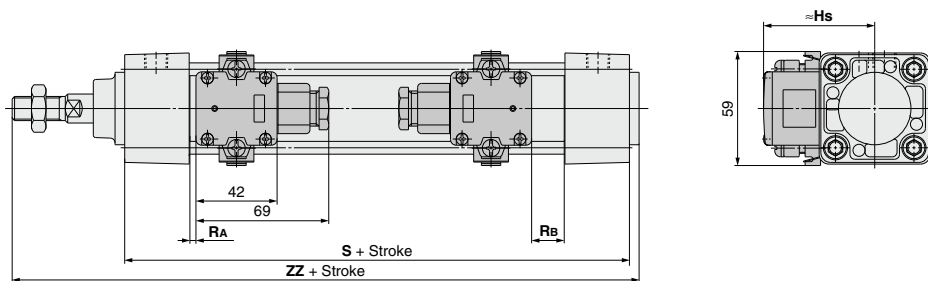
Ambient temperature range	−10 to 120°C
Bore size (mm)	40, 50, 63, 80, 100
Seal material	Fluororubber
Grease	Heat resistant grease

Warning

Precautions

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

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



Bore size	S	ZZ	Hs	RA	RB	Minimum mounting stroke		Auto switch mounting bracket : part no.
						Other than center trunnion	Center trunnion	
40	99	154	57.5	2.5	14.5	1 pc.: 50 st or more 2 pcs.: Different surfaces 50 st or more	200 st or more	BMB2-040
50	109	171	62.5	3.5	14.5		200 st or more	BMB1-050
63	109	171	69	0.5	14.5	2 pcs.: Same surface 220 st or more	200 st or more	BMB1-063
80	129	205	78	2.5	22.5		210 st or more	BMB1-080
100	129	205	88.5	1	22		210 st or more	BMB1-100

mm



Series MB

Specific Product Precautions

Be sure to read before handling.
Refer to front matter 57 for Safety Instructions and pages 3 to 12 for Actuator and Auto Switch Precautions.

Adjustment

⚠ Warning

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

Crimping (ø32) or a snap ring (ø40 to ø100) is provided to prevent the accidental removal of the cushion valve. Do not open the valve beyond the mechanism. If air is supplied, the cushion valve may shoot out from the cover.

Bore (mm)	Cushion valve width across flats	Socket wrench
32, 40	2.5	JIS 4648 Hexagonal spanner wrench 2.5
50, 63	3	JIS 4648 Hexagonal spanner wrench 3
80, 100	4	JIS 4648 Hexagonal spanner wrench 4
125	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 no.	Width across flats	Tightening torque (N·m)
32, 40		MB-32-48-C1247	4	5.1
50, 63		MB-50-48-C1249	5	11
80,	Foot	MB-80-48AC1251	6	25
100	Other	MB-80-48BC1251		
125	Foot Other	CE00008 (M12 x 1.75 x 25, Hexagon thin socket head bolt)	8	30.1
		CE00032 (M12 x 1.75 x 28, Hexagon thin socket head bolt)		

4. When replacing a bracket, tie-rod nuts on the cylinder body become loosened.

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

5. Mounting precision is required for the trunnion type cylinder.

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

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.

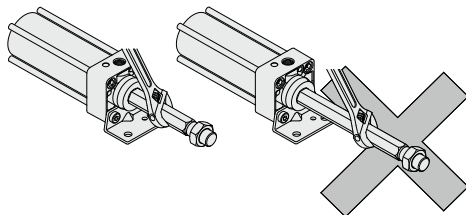
If rotational force is applied, the non-rotating guide will deform, thus affecting the non-rotating accuracy. valve may shoot out from the cover.

Mounting and Piping

⚠ Caution

1. Mounting a workpiece on the rod end

To screw a bracket or a nut onto the threaded portion at the tip of the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes. To tighten, take precautions to prevent the tightening torque from being applied to the non-rotating guide.



With rod boot

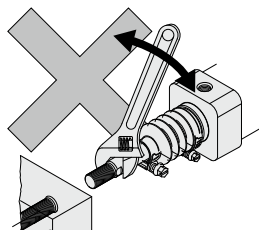
Handling

⚠ Caution

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

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

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



CJ1

CJP

CJ2

CJ2

CM2

CM2

CM3

CG1

CG1

CG3

MB

MB

MB1

CA2

CA2

CS1

CS2

D-□

-X□

Technical data