

Air Cylinder

ø32, ø40, ø50, ø63, ø80, ø100, ø125

New

RoHS



Weight

10% lighter
(ø50-100 stroke)

Current model
1.9 kg

New Series MB1

1.7 kg

Reduced weight by changing the shape of the rod cover and head cover.

Can mount small auto switches on 4 surfaces.

Page 2

Dustproof

Fastener on auto switch mounting groove for dust-prevention (Option)

Page 2



• Non-rotating rod type MB1K-Z series added.

Series **MB1**



CAT.ES20-234B

Part numbers with rod end bracket and/or pivot bracket available

Not necessary to order a bracket for the applicable cylinder separately
 Note) Mounting bracket is shipped together with the product, but not assembled.

Example) **MDB1** **D** 40-100Z- **N** **V** -M9BW

• Mounting style

Pivot bracket	
Nil	No bracket
N	Pivot bracket is shipped together with the product, but not assembled.

* Applicable to only D (Double clevis) mounting style.

Double clevis



Rod end bracket	
Nil	No bracket
V	Single knuckle joint
W	Double knuckle joint

With rod end bracket

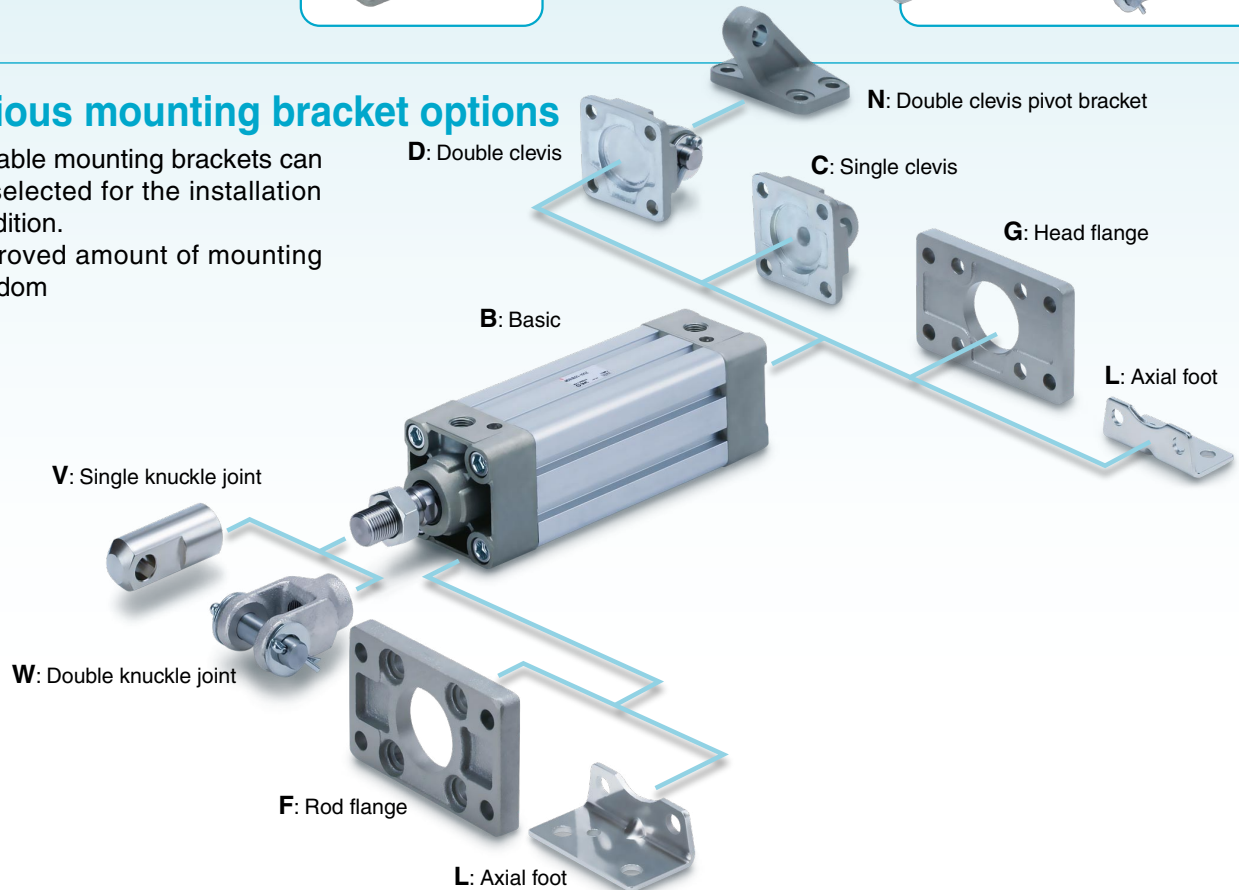
V: Single knuckle joint

W: Double knuckle joint



Various mounting bracket options

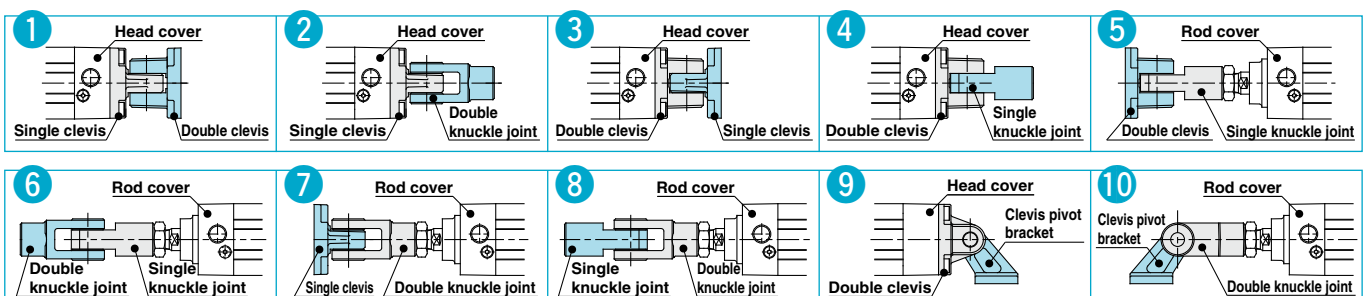
- Suitable mounting brackets can be selected for the installation condition.
- Improved amount of mounting freedom



Bracket Combinations

Bracket combination available.....Circled numbers are those shown in figures below.

Bracket for cylinder \ Bracket for workpiece	Single clevis	Double clevis	Single knuckle joint	Double knuckle joint	Clevis pivot bracket
Single clevis	—	①	—	②	—
Double clevis	③	—	④	—	⑨
Single knuckle joint	—	⑤	—	⑥	—
Double knuckle joint	⑦	—	⑧	—	⑩



Features

Lightweight

Reduced weight by changing the shape of the rod cover and head cover.

Bore size [mm]	New MB1	Reduction rate [%]	Current model
32	0.8	11	0.9
40	1.0	9	1.1
50	1.7	11	1.9
63	2.1	9	2.3
80	3.6	10	4.0
100	4.9	8	5.3
125	7.6	0	7.6

* At 100 stroke

Applicable speed/load

- Piston speed: Max. **1000** mm/s (ø32 to ø125)
- Load yield: See table below.

Bore size [mm]	Maximum load mass
32	80
40	140
50	190
63	310
80	500
100	800
125	1250

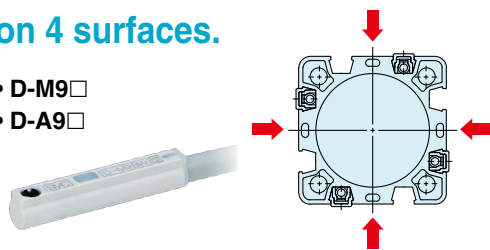
* Speed: 200 mm/s

Mounting dimensions are the same as the current product.



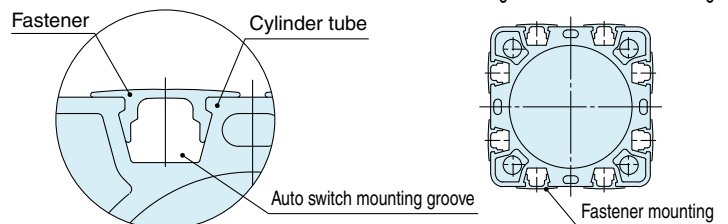
Can mount small auto switches on 4 surfaces.

- D-M9□
- D-A9□



Dust-prevention from fastener (Option)

- 1 Fastener avoids dust and foreign matter from entering or accumulating in the auto switch mounting groove.
- 2 Flat outer circumference prevents dust and foreign matter from accumulating



Series Variations

Series	Type	Cushion	Bore size [mm]						Built-in magnet	With rod boot	Water resistant	Page
			32	40	50	63	80	100				
Standard Single rod MB1-Z	Double acting, Single rod	Rubber	●	●	●	●	●	●	●	●	●	5
		Air	●	●	●	●	●	●	●	●	●	
Standard Double rod MB1W-Z	Double acting, Double rod	Rubber	●	●	●	●	●	●	●	●	●	15
		Air	●	●	●	●	●	●	●	●	●	
Non-rotating rod Single rod MB1K-Z	Double acting, Single rod	Rubber	●	●	●	●	●	●	●	●	●	21
		Air	●	●	●	●	●	●	●	●	●	

Combinations of Standard and Made to Order Specifications

Series MB1

- : Standard
- ◎: Made to Order
- : Special product (Please contact SMC for details.)
- : Not available

Series	MB1 (Standard type)			
Action/ Type	Double acting			
Cushion	Single rod			
Page	Air	Rubber		
	5			

Symbol	Specifications	Applicable bore size	ø32 to ø100	ø125	ø32 to ø100	ø125	
Standard	Standard	ø32 to ø125	●	●	●	●	
Long st	Long stroke		○	○	○	○	
D	Built-in magnet		●	●	●	●	
MB1□-□ ^J _K	With rod boot		●	●	●	●	
10- ^{Note 4)}	Clean series		○	○	○	○	
20- ^{Note 4)}	Copper ^{Note 3)} and Fluorine-free		●	○	●	○	
MB1□ ^R _V	Water resistant		●	○	●	○	
XA□	Change of rod end shape		◎	◎	◎	◎	
XB5 ^{Note 4)}	Oversized rod cylinder	◎	○	○	○		
XB6	Heat resistant cylinder (-10 to 150°C)	◎	○	○	○		
XC3 ^{Note 4)}	Special port location	◎	○	◎	○		
XC4	With heavy duty scraper	◎	○	◎	○		
XC5	Heat resistant cylinder (-10 to 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	ø32 to ø125	◎	○	◎	○	
XC8	Adjustable stroke cylinder/ Adjustable extension type		◎	○	◎	○	
XC9	Adjustable stroke cylinder/ Adjustable retraction type		◎	○	◎	○	
XC10	Dual stroke cylinder/Double rod type		◎	○	◎	○	
XC11	Dual stroke cylinder/Single rod type		◎	○	◎	○	
XC12	Tandem cylinder		◎	○	◎	○	
XC22	Fluororubber seal		◎	○	◎	○	
XC26	With split pins for double clevis pin/double knuckle joint pin and flat washers		ø125	—	◎	—	◎
XC27	Double clevis and double knuckle joint pins made of stainless steel			◎	◎	◎	◎
XC29	Double knuckle joint with spring pin		ø32 to ø125	◎	○	◎	○
XC30	Rod trunnion	◎ ^{Note 1)}		○	◎ ^{Note 1)}	○	
XC35	With coil scraper	◎		○	◎	○	
XC65	Made of stainless steel (Combination of XC7 and XC68)	◎		○	◎	○	
XC68	Piston rod and rod end nut made of stainless steel (with hard chrome plated piston rod)	◎		○	◎	○	
X846	Fastener strips mounted on switch mounting grooves	◎		◎	◎	◎	

Note 1) T bracket can be used only when selecting XC30.

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

Note 3) Copper-free for the externally exposed part.

Note 4) The cover shape is the same as the current product.

		MB1W (Standard type)				MB1K (Non-rotating rod type)		
		Double acting						
		Double rod				Single rod		
		Air		Rubber		Air	Rubber	
		15				21		
		ø32 to ø100	ø125	ø32 to ø100	ø125	ø32 to ø100		Symbol
	●	●	●	●	●	●	●	Standard
	○	○	○	○	○	○	○	Long st
	●	●	●	●	●	●	●	D
	●	●	●	●	●	●	●	MB1□-□ ^J _K
	○	○	○	○	○	○	○	10-
	●	○	●	○	○	—	—	20-
	●	○	●	○	○	—	—	MB1□ ^R _V
	◎	◎	◎	◎	◎	◎	◎	XA□
	○	○	○	○	○	○	○	XB5
	◎	○	◎	○	◎	◎	◎	XB6
	◎	○	◎	○	◎	◎	◎	XC3
	◎	○	◎	○	◎	—	—	XC4
	◎	○	◎	○	◎	◎	◎	XC5
	—	○	—	○	◎	◎	◎	XC6
	◎	○	◎	○	◎	◎	◎	XC7
	—	—	—	—	◎	◎	◎	XC8
	—	—	—	—	◎	◎	◎	XC9
	—	—	—	—	◎ Note 2)	◎ Note 2)	◎	XC10
	—	—	—	—	○	○	○	XC11
	○	○	○	○	○	○	○	XC12
	◎	○	◎	○	○	○	○	XC22
	—	—	—	—	—	—	—	XC26
	—	—	—	—	◎	◎	◎	XC27
	○	○	○	○	○	○	○	XC29
	◎ Note 1)	○	◎ Note 1)	○	◎ Note 1)	◎ Note 1)	◎	XC30
	◎	○	◎	○	—	—	—	XC35
	◎	◎	◎	◎	○	○	○	XC65
	◎	○	◎	○	—	—	—	XC68
	◎	◎	◎	◎	◎	◎	◎	X846

Standard
Double Acting, Single Rod
MB1

Double Acting, Double Rod
MB1W

Non-rotating Rod
Double Acting, Single Rod
MB1K

Auto Switch

Made to Order

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

Series MB1

RoHS

∅32, ∅40, ∅50, ∅63, ∅80, ∅100, ∅125

How to Order

MB1 B 32 [] - 50 [] [] Z - [] [] - []

With auto switch **MDB1 B 32 [] - 50 [] [] Z - [] [] - M9BW [] - []**

With auto switch
(Built-in magnet)

Mounting style

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

* Mounting bracket is shipped together with the product, but not assembled (except ∅125).

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 "Standard Strokes" on page 6.

Suffix (Rod boot)

Nil	None
J	Nylon tarpaulin
K	Heat resistant tarpaulin

Suffix (Cushion)

Nil	Air cushion
N*	Rubber bumper

* Since the bumpers are attached to the both sides of the piston for rubber bumper type, the overall length is longer than the cylinder with air cushion as follows: ∅32, ∅40: +6 mm, ∅50, ∅63: +8 mm, ∅80, ∅100: +10 mm, ∅125: +12 mm.

Made to Order
For details, refer to page 6.

Number of auto switches

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

Auto switch

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

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

Accessories 2

Nil	No bracket
V	Single knuckle joint
W	Double knuckle joint

* A knuckle joint pin is not provided with the single knuckle joint.
* Rod end bracket is shipped together with the product.

Accessories 1

Nil	No bracket
N	Pivot bracket

* Only for D mounting style.
* Pivot bracket is shipped together with the product.
* For details, refer to page 13.

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) MDB1B40-100Z

*** Refer to "Ordering Example of Cylinder Assembly" on page 6.**

Applicable Auto Switches/Refer to the WEB catalog or the Best Pneumatics No. 2 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length [m]				Pre-wired connector	Applicable load		
					DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)				
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PV	M9P	●	●	●	○	○		
				2-wire				M9BV	M9B	●	●	●	○	○		
	Diagnostic indication (2-color indication)			3-wire (NPN)	24 V	5 V, 12 V	—	M9NVW	M9NW	●	●	●	○	○	○	IC circuit
				3-wire (PNP)				M9PVW	M9PW	●	●	●	○	○		
				2-wire				M9BVW	M9BW	●	●	●	○	○		
	Water resistant (2-color indication)			3-wire (NPN)	24 V	5 V, 12 V	—	M9NAV*1	M9NA*1	○	○	●	○	○	○	IC circuit
				3-wire (PNP)				M9PAV*1	M9PA*1	○	○	●	○	○		
				2-wire				M9BAV*1	M9BA*1	○	○	●	○	○		
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	24 V	5 V	—	A96V	A96	●	—	●	—	IC circuit		
				2-wire				100 V	A93V*2	A93	●	●	●		●	—
								100 V or less	A90V	A90	●	—	●		—	

*1 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.

*2 1 m type lead wire is only applicable to the D-A93.

* Lead wire length symbols: 0.5 m Nil (Example) M9NV
1 m M (Example) M9NVW
3 m L (Example) M9NVWL
5 m Z (Example) M9NVWZ

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

* Since there are other applicable auto switches than listed above, refer to page 26 for details.

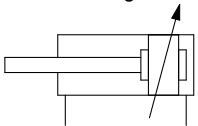
* For details about auto switches with pre-wired connector, refer to the WEB catalog or the Best Pneumatics No. 2.

* Auto switches are shipped together, (but not assembled).

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



Symbol
Double acting



Made to Order
(For details, refer to pages 29 to 43.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB5	Oversized rod cylinder*1 *2 *3
-XB6	Heat resistant cylinder (-10 to 150°C)*1 *2
-XC3	Special port location*3
-XC4	With heavy duty scraper*2
-XC5	Heat resistant cylinder (-10 to 110°C)*1 *2
-XC6	Piston rod and rod end nut made of stainless steel*4
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel*2
-XC8	Adjustable stroke cylinder/Adjustable extension type*2
-XC9	Adjustable stroke cylinder/Adjustable retraction type*2
-XC10	Dual stroke cylinder/Double rod type*2
-XC11	Dual stroke cylinder/Single rod type*2
-XC12	Tandem cylinder*2
-XC22	Fluororubber seal*2
-XC26	With split pins for double clevis pin/double knuckle joint pin and flat washers*4
-XC27	Double clevis and double knuckle joint pins made of stainless steel
-XC29	Double knuckle joint with spring pin*2
-XC30	Rod trunnion*2
-XC35	With coil scraper*2
-XC65	Made of stainless steel (Combination of XC7 and XC68)*2
-XC68	Piston rod and rod end nut made of stainless steel*2 (with hard chrome plated piston rod)
-X846	Fastener strips mounted on switch mounting grooves

*1 Air cushion only

*2 Except ø125

*3 The cover shape is the same as the current product.

*4 ø125 only

For special port location (-XC3), the mounting bracket and port location can be determined using the standard product corresponding to the operating conditions. Also, this is only applicable to -XC3BB, -XC3CC and -XC3DD with trunnion bracket.

Refer to pages 25 and 26 for cylinders with auto switches.

- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Minimum stroke for auto switch mounting
- Operating range
- Auto switch mounting brackets/Part no.

Specifications

Bore size [mm]	32	40	50	63	80	100	125
Action	Double acting, Single rod						
Fluid	Air						
Proof pressure	1.5 MPa						
Maximum operating pressure	1.0 MPa						
Minimum operating pressure	0.05 MPa						
Ambient and fluid temperature	Without auto switch: -10 to 70°C With auto switch: -10 to 60°C (No freezing)						
Lubrication	Not required (Non-lube)						
Piston speed	50 to 1000 mm/s						50 to 700 mm/s
Stroke length tolerance	Up to 250: $^{+1.0}_0$, 251 to 1000: $^{+1.4}_0$, 1001 to 1500: $^{+1.8}_0$, 1501 to 2000: $^{+2.2}_0$, 2001 to 2300: $^{+2.6}_0$						
Cushion	Air cushion or Rubber bumper						
Port size (Rc, NPT, G)	1/8	1/4		3/8		1/2	
Mounting	Basic, Axial foot, Rod flange, Head flange Single clevis, Double clevis						

Standard Strokes

Bore size	Standard stroke		Max. manufacturable stroke
	Stroke range ①	Stroke range ②	
32	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	Up to 1800	Up to 1800
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	Up to 2300	Up to 2300

Note 1) Intermediate strokes are available. (No spacer is used.)

Note 2) Applicable strokes should be confirmed according to the usage. For details, refer to "Air Cylinders Model Selection" on front matter pages of the Best Pneumatics No. 2 or the **WEB catalog**. In addition, the products that exceed the stroke range ① might not be able to fulfill the specifications due to the deflection etc.

Note 3) Please consult with SMC for manufacturability and the part numbers when exceeding the stroke range ②.

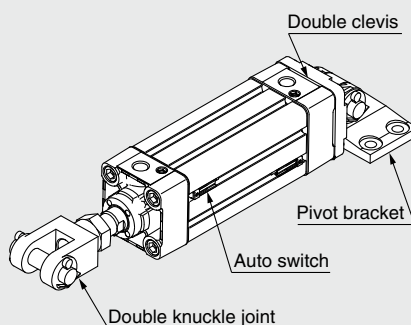
Rod Boot Material

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

* Max. ambient temperature for rod boot itself.

Ordering Example of Cylinder Assembly

Cylinder model: **MDB1D50-100Z-NW-M9BW**



Mounting D: Double clevis
Pivot bracket N: Yes
Rod end bracket W: Double knuckle joint
Auto switch D-M9BW: 2 pcs.

*Pivot bracket, double knuckle joint and auto switch are shipped together with the product, but not assembled.

Standard Double Acting, Single Rod **MB1**
 Double Acting, Double Rod **MB1W**
 Non-rotating Rod Double Acting, Single Rod **MB1K**
 Auto Switch
 Made to Order

Series MB1

Accessories

Mounting		Basic	Axial foot	Rod flange	Head flange	Single clevis	Double clevis
Standard	Rod end nut	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●
Option	Single knuckle joint	●	●	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●

* Refer to page 14 for part numbers and dimensions. (Refer to page 10 for rod boot.)

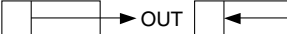
Mounting Brackets/Part No.

Bore size [mm]	32	40	50	63	80	100	125
Axial foot <small>Note 1)</small>	MB-L03	MB-L04	MB-L05	MB-L06	MB-L08	MB-L10	MB-L12
Rod/Head 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) Order two foots per cylinder.

Note 2) Accessories for each mounting bracket are as follows. Axial foot, Rod/Head flange, Single clevis/Body mounting bolt; Double clevis/Body mounting bolt, Clevis pin, Split pins and Flat washers. → Refer to page 14 for details.

Theoretical Force

(Unit: N) 

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]

Weights

[kg]

Bore size [mm]		32	40	50	63	80	100	125
Basic weight	Basic	0.47	0.62	1.1	1.36	2.54	3.51	5.68
	Axial foot	0.59	0.76	1.32	1.64	3.04	4.17	7.76
	Rod/Head flange	0.76	0.99	1.55	2.15	3.99	6.82	9.84
	Single clevis	0.72	0.85	1.44	1.99	3.65	6.68	8.25
	Double clevis	0.73	0.89	1.53	2.15	3.94	7.2	8.45
Additional weight per 50 mm of stroke	All mounting brackets	0.16	0.21	0.33	0.37	0.57	0.72	0.94
Accessories	Single knuckle joint	0.15	0.23	0.26	0.26	0.6	0.83	1.08
	Double knuckle joint (with pin)	0.22	0.37	0.43	0.43	0.87	1.27	1.58

Calculation

Example) **MB1B32-100Z** (Basic, ø32, 100 stroke)

• Basic weight 0.47 (Basic, ø32)

• Additional weight 0.16/50 stroke

• Cylinder stroke 100 stroke

$$0.47 + 0.16 \times 100/50 = 0.79 \text{ kg}$$

Kinetic Energy Absorbable by Cushion Mechanism

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

With Air Cushion

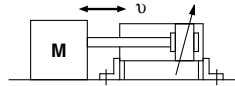
At the stroke end, when stopping a large amount of kinetic energy generated by a large load and high speed operation, compression of air is used to absorb the impact without transmitting vibration to the surroundings. The purpose of an air cushion is not to reduce the speed of a piston as it nears the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

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

E_k : Kinetic energy [J]

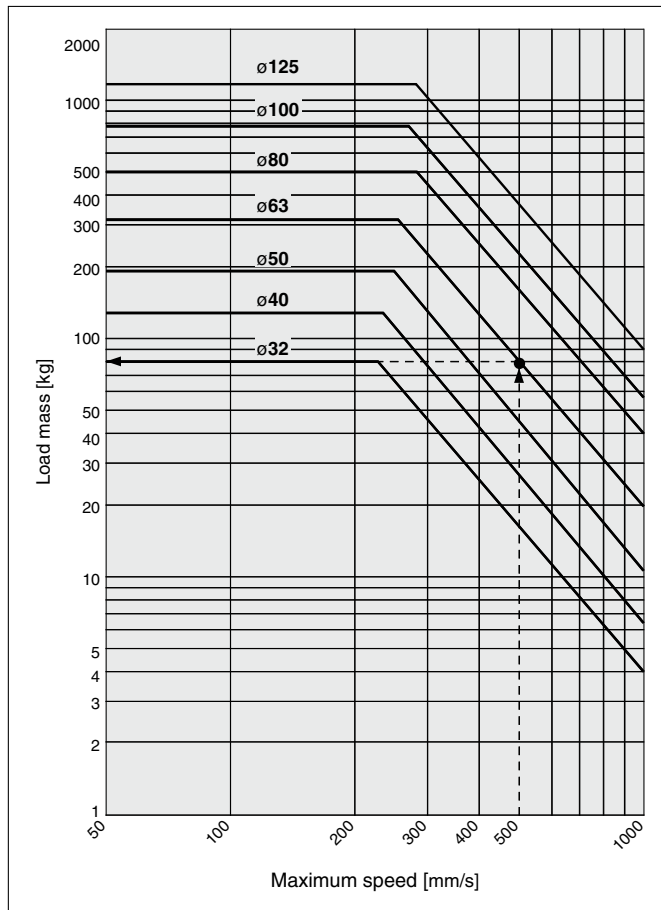
M : Mass of load [kg]

v : Piston speed [m/s]



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

Allowable Kinetic Energy



Example) Load limit at rod end when the air cylinder ø63 is actuated at 500 mm/s. Extend upward from 500 mm/s on the horizontal axis of the graph to the intersection point with the line for a tube bore size of 63 mm, and then extend leftward from this point to find the load of 80 kg.

Standard Double Acting, Single Rod **MB1**

Standard Double Acting, Double Rod **MB1W**

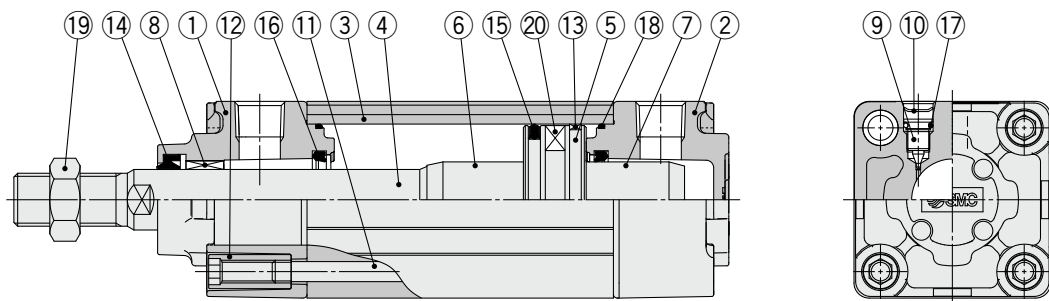
Non-rotating Rod Double Acting, Single Rod **MB1K**

Auto Switch

Made to Order

Series MB1

Construction



Component Parts

No.	Description	Material	Q'ty	Note
1	Rod cover	Aluminum die-cast	1	Trivalent chromated
2	Head cover	Aluminum die-cast	1	Trivalent chromated
3	Cylinder tube	Aluminum alloy	1	Hard anodized
4	Piston rod	Carbon steel	1	Hard chrome plating
5	Piston	Aluminum alloy	1	
6	Cushion ring	Aluminum alloy	1	Anodized
7	Cushion ring B	Aluminum alloy	1	Anodized
8	Bushing	Bearing alloy	1	
9	Cushion valve	Steel wire	2	Trivalent zinc chromated
10	Retaining ring	Steel for spring	2	ø40 to ø125

No.	Description	Material	Q'ty	Note
11	Tie-rod	Carbon steel	4	Trivalent zinc chromated
12	Tie-rod nut	Carbon steel	8	Trivalent zinc chromated
13	Wear ring	Resin	1	
14*	Rod seal	NBR	1	
15*	Piston seal	NBR	1	
16*	Cushion seal	Urethane	2	
17	Cushion valve seal	NBR	2	
18*	Cylinder tube gasket	NBR	2	
19	Rod end nut	Rolled steel	1	Trivalent zinc chromated
20	Magnet	—	(1)	

Replacement Parts/Seal Kit

Bore size [mm]	Kit no.	Contents
32	MB32Z-PS	Set of the nos. ⑭, ⑮, ⑯, ⑰
40	MB1-40Z-PS	
50	MB1-50Z-PS	
63	MB1-63Z-PS	
80	MB1-80Z-PS	
100	MB1-100Z-PS	
125	MB125-PS	

* Seal kits consist of items ⑭, ⑮, ⑯, ⑰, and can be ordered by using the seal kit number corresponding to each bore size.

* The seal kit includes a grease pack (10 g for ø32 to ø50, 20 g for ø63 and ø80, 30 g for ø100).

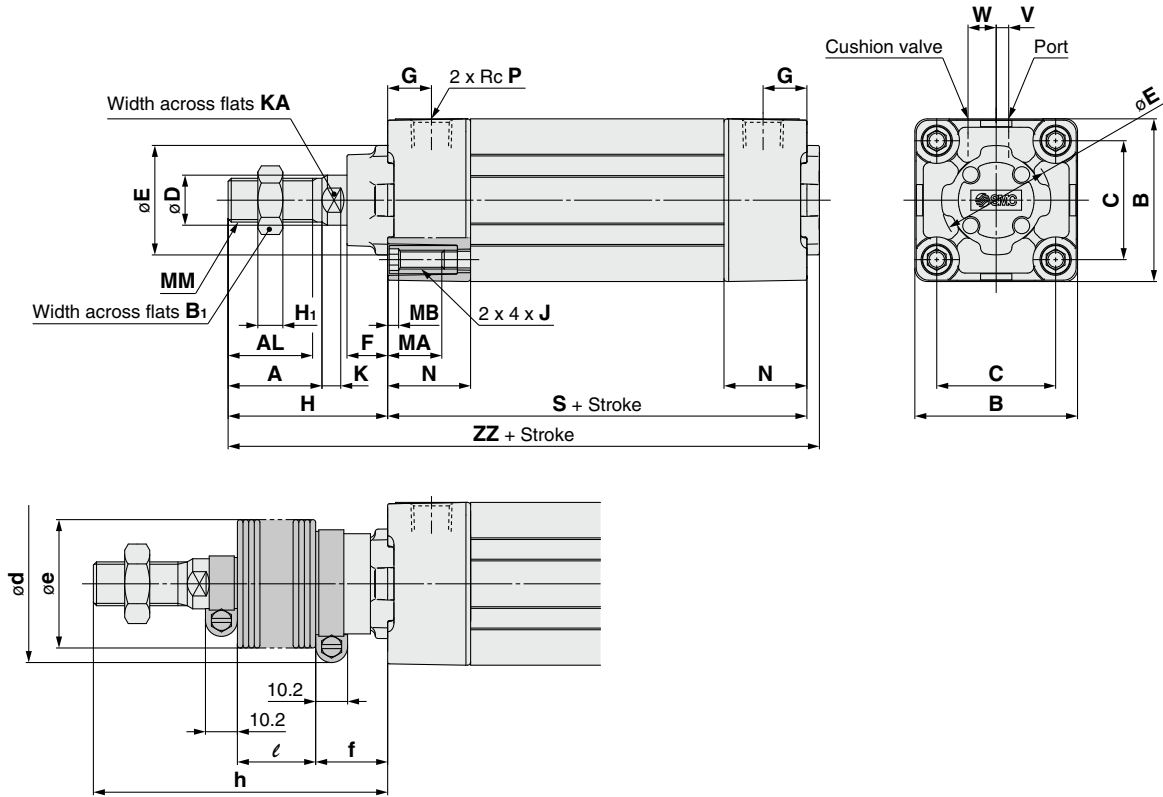
Order with the following part number when only the grease pack is needed.

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

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

Standard

Basic: (B)



* Since the bumpers are attached to the both sides of the piston for rubber bumper type, 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, ø125: +12 mm.

Rubber Bumper

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

Bore size [mm]	A	AL	B	B ₁	C	D	E	F	G	H	H ₁	J	K	KA	MA	MB	MM	N	P	S*	V	W	ZZ*
32	22	19.5	46	17	32.5	12	30	13	13	47	6	M6 x 1	6	10	16	4	M10 x 1.25	26	1/8	84	4	6.5	135
40	30	27	52	22	38	16	35	13	14	51	8	M6 x 1	6	14	16	4	M14 x 1.5	26	1/4	84	4	9	139
50	35	32	65	27	46.5	20	40	14	15.5	58	11	M8 x 1.25	7	18	16	5	M18 x 1.5	30.5	1/4	94	5	10.5	156
63	35	32	75	27	56.5	20	45	14	16.5	58	11	M8 x 1.25	7	18	16	5	M18 x 1.5	30.5	3/8	94	9	12	156
80	40	37	95	32	72	25	45	20	19	72	13	M10 x 1.5	10	22	16	5	M22 x 1.5	37	3/8	114	11.5	14	190
100	40	37	114	41	89	30	55	20	19	72	16	M10 x 1.5	10	26	16	5	M26 x 1.5	37	1/2	114	17	15	190
125	54	50	136	41	110	32	60	27	19	97	16	M12 x 1.75	13	27	20	6	M27 x 2	38	1/2	120	17	15	223

With Rod Boot (Up to 1000 mm stroke)

Bore size [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								
32	54	36	23	12.5	25	37.5	50	75	100	125	150	175	200	225	250	73	86	98	111	136	161	186	211	236	261	286	311								
40	56	41	23	12.5	25	37.5	50	75	100	125	150	175	200	225	250	81	94	106	119	144	169	194	219	244	269	294	319								
50	64	51	25	12.5	25	37.5	50	75	100	125	150	175	200	225	250	89	102	114	127	152	177	202	227	252	277	302	327								
63	64	51	25	12.5	25	37.5	50	75	100	125	150	175	200	225	250	89	102	114	127	152	177	202	227	252	277	302	327								
80	68	56	29	12.5	25	37.5	50	75	100	125	150	175	200	225	250	101	114	126	139	164	189	214	239	264	289	314	339								
100	76	61	29	12.5	25	37.5	50	75	100	125	150	175	200	225	250	101	114	126	139	164	189	214	239	264	289	314	339								
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								

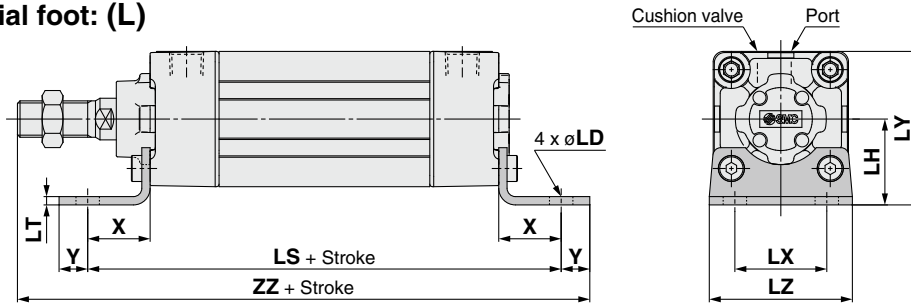
Standard Double Acting, Single Rod **MB1**
 Double Acting, Double Rod **MB1W**
 Non-rotating Rod Double Acting, Single Rod **MB1K**
 Auto Switch
 Made to Order

Series MB1

Standard/With Mounting Bracket

* Refer to Basic (page 10) for other dimensions and with rod boot.

Axial foot: (L)



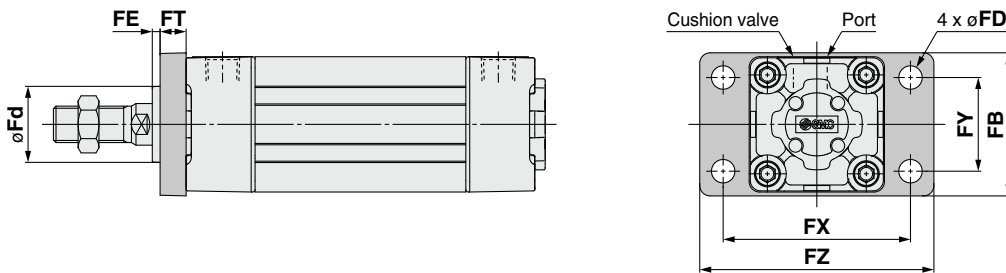
Axial Foot

[mm]

Rubber Bumper

Bore size [mm]	X	Y	LD	LH	LS*	LT	LX	LY	LZ	ZZ*	Bore size [mm]	LS	ZZ
32	22	9	7	30	128	3.2	32	53	50	162	32	134	168
40	24	11	9	33	132	3.2	38	59	55	170	40	138	176
50	27	11	9	40	148	3.2	46	72.5	70	190	50	156	198
63	27	14	12	45	148	3.6	56	82.5	80	193	63	156	201
80	30	14	12	55	174	4.5	72	102.5	100	230	80	184	240
100	32	16	14	65	178	4.5	89	122	120	234	100	188	244
125	45	20	14	81	210	8	90	149	136	282	125	222	294

Rod flange: (F)

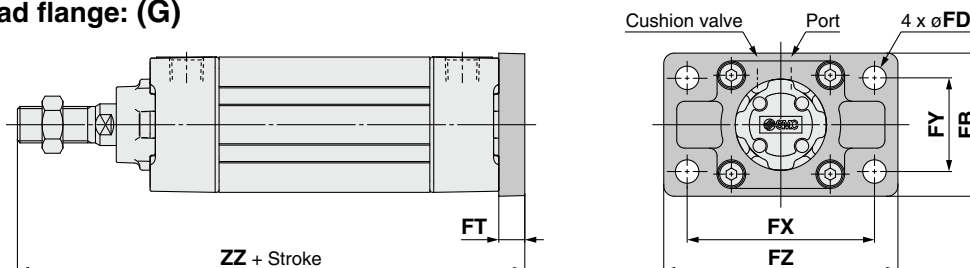


Rod Flange

[mm]

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

Head flange: (G)



Head Flange

[mm]

Rubber Bumper

Bore size [mm]	FB	FD	FT	FX	FY	FZ	ZZ*	Bore size [mm]	ZZ
32	50	7	10	64	32	79	141	32	147
40	55	9	10	72	36	90	145	40	151
50	70	9	12	90	45	110	164	50, 63	172
63	80	9	12	100	50	120	164	80, 100	212
80	100	12	16	126	63	153	202	125	249
100	120	14	16	150	75	178	202		
125	138	14	20	180	102	216	237		

Axial foot, Rod/Head flange

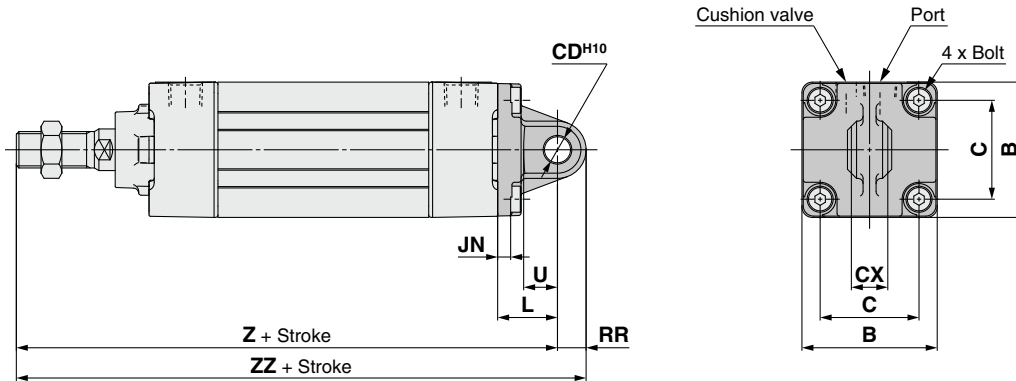
* Since the bumpers are attached to the both sides of the piston for rubber bumper type, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm.

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

Standard/With Mounting Bracket

* Refer to Basic (page 10) for other dimensions and with rod boot.

Single clevis: (C)



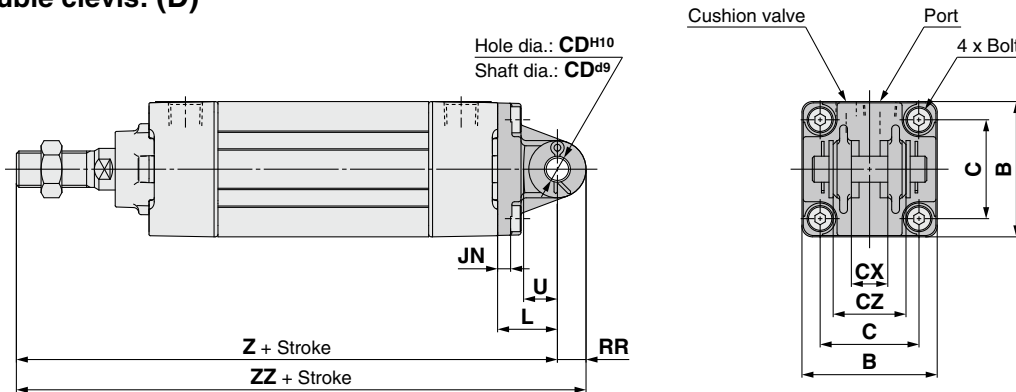
Single Clevis

Bore size [mm]	B	C	JN	L	RR	U	CD ^{H10}	CX ^{+0.3} / _{+0.1}	Z*	ZZ*	Bolt
32	46	32.5	5	23	10.5	13	10	14	154	164.5	MB-32-48-C1247
40	52	38	5	23	11	13	10	14	158	169	(M6 x 1 x 16L, Low head)
50	65	46.5	6	30	15	17	14	20	182	197	MB-50-48-C1249
63	75	56.5	6	30	15	17	14	20	182	197	(M8 x 1.25 x 18L, Low head)
80	95	72	8	42	23	26	22	30	228	251	MB-80-48BC1251
100	114	89	8	42	23	26	22	30	228	251	(M10 x 1.5 x 22L, Low head)
125	136	110	10	50	28	30	25	32	267	295	M12 x 1.75 x 28L, Low head

Rubber Bumper

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: (D)



Double Clevis

Bore size [mm]	B	C	JN	L	RR	U	CD ^{H10}	CX ^{+0.3} / _{+0.1}	CZ	Z*	ZZ*	Bolt
32	46	32.5	5	23	10.5	13	10	14	28	154	164.5	MB-32-48-C1247
40	52	38	5	23	11	13	10	14	28	158	169	(M6 x 1 x 16L, Low head)
50	65	46.5	6	30	15	17	14	20	40	182	197	MB-50-48-C1249
63	75	56.5	6	30	15	17	14	20	40	182	197	(M8 x 1.25 x 18L, Low head)
80	95	72	8	42	23	26	22	30	60	228	251	MB-80-48BC1251
100	114	89	8	42	23	26	22	30	60	228	251	(M10 x 1.5 x 22L, Low head)
125	136	110	10	50	28	30	25	32	64	267	295	M12 x 1.75 x 28L, Low head

Rubber Bumper

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

Single/Double clevis

* Since the bumpers are attached to the both sides of the piston for rubber bumper type, the overall length is longer than the cylinder with air cushion as follows: $\phi 32, \phi 40$: +6 mm, $\phi 50, \phi 63$: +8 mm, $\phi 80, \phi 100$: +10 mm, $\phi 125$: +12 mm.

Standard
Double Acting, Single Rod
MB1

Double Acting, Double Rod
MB1W

Non-rotating Rod
Double Acting, Single Rod
MB1K

Auto Switch

Made to Order

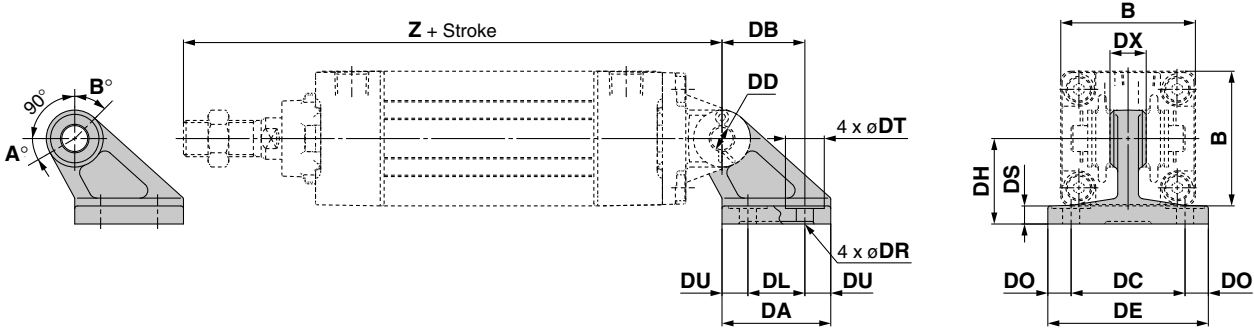
Series MB1

Pivot Bracket/Double Clevis Pivot Bracket

Part No.

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

Double clevis pivot bracket



Part no.	Bore size [mm]	[mm]															Rubber Bumper	
		B	DA	DB	DL	DU	DC	DX	DE	DO	DR	DT	DS	DH	Z*	DD _{H10}	Bore size [mm]	Z
MB-B03	32	46	42	32	22	10	44	14	62	9	6.6	15	7	33	154	10 ^{+0.058} ₀	32	160
	40	52	42	32	22	10	44	14	62	9	6.6	15	7	33	158	10 ^{+0.058} ₀	40	164
MB-B05	50	65	53	43	30	11.5	60	20	81	10.5	9	18	8	45	182	14 ^{+0.070} ₀	50	190
	63	75	53	43	30	11.5	60	20	81	10.5	9	18	8	45	182	14 ^{+0.070} ₀	63	190
MB-B08	80	95	73	64	45	14	86	30	111	12.5	11	22	10	65	228	22 ^{+0.084} ₀	80	238
	100	114	73	64	45	14	86	30	111	12.5	11	22	10	65	228	22 ^{+0.084} ₀	100	238
MB-B12	125	136	90	78	60	15	110	32	136	13	13.5	24	14	75	267	25 ^{+0.084} ₀	125	279

Rotating Angle

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

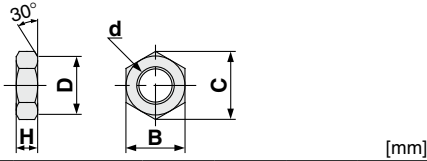
Clevis pivot bracket

* Since the bumpers are attached to the both sides of the piston for rubber bumper type, 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, ø125: +12 mm.

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

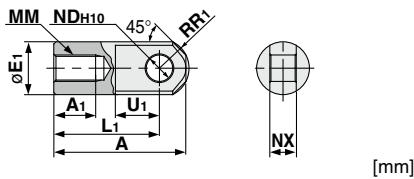
Dimensions of Accessories

Rod end nut
(Standard)



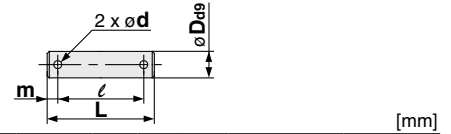
Part no.	Bore size [mm]	d	H	B	C	D
NT-03	32	M10 x 1.25	6	17	19.6	16.5
NT-04	40	M14 x 1.5	8	22	25.4	21
NT-05	50, 63	M18 x 1.5	11	27	31.2	26
NT-08	80	M22 x 1.5	13	32	37.0	31
NT-10	100	M26 x 1.5	16	41	47.3	39
NT-12M	125	M27 x 2	16	41	47.3	39

I type
Single knuckle joint



Part no.	Bore size [mm]	A	A ₁	E ₁	L ₁	MM	R ₁	U ₁	ND _{H10}	NX
I-03M	32	40	14	20	30	M10 x 1.25	12	16	10 ^{+0.058} ₀	14 ^{-0.10} _{-0.30}
I-04M	40	50	19	22	40	M14 x 1.5	12.5	19	10 ^{+0.058} ₀	14 ^{-0.10} _{-0.30}
I-05M	50, 63	64	24	28	50	M18 x 1.5	16.5	24	14 ^{+0.070} ₀	20 ^{-0.10} _{-0.30}
I-08M	80	80	26	40	60	M22 x 1.5	23.5	34	22 ^{+0.084} ₀	30 ^{-0.10} _{-0.30}
I-10M	100	80	26	40	60	M26 x 1.5	23.5	34	22 ^{+0.084} ₀	30 ^{-0.10} _{-0.30}
I-12M	125	119	36	46	92	M27 x 2	28.5	34	25 ^{+0.084} ₀	32 ^{-0.10} _{-0.30}

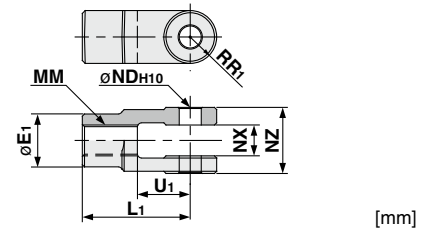
Knuckle joint pin
Clevis pin



Part no.	Bore size [mm]		D _{ø9}	L	l	m	d (Drill through)	Split pin
	Clevis	Knuckle						
CD-M03 ^{Note)}	32, 40		10 ^{-0.040} _{-0.076}	44	36	4	3	ø3 x 18ℓ
CD-M05 ^{Note)}	50, 63		14 ^{-0.050} _{-0.093}	60	51	4.5	4	ø4 x 25ℓ
CD-M08 ^{Note)}	80, 100		22 ^{-0.065} _{-0.117}	82	72	5	4	ø4 x 35ℓ
IY-12	125		25 ^{-0.065} _{-0.117}	79.5	69.5	5	4	ø4 x 40ℓ

Note) Split pins and flat washers are included.

Y type
Double knuckle joint



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

Note) A pin, split pins, and flat washers are included.

Bracket Combinations

Bracket combination available Refer to the figure below.

Bracket for cylinder	Bracket for workpiece	Single clevis	Double clevis	Single knuckle joint	Double knuckle joint	Clevis pivot bracket
Single clevis	—	—	①	—	②	—
Double clevis	③	—	—	④	—	⑨
Single knuckle joint	—	—	⑤	—	⑥	—
Double knuckle joint	⑦	—	—	⑧	—	⑩

No.	Appearance	No.	Appearance
①	Single clevis + Double clevis 	⑥	Single knuckle joint + Double knuckle joint
②	Single clevis + Double knuckle joint 	⑦	Double knuckle joint + Single clevis
③	Double clevis + Single clevis 	⑧	Double knuckle joint + Single knuckle joint
④	Double clevis + Single knuckle joint 	⑨	Double clevis + Clevis pivot bracket
⑤	Single knuckle joint + Double clevis 	⑩	Double knuckle joint + Clevis pivot bracket

Standard Double Acting, Single Rod **MB1**
 Double Acting, Double Rod **MB1W**
 Non-rotating Rod Double Acting, Single Rod **MB1K**
 Auto Switch
 Made to Order

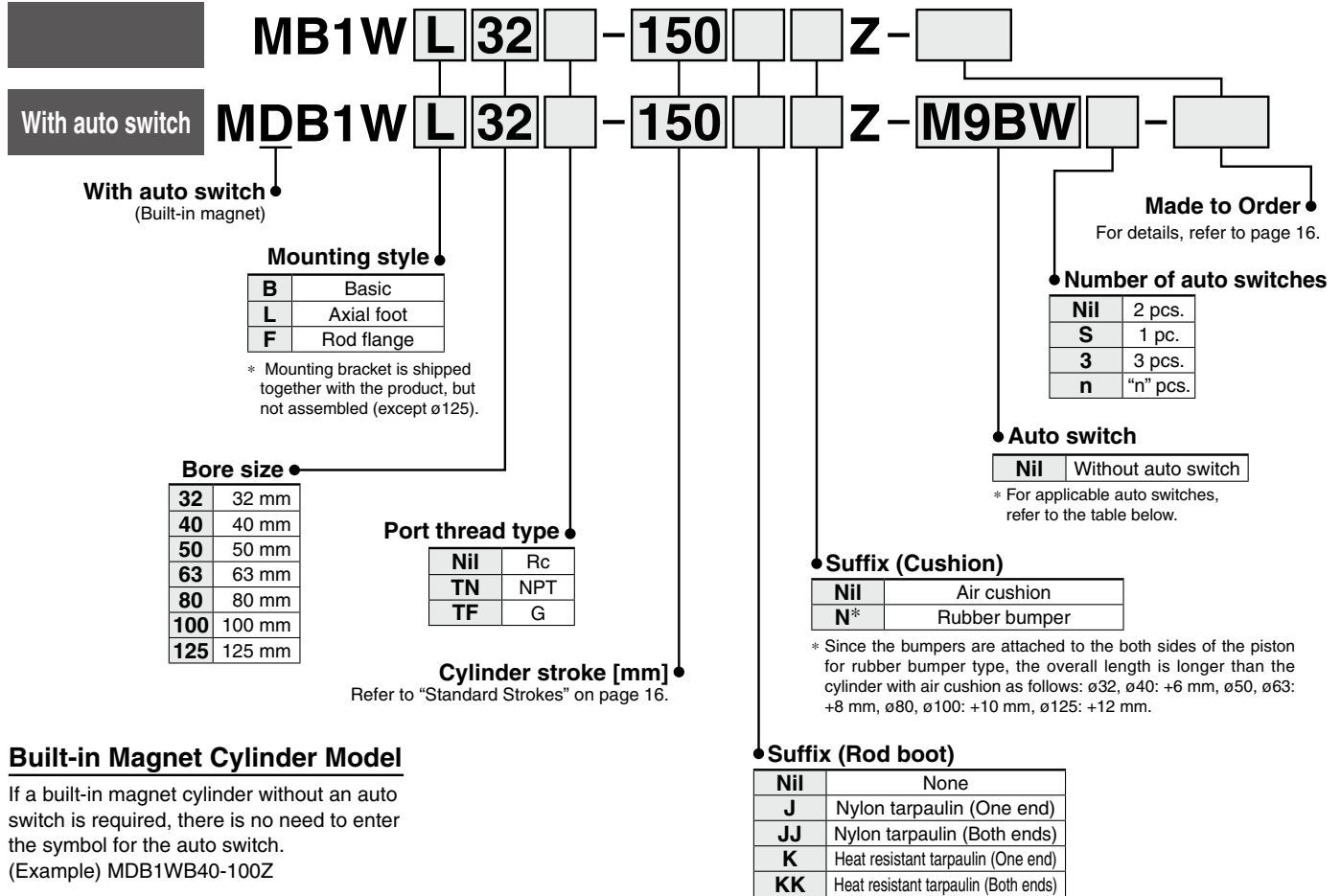
Square Tube Type Air Cylinder: Standard Type Double Acting, Double Rod

Series **MB1W**



∅32, ∅40, ∅50, ∅63, ∅80, ∅100, ∅125

How to Order



Built-in Magnet Cylinder Model

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

Applicable Auto Switches/Refer to the WEB catalog or the Best Pneumatics No. 2 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length [m]				Pre-wired connector	Applicable load			
					DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)					
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC	
				3-wire (PNP)				M9PV	M9P	●	●	●	○				
				2-wire				M9BV	M9B	●	●	●	○				
				3-wire (NPN)				M9NVV	M9NV	●	●	●	○				
	Diagnostic indication (2-color indication)			3-wire (PNP)	M9PVV	M9PV	●	●	●	○	○						
				2-wire	M9BVV	M9BV	●	●	●	○							
	Water resistant (2-color indication)			3-wire (NPN)	M9NAV*1	M9NA*1	○	○	●	○	○						
				3-wire (PNP)	M9PAV*1	M9PA*1	○	○	●	○							
				2-wire	M9BAV*1	M9BA*1	○	○	●	○							
				—	—	—	—	—	—	—							
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	24 V	5 V	—	A96V	A96	●	—	●	—	—	IC circuit		
				2-wire				100 V	A93V*2	A93	●	●	●			●	—
								100 V or less	A90V	A90	●	—	●			—	

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

Please contact SMC regarding water resistant types with the above model numbers.

*2 1 m type lead wire is only applicable to the D-A93.

* Lead wire length symbols: 0.5 m Nil (Example) M9NV
 1 m M (Example) M9NVV
 3 m L (Example) M9NWL
 5 m Z (Example) M9NWZ

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

* Since there are other applicable auto switches than listed above, refer to page 26 for details.

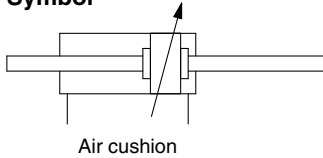
* For details about auto switches with pre-wired connector, refer to the WEB catalog or the Best Pneumatics No. 2.

* Auto switches are shipped together, (but not assembled).

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



Symbol



Air cushion



Made to Order
(For details, refer to pages 29 to 43.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat resistant cylinder (-10 to 150°C)*1 *2
-XC3	Special port location*3
-XC4	With heavy duty scraper*2
-XC5	Heat resistant cylinder (-10 to 110°C)*1 *2
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel*2
-XC22	Fluororubber seal*2
-XC26	With split pins for double clevis pin/double knuckle joint pin and flat washers*4
-XC30	Rod trunnion*2
-XC35	With coil scraper*2
-XC65	Made of stainless steel (Combination of XC7 and XC68)*2
-XC68	Piston rod and rod end nut made of stainless steel*2 (with hard chrome plated piston rod)
-X846	Fastener strips mounted on switch mounting grooves

*1 Air cushion only

*2 Except ø125

*3 The cover shape is the same as the current product.

*4 ø125 only

For special port location (-XC3), the mounting bracket and port location can be determined using the standard product corresponding to the operating conditions. Also, this is only applicable to -XC3BB, -XC3CC and -XC3DD with trunnion bracket.

Refer to pages 25 and 26 for cylinders with auto switches.

- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Minimum stroke for auto switch mounting
- Operating range
- Auto switch mounting brackets/Part no.

Specifications

Bore size [mm]	32	40	50	63	80	100	125
Action	Double acting, Double rod						
Fluid	Air						
Proof pressure	1.5 MPa						
Maximum operating pressure	1.0 MPa						
Minimum operating pressure	0.05 MPa						
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing) With auto switch: -10 to 60°C						
Lubrication	Not required (Non-lube)						
Piston speed	50 to 1000 mm/s						50 to 700 mm/s
Stroke length tolerance	Up to 250: $^{+1.0}_0$, 251 to 1000: $^{+1.4}_0$						
Cushion <small>Note)</small>	Air cushion or Rubber bumper						
Port size (Rc, NPT, G)	1/8	1/4	3/8		1/2		
Mounting	Basic, Axial foot, Rod flange						

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

Standard Strokes

Bore size	Standard stroke		Max. manufacturable stroke
	Stroke range ①	Stroke range ②	
32	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	Up to 1000	Up to 1800
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		

Note 1) Intermediate strokes are available. (No spacer is used.)

Note 2) Applicable strokes should be confirmed according to the usage. For details, refer to "Air Cylinders Model Selection" on front matter pages of the Best Pneumatics No. 2 or the **WEB catalog**. In addition, the products that exceed the stroke range ① might not be able to fulfill the specifications due to the deflection etc.

Note 3) Please consult with SMC for manufacturability and the part numbers when exceeding the stroke range ②.

Accessories

Mounting		Basic	Axial foot	Rod flange
Standard	Rod end nut	●	●	●
	Single knuckle joint	●	●	●
Option	Double knuckle joint (with pin)	●	●	●
	Rod boot	●	●	●

* Refer to page 14 for part numbers and dimensions. (Refer to page 19 for rod boot.)

Mounting Brackets/Part No.

Bore size [mm]	32	40	50	63	80	100	125
Axial foot	MB-L03	MB-L04	MB-L05	MB-L06	MB-L08	MB-L10	MB-L12
Rod flange	MB-F03	MB-F04	MB-F05	MB-F06	MB-F08	MB-F10	MB-F12

Note) Order two feet per cylinder.

Rod Boot Material

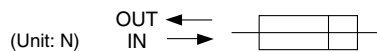
Symbol	Rod boot material	Max. ambient temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C*

* Max. ambient temperature for rod boot itself.

Standard Double Acting, Single Rod **MB1W**
 Non-rotating Rod Double Acting, Single Rod **MB1K**
 Auto Switch
 Made to Order

Series MB1W

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	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]

Weights

[kg]

Bore size [mm]		32	40	50	63	80	100	125
Basic weight	Basic	0.59	0.81	1.43	1.71	3.18	4.38	6.68
	Axial foot	0.71	0.95	1.65	1.99	3.68	5.04	8.76
	Rod flange	0.88	1.18	1.88	2.50	4.63	7.69	10.86
Additional weight per 50 mm of stroke	All mounting brackets	0.21	0.3	0.46	0.51	0.77	1.1	1.25

Calculation

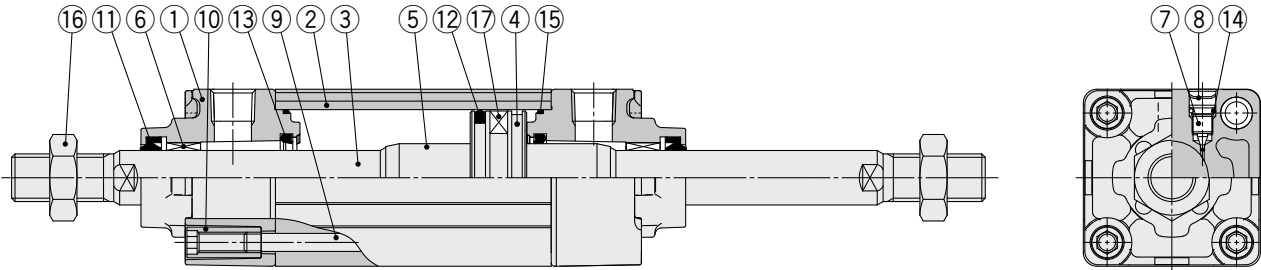
Example) **MB1WB32-100Z** (Basic, ø32, 100 stroke)

- Basic weight 0.59 kg
- Additional weight 0.21/50 stroke
- Cylinder stroke 100 stroke

$$0.59 + 0.21 \times 100/50 = \mathbf{1.01 \text{ kg}}$$

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

Construction



Component Parts

No.	Description	Material	Q'ty	Note
1	Rod cover	Aluminum die-cast	2	Trivalent chromated
2	Cylinder tube	Aluminum alloy	1	Hard anodized
3	Piston rod	Carbon steel	1	Hard chrome plating
4	Piston	Aluminum alloy	1	
5	Cushion ring	Aluminum alloy	2	Anodized
6	Bushing	Bearing alloy	2	
7	Cushion valve	Steel wire	2	Trivalent zinc chromated
8	Retaining ring	Steel for spring	2	ø40 to ø125
9	Tie-rod	Carbon steel	4	Trivalent zinc chromated

No.	Description	Material	Q'ty	Note
10	Tie-rod nut	Carbon steel	8	Trivalent zinc chromated
11*	Rod seal	NBR	2	
12*	Piston seal	NBR	1	
13*	Cushion seal	Urethane	2	
14	Cushion valve seal	NBR	2	
15*	Cylinder tube gasket	NBR	2	
16	Rod end nut	Rolled steel	2	Trivalent zinc chromated
17	Magnet	—	(1)	

Replacement Parts/Seal Kit

Bore size [mm]	Kit no.	Contents
32	MBW32Z-PS	Set of the nos. ⑪, ⑫, ⑬, ⑮
40	MB1W40Z-PS	
50	MB1W50Z-PS	
63	MB1W63Z-PS	
80	MB1W80Z-PS	
100	MB1W100Z-PS	
125	MBW125-PS	

* Seal kits consist of items ⑪, ⑫, ⑬, ⑮, and can be ordered by using the seal kit number corresponding to each bore size.

* The seal kit includes a grease pack (10 g for ø32 to ø50, 20 g for ø63 and ø80, 30 g for ø100).

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)

Standard Double Acting, Single Rod **MB1**

Double Acting, Double Rod **MB1W**

Non-rotating Rod Double Acting, Single Rod **MB1K**

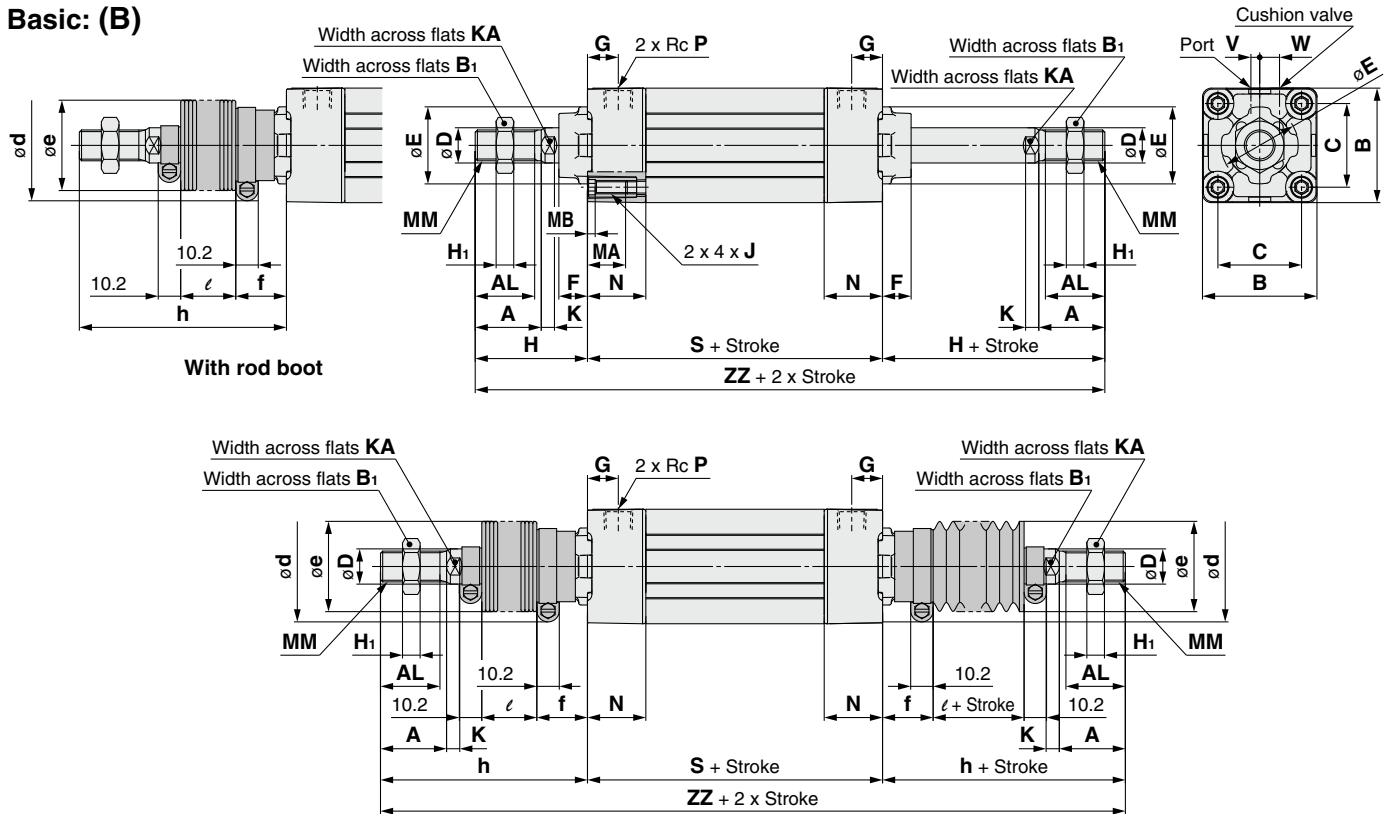
Auto Switch

Made to Order

Series MB1W

Standard

Basic: (B)



Bore size [mm]	[mm]																				Rubber Bumper				
	A	AL	B	B ₁	C	D	E	F	G	H	H ₁	J	K	KA	MA	MB	MM	N	P	S*	V	W	ZZ*	S	ZZ
32	22	19.5	46	17	32.5	12	30	13	13	47	6	M6 x 1	6	10	16	4	M10 x 1.25	26	1/8	84	4	6.5	178	90	184
40	30	27	52	22	38	16	35	13	14	51	8	M6 x 1	6	14	16	4	M14 x 1.5	26	1/4	84	4	9	186	90	192
50	35	32	65	27	46.5	20	40	14	15.5	58	11	M8 x 1.25	7	18	16	5	M18 x 1.5	30.5	1/4	94	5	10.5	210	102	218
63	35	32	75	27	56.5	20	45	14	16.5	58	11	M8 x 1.25	7	18	16	5	M18 x 1.5	30.5	3/8	94	9	12	210	102	218
80	40	37	95	32	72	25	45	20	19	72	13	M10 x 1.5	10	22	16	5	M22 x 1.5	37	3/8	114	11.5	14	258	124	268
100	40	37	114	41	89	30	55	20	19	72	16	M10 x 1.5	10	26	16	5	M26 x 1.5	37	1/2	114	17	15	258	124	268
125	54	50	136	41	110	32	60	27	19	97	16	M12 x 1.75	13	27	20	6	M27 x 2	38	1/2	120	17	15	314	132	316

With Rod Boot (Up to 1000 mm stroke)

Bore size [mm]	[mm]																										
	d	e	f	ℓ										h													
32	54	36	23	12.5	25	37.5	50	75	100	125	150	175	200	225	250	73	86	98	111	136	161	186	211	236	261	286	311
40	56	41	23	12.5	25	37.5	50	75	100	125	150	175	200	225	250	81	94	106	119	144	169	194	219	244	269	294	319
50	64	51	25	12.5	25	37.5	50	75	100	125	150	175	200	225	250	89	102	114	127	152	177	202	227	252	277	302	327
63	64	51	25	12.5	25	37.5	50	75	100	125	150	175	200	225	250	89	102	114	127	152	177	202	227	252	277	302	327
80	68	56	29	12.5	25	37.5	50	75	100	125	150	175	200	225	250	101	114	126	139	164	189	214	239	264	289	314	339
100	76	61	29	12.5	25	37.5	50	75	100	125	150	175	200	225	250	101	114	126	139	164	189	214	239	264	289	314	339
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

Bore size [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
32	230	256	280	306	356	406	456	506	556	606	656	706
40	246	272	296	322	372	422	472	522	572	622	672	722
50	272	298	322	348	398	448	498	548	598	648	698	748
63	272	298	322	348	398	448	498	548	598	648	698	748
80	316	342	366	392	442	492	542	592	642	692	742	792
100	316	342	366	392	442	492	542	592	642	692	742	792
125	360	380	400	420	460	500	540	580	620	660	700	740

Note) ZZ indicates dimensions for double side rod boot.

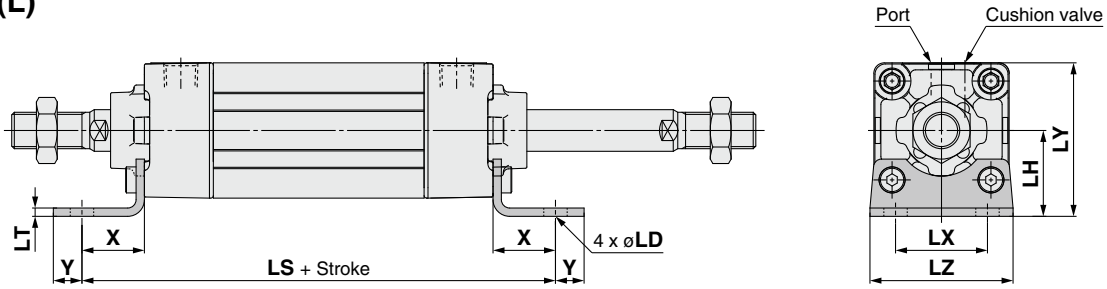
* Since the bumpers are attached to the both sides of the piston for rubber bumper type, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm.

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

Standard/With Mounting Bracket

* Dimensions not indicated are the same as the basic type, double acting, single rod (page 10).

Axial foot: (L)



Axial Foot

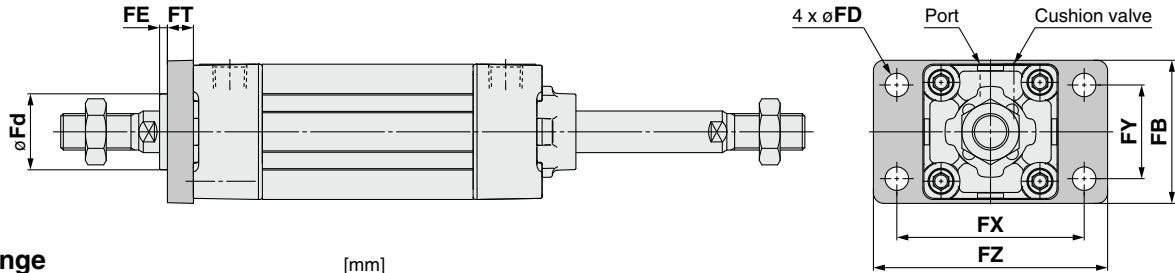
Bore size [mm]	X	Y	LD	LH	LS*	LT	LX	LY	LZ	LS
32	22	9	7	30	128	3.2	32	53	50	134
40	24	11	9	33	132	3.2	38	59	55	138
50	27	11	9	40	148	3.2	46	72.5	70	156
63	27	14	12	45	148	3.6	56	82.5	80	156
80	30	14	12	55	174	4.5	72	102.5	100	184
100	32	16	14	65	178	4.5	89	122	120	188
125	45	20	14	81	210	8	90	149	136	222

Rubber Bumper

[mm]

* Since the bumpers are attached to the both sides of the piston for rubber bumper type, 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, ø125: +12 mm.

Rod flange: (F)



Rod Flange

Bore size [mm]	FB	FD	FT	FX	FY	FZ	Fd
32	50	7	10	64	32	79	25
40	55	9	10	72	36	90	31
50	70	9	12	90	45	110	38.5
63	80	9	12	100	50	120	39.5
80	100	12	16	126	63	153	45.5
100	120	14	16	150	75	178	54
125	138	14	20	180	102	216	57.5

Standard
Double Acting, Double Rod
MB1W

Non-rotating Rod
Double Acting, Single Rod
MB1K

Auto Switch

Made to Order

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

Series **MB1K**

∅32, ∅40, ∅50, ∅63, ∅80, ∅100



How to Order

MB1K **B** **32** **50** **Z** **M9BW**

With auto switch **MDB1K** **B** **32** **50** **Z** **M9BW**

With auto switch
(Built-in magnet)

Mounting style

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

* Mounting bracket is shipped together with the product, but not assembled.

Bore size

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

Cylinder stroke [mm]
Refer to "Standard Strokes" on page 22.

Suffix (Rod boot)

Nil	None
J	Nylon tarpaulin
K	Heat resistant tarpaulin

Suffix (Cushion)

Nil	Air cushion
N*	Rubber bumper

* Since the bumpers are attached to the both sides of the piston for rubber bumper type, the overall length is longer than the cylinder with air cushion as follows: ∅32, ∅40: +6 mm, ∅50, ∅63: +8 mm, ∅80, ∅100: +10 mm.

Number of auto switches

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

Auto switch

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

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

Accessories 2

Nil	No bracket
V	Single knuckle joint
W	Double knuckle joint

* A knuckle joint pin is not provided with the single knuckle joint.
* Rod end bracket is shipped together with the product.
* The screw-in amount of the piston rod end cannot be adjusted when a clevis bracket, trunnion bracket and knuckle joint are used together.

Accessories 1

Nil	No bracket
N	Pivot bracket

* Only for D mounting style.
* Pivot bracket is shipped together with the product.
* Refer to page 13 for pivot bracket.

Port thread type

Nil	Rc
TN	NPT
TF	G

* Refer to "Ordering Example of Cylinder Assembly" on page 6.

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) MDB1B40-100Z

Applicable Auto Switches/Refer to the WEB catalog or the Best Pneumatics No. 2 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length [m]				Pre-wired connector	Applicable load			
					DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)					
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC	
				3-wire (PNP)				M9PV	M9P	●	●	●	○	○			
				2-wire				M9BV	M9B	●	●	●	○	○			
				3-wire (NPN)				M9NVV	M9NV	●	●	●	○	○			
	Diagnostic indication (2-color indication)			3-wire (PNP)	M9PVV	M9PV	●	●	●	○	○	○	IC circuit				
				2-wire	M9BVV	M9BV	●	●	●	○	○						
				3-wire (NPN)	M9NAV	M9NA	○	○	○	○	○	IC circuit					
				3-wire (PNP)	M9PAV	M9PA	○	○	●	○	○						
				2-wire	M9BAV	M9BA	○	○	●	○	○						
				3-wire (NPN)	M9NAV	M9NA	○	○	○	○	○						
Water resistant (2-color indication)	3-wire (PNP)	M9PAV	M9PA	○	○	●	○	○									
	2-wire	M9BAV	M9BA	○	○	●	○	○									
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	24 V	5 V	—	A96V	A96	●	—	●	—	—	IC circuit	—	
				2-wire				A93V	A93	●	●	●	●	—	—		IC circuit
								A90V	A90	●	—	●	—	—	—		

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

*2 1 m type lead wire is only applicable to the D-A93.

* Lead wire length symbols: 0.5 m Nil (Example) M9NV
1 m M (Example) M9NVW
3 m L (Example) M9NVWL
5 m Z (Example) M9NVWZ

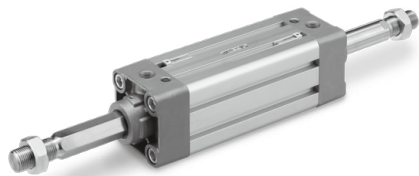
* Solid state auto switches marked with "○" are produced upon receipt of order.

* Since there are other applicable auto switches than listed above, refer to page 26 for details.

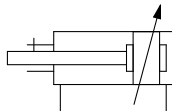
* For details about auto switches with pre-wired connector, refer to the WEB catalog or the Best Pneumatics No. 2.

* Auto switches are shipped together, (but not assembled).

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



Symbol
Air cushion



Made to Order
Made to Order
(For details, refer to pages 29 to 43.)

Symbol	Specifications
-XA□	Change of rod end shape
-XC3	Special port location*
-XC6	Piston rod and rod end nut made of stainless steel
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel
-XC8	Adjustable stroke cylinder/Adjustable extension type
-XC9	Adjustable stroke cylinder/Adjustable retraction type
-XC10	Dual stroke cylinder/Double rod type
-XC27	Double clevis and double knuckle joint pins made of stainless steel
-XC30	Rod trunnion
-X846	Fastener strips mounted on switch mounting grooves

* The cover shape is the same as the current product.

For special port location (-XC3), the mounting bracket and port location can be determined using the standard product corresponding to the operating conditions. Also, this is only applicable to -XC3BB, -XC3CC and -XC3DD with trunnion bracket.

Mounting Brackets/Part No.

Bore size [mm]	32	40	50
Axial foot (Note 1)	MB-L03	MB-L04	MB-L05
Rod/Head flange	MB-F03	MB-F04	MB-F05
Single clevis	MB-C03	MB-C04	MB-C05
Double clevis	MB-D03	MB-D04	MB-D05

Bore size [mm]	63	80	100
Axial foot (Note 1)	MB-L06	MB-L08	MB-L10
Rod/Head flange	MB-F06	MB-F08	MB-F10
Single clevis	MB-C06	MB-C08	MB-C10
Double clevis	MB-D06	MB-D08	MB-D10

Note 1) Order two feet per cylinder.

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

Axial foot, Rod/Head flange, Single clevis/ Body mounting bolt; Double clevis/Body mounting bolt, Clevis pin, Split pins and Flat washers. → Refer to page 14 for details.

Refer to pages 25 and 26 for cylinders with auto switches.

- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Minimum stroke for auto switch mounting
- Operating range
- Auto switch mounting brackets/Part no.

Specifications

Bore size [mm]	32	40	50	63	80	100
Action	Double acting, Single rod					
Fluid	Air					
Proof pressure	1.5 MPa					
Maximum operating pressure	1.0 MPa					
Minimum operating pressure	0.05 MPa					
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing) With auto switch: -10 to 60°C					
Lubricant	Non-lube					
Piston speed	50 to 1000 mm/s					
Stroke length tolerance (Note)	Up to 250: $^{+1.0}_0$, 251 to 1000: $^{+1.4}_0$, 1001 to 1500: $^{+1.8}_0$					
Cushion	Air cushion or Rubber bumper					
Port size (Rc, NPT, G)	1/8	1/4	3/8	1/2		
Mounting	Basic, Axial foot, Rod flange, Head flange, Single clevis, Double clevis					
Non-rotating accuracy	$\pm 0.5^\circ$			$\pm 0.3^\circ$		
Allowable rotating torque N·m or less	0.25	0.45	0.64	0.79	0.93	

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

Accessories

Mounting		Basic	Axial foot	Rod flange	Head flange	Single clevis	Double clevis
Standard	Rod end nut	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●
Option	Single knuckle joint	●	●	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●

* Refer to page 14 for part numbers and dimensions. (Refer to page 10 for rod boot.)

Standard Strokes

Bore size	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.)

Rod Boot Material

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 the table below for IN side.

Bore size [mm]	Piston area [mm ²]	Bore size [mm]	Piston area [mm ²]
32	675	63	2804
40	1082	80	4568
50	1651	100	7223

Theoretical force [N] = Pressure [MPa] x Piston area [mm²]

Series MB1K

Weights

Bore size [mm]		32	40	50	63	80	100
Basic weight	Basic	0.50	0.67	1.16	1.42	2.67	3.67
	Axial foot	0.62	0.81	1.38	1.70	3.17	4.33
	Rod/Head flange	0.79	1.04	1.61	2.21	4.12	6.98
	Single clevis	0.75	0.90	1.50	2.05	3.78	6.84
	Double clevis	0.76	0.94	1.59	2.21	4.07	7.36
Additional weight per 50 mm of stroke	All mounting brackets	0.16	0.20	0.34	0.39	0.57	0.72
Accessories	Single knuckle joint	0.15	0.23	0.26	0.26	0.60	0.83
	Double knuckle joint (with pin)	0.22	0.37	0.43	0.43	0.87	1.27

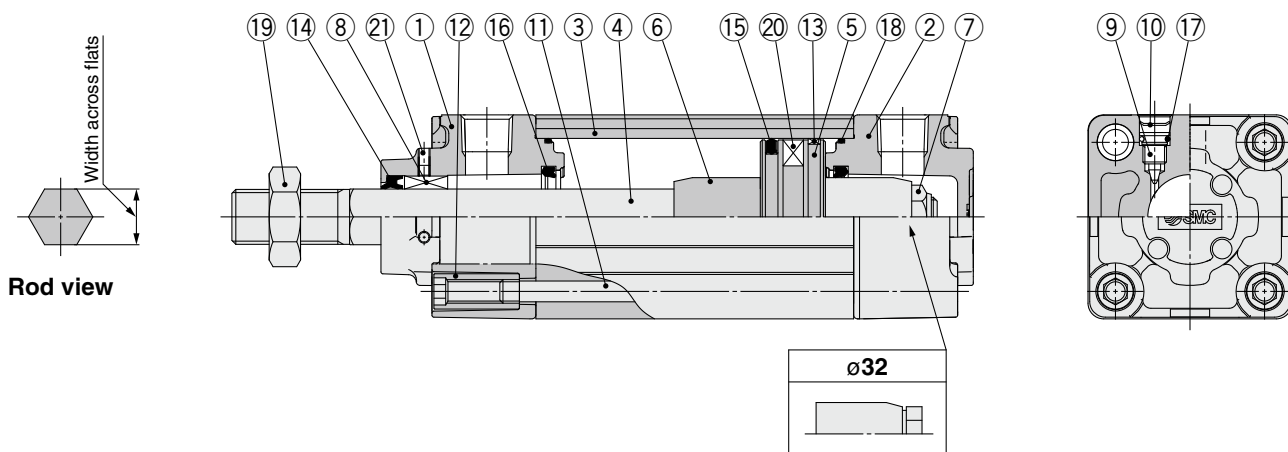
Calculation

Example) **MB1K32-100** (Basic, ø32, 100 stroke)

- Basic weight0.53 kg
- Additional weight0.16/50 stroke
- Cylinder stroke100 stroke

$$0.53 + 0.16 \times 100/50 = 0.85 \text{ kg}$$

Construction



Component Parts

No.	Description	Material	Q'ty	Note
1	Rod cover	Aluminum die-casted	1	Trivalent chromated
2	Head cover	Aluminum die-casted	1	Trivalent chromated
3	Cylinder tube	Aluminum alloy	1	Hard anodized
4	Piston rod	Stainless steel	1	
5	Piston	Aluminum alloy	1	
6	Cushion ring	Rolled steel	2	Zinc chromated
7	Piston nut	Rolled steel	1	Zinc chromated
8	Non-rotating guide	Bearing alloy	1	
9	Cushion valve	Steel wire	2	Trivalent zinc chromated
10	Retaining ring	Spring steel	2	ø40 to ø100
11	Tie-rod	Carbon steel	4	Trivalent zinc chromated

No.	Description	Material	Q'ty	Note
12	Tie-rod nut	Carbon steel	8	Trivalent zinc chromated
13	Wear ring	Resin	1	
14	Rod seal	NBR	1	
15	Piston seal	NBR	1	
16	Cushion seal	Urethane	2	
17	Cushion valve seal	NBR	2	
18	Cylinder tube gasket	NBR	2	
19	Rod end nut	Rolled steel	1	Trivalent zinc chromated
20	Magnet	—	(1)	
21	Hexagon socket head set screw	Steel wire	2	Trivalent black zinc chromated

Replacement Parts/Seal Kit

Bore size [mm]	Kit no.	Contents
32	MBK32Z-PS	Set of the nos. ⑭, ⑮, ⑯, ⑰
40	MBK40Z-PS	
50	MBK50Z-PS	
63	MBK63Z-PS	
80	MBK80Z-PS	
100	MBK100Z-PS	

* Seal kits consist of items ⑭, ⑮, ⑯, ⑰, and can be ordered by using the seal kit number corresponding to each bore size.

* The seal kit includes a grease pack (10 g for ø32 to ø50, 20 g for ø63 and ø80, 30 g for ø100).

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

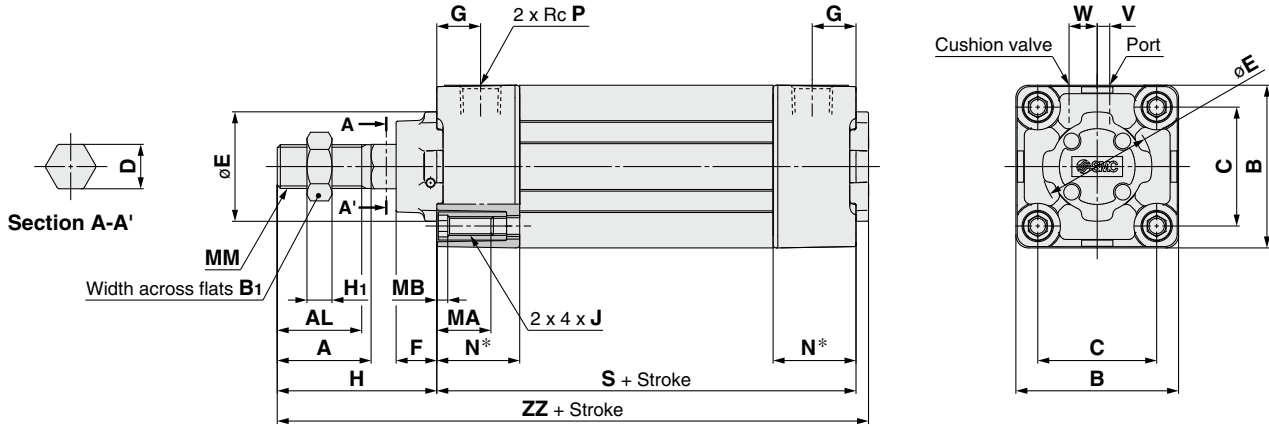
Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

* Model without air cushion is designed to include rubber bumpers. Since the bumpers are attached to the both sides of the piston, 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

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

Standard

Basic: (B)



Bore size [mm]	Stroke range	A	AL	B	B ₁	C	D	E	F	G	H	H ₁	J	MA	MB	MM	N*	P	S	V	W	ZZ
32	Up to 500	22	19.5	46	17	32.5	12.2	30	13	13	47	6	M6 x 1	16	4	M10 x 1.25	26	1/8	84	4	6.5	135
40	Up to 500	30	27	52	22	38	14.2	35	13	14	51	8	M6 x 1	16	4	M14 x 1.5	26	1/4	84	4	9	139
50	Up to 600	35	32	65	27	46.5	19	40	14	15.5	58	11	M8 x 1.25	16	5	M18 x 1.5	30.5	1/4	94	5	10.5	156
63	Up to 600	35	32	75	27	56.5	19	45	14	16.5	58	11	M8 x 1.25	16	5	M18 x 1.5	30.5	3/8	94	9	12	156
80	Up to 800	40	37	95	32	72	23	45	20	19	72	13	M10 x 1.5	16	5	M22 x 1.5	37	3/8	114	11.5	14	190
100	Up to 800	40	37	114	41	89	27	55	20	19	72	16	M10 x 1.5	16	5	M26 x 1.5	37	1/2	114	17	15	190

The dimensions for each mounting style are the same as those for standard model (single rod). Refer to pages 11 to 13.

Standard
 Double Acting, Single Rod
MB1K

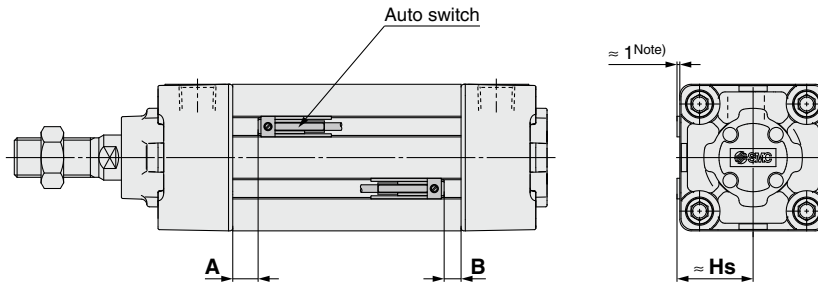
Non-rotating Rod
 Double Acting, Single Rod
MB1K

Auto Switch

Made to Order

Series MB1 Auto Switch Mounting

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



Auto Switch Proper Mounting Position [mm]

Auto switch model	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV		D-A9□ D-A9□V		D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BA D-Z7□/Z80	
	A	B	A	B	A	B
Bore size 32	9.5	7.5	5.5	3.5	4.5	2.5
40	8.5	8	4.5	4	3.5	3
50	9	8.5	5	4.5	4	3.5
63	9	8.5	5	4.5	4	3.5
80	14	10.5	10	6.5	9	5.5
100	13.5	11	9.5	7	8.5	6
125	14.5	14.5	10.5	10.5	9.5	9.5

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

Auto Switch Proper Mounting Height [mm]

Auto switch model	D-Y69□ D-Y7PV D-Y7□WV D-A9□V		D-M9□V D-M9□WV D-M9□AV	
	Bore size	Hs	Bore size	Hs
32	27	30		
40	30	33		
50	36	39		
63	41	44		
80	51	54		
100	60.5	63.5		
125	71.5	74.5		

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

Minimum Stroke for Auto Switch Mounting

Auto switch model	Number of auto switches	Bore size						
		32	40	50	63	80	100	125
D-M9□ D-M9□V	With 2 pcs. (Different surfaces, Same surface)	10						
	With 1 pc.	10						
	With n pcs.	10 + 5 (n - 2)				10 + 10 (n - 2)		
D-M9□W D-M9□WV D-M9□A D-M9□AV	With 2 pcs. (Different surfaces, Same surface)	15				10		
	With 1 pc.	15				10		
	With n pcs.	15 + 10 (n - 2)				10 + 10 (n - 2)		10 + 15 (n - 2)
D-A9□ D-A9□V	With 2 pcs. (Different surfaces, Same surface)	10						15
	With 1 pc.	10						
	With n pcs.	10 + 10 (n - 2)			10 + 15 (n - 2)			15 + 20 (n - 2)
D-Y59□/Y69□ D-Y7P/Y7PV	With 2 pcs. (Different surfaces, Same surface)	15			10		15	
	With 1 pc.	15			10		15	
	With n pcs.	15 + 10 (n - 2)			10 + 10 (n - 2)		10 + 15 (n - 2)	
D-Y7□W D-Y7□WV	With 2 pcs. (Different surfaces, Same surface)	15			10		20	
	With 1 pc.	15			10		20	
	With n pcs.	15 + 10 (n - 2)			10 + 10 (n - 2)		10 + 15 (n - 2)	
D-Y7BA	With 2 pcs. (Different surfaces, Same surface)	20			15		20	
	With 1 pc.	20			15		20	
	With n pcs.	20 + 10 (n - 2)			15 + 15 (n - 2)		20 + 15 (n - 2)	
D-Z7□ D-Z80	With 2 pcs. (Different surfaces, Same surface)	15						
	With 1 pc.	15						
	With n pcs.	15 + 15 (n - 2)				15 + 20 (n - 2)		

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

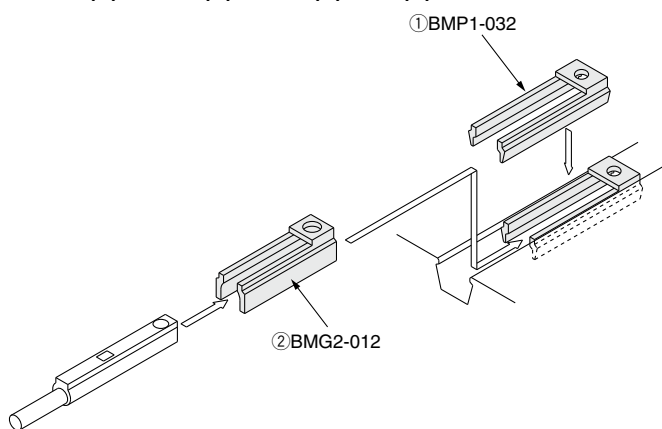
Note 2) Center trunnion type is not included.

Auto Switch Mounting Brackets/Part No.

Auto switch model	Bore size [mm]
	32 to 125
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV D-A9□/A9□V	Note) ① BMP1-032 ② BMG2-012
D-Y5□/Y7P D-Y7□W D-Y6□/Y7PV D-Y7□WV D-Y7BA D-Z7□/Z80	① BMP1-032

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

D-M9□(V)/M9□W(V)/M9□A(V)/A9□(V)



Operating Range

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

* Values which include hysteresis are for guideline purposes only, they are not a guarantee (assuming approximately ±30% dispersion) and may change substantially depending on the ambient environment.

Other than the applicable auto switches listed in "How to Order", the following auto switches are mountable.

Refer to the **WEB catalog** or the Best Pneumatics No.2 for the detailed specifications.

Type	Model	Electrical entry	Features
Solid state	D-Y69A, Y69B, Y7PV	Grommet (Perpendicular)	—
	D-Y7NWV, Y7PWV, Y7BWV		Diagnostic indication (2-color indication)
	D-Y59A, Y59B, Y7P	Grommet (In-line)	—
	D-Y7NW, Y7PW, Y7BW		Diagnostic indication (2-color indication)
	D-Y7BA		Water resistant (2-color indication)
Reed	D-Z73, Z76	Grommet (In-line)	—
	D-Z80		Without indicator light

* With pre-wired connector is also available for solid state auto switches. For details, refer to the **WEB catalog** or the Best Pneumatics No. 2.

* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H/Y7G/Y7H) are also available. For details, refer to the **WEB catalog** or the Best Pneumatics No. 2.

Standard
 Double Acting, Single Rod
MB1
 Double Acting, Double Rod
MB1W
 Non-rotating Rod
 Double Acting, Single Rod
MB1K

Auto Switch

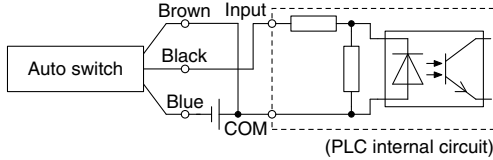
Made to Order

Prior to Use

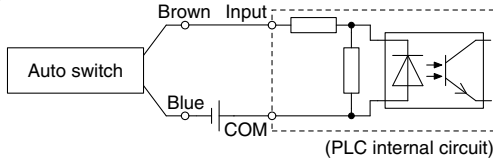
Auto Switch Connection and Example

Sink Input Specifications

3-wire, NPN

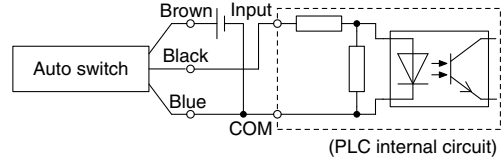


2-wire

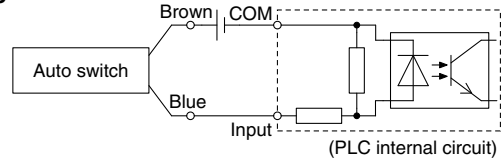


Source Input Specifications

3-wire, PNP



2-wire

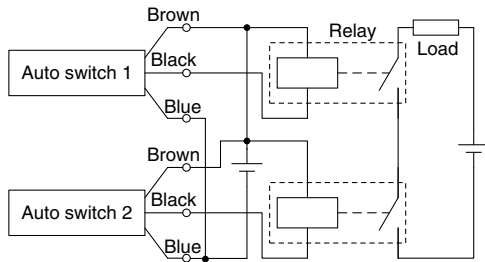


Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

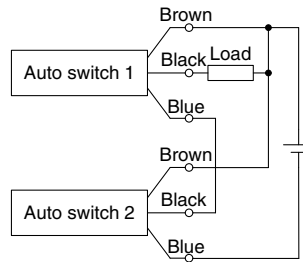
Example of AND (Series) and OR (Parallel) Connection

* When using solid state auto switches, ensure the application is set up so the signals for the first 50 ms are invalid.

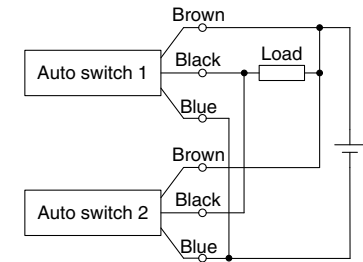
3-wire AND connection for NPN output (Using relays)



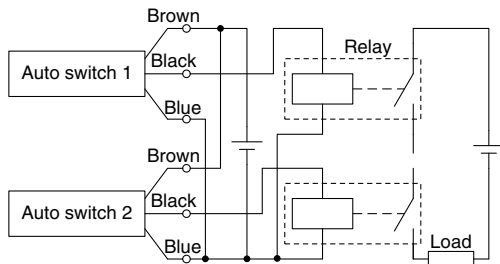
(Performed with auto switches only)



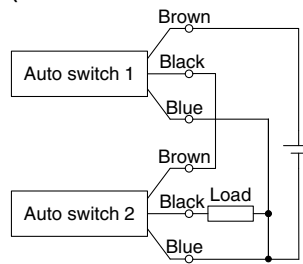
3-wire OR connection for NPN output



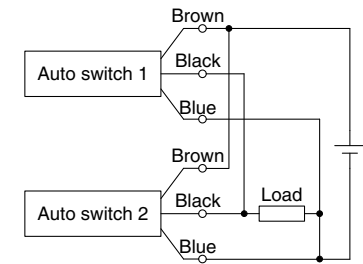
3-wire AND connection for PNP output (Using relays)



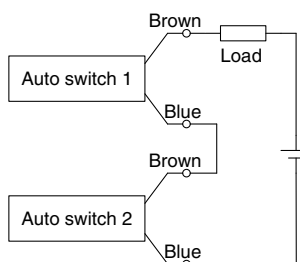
(Performed with auto switches only)



3-wire OR connection for PNP output



2-wire AND connection

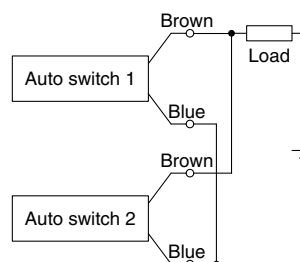


When two auto switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state. The indicator lights will light up when both of the auto switches are in the ON state. Auto switches with load voltage less than 20 V cannot be used.

$$\begin{aligned} \text{Load voltage at ON} &= \text{Power supply voltage} - \text{Residual voltage} \times 2 \text{ pcs.} \\ &= 24 \text{ V} - 4 \text{ V} \times 2 \text{ pcs.} \\ &= 16 \text{ V} \end{aligned}$$

Example: Power supply is 24 VDC
Internal voltage drop in auto switch is 4 V.

2-wire OR connection



(Solid state)
When two auto switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

(Reed)
Because there is no current leakage, the load voltage will not increase when turned OFF. However, depending on the number of auto switches in the ON state, the indicator lights may sometimes grow dim or not light up, due to the dispersion and reduction of the current flowing to the auto switches.

$$\begin{aligned} \text{Load voltage at OFF} &= \text{Leakage current} \times 2 \text{ pcs.} \times \text{Load impedance} \\ &= 1 \text{ mA} \times 2 \text{ pcs.} \times 3 \text{ k}\Omega \\ &= 6 \text{ V} \end{aligned}$$

Example: Load impedance is 3 k Ω .
Leakage current from auto switch is 1 mA.

Made to Order

Auto Switch

Non-rotating Rod
Double Acting, Single Rod
MB1K

Double Acting, Double Rod
MB1W

Standard
Double Acting, Single Rod
MB1

Series MB1

Simple Specials/Made to Order

Please contact SMC for detailed specifications, delivery and prices.



Simple Specials The following special specifications can be ordered as a simplified Made-to-Order. There is a specification sheet available on paper and CD-ROM. Please contact your SMC sales representatives if necessary.

Symbol	Specifications
-XA0 to 30	Change of rod end shape

MB1			
Single rod			
Air		Rubber	
ø32 to ø100	ø125	ø32 to ø100	ø125
●	●	●	●

Made to Order

Symbol	Specifications
-XB5	Oversized rod cylinder ^{Note 2)}
-XB6	Heat resistant cylinder (-10 to 150°C)
-XC3	Special port location ^{Note 2)}
-XC4	With heavy duty scraper
-XC5	Heat resistant cylinder (-10 to 110°C)
-XC6	Piston rod and rod end nut made of stainless steel
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel
-XC8	Adjustable stroke cylinder/Adjustable extension type
-XC9	Adjustable stroke cylinder/Adjustable retraction type
-XC10	Dual stroke cylinder/Double rod type
-XC11	Dual stroke cylinder/Single rod type
-XC12	Tandem cylinder
-XC22	Fluororubber seal
-XC26	With split pins for double clevis pin/double knuckle joint pin and flat washers
-XC27	Double clevis and double knuckle joint pins made of stainless steel
-XC29	Double knuckle joint with spring pin
-XC30	Rod trunnion
-XC35	With coil scraper
-XC65	Made of stainless steel (Combination of XC7 and XC68)
-XC68	Piston rod and rod end nut made of stainless steel (with hard chrome plated piston rod)
-X846	Fastener strips mounted on switch mounting grooves

MB1			
Single rod			
Air		Rubber	
ø32 to ø100	ø125	ø32 to ø100	ø125
●			
●			
●		●	
●		●	
●			
●	●		●
●		●	
●		●	
●		●	
●		●	
●		●	
●		●	
●	●		●
●	●	●	●
●		●	
●		●	
●	●	●	●

Note 1) For details, refer to the **WEB** catalog.
 Note 2) The cover shape is the same as the current product.

Simple Specials/Made to Order *Series MB1*

MB1W				MB1K		Symbol	Page
Air		Rubber		Air	Rubber		
ø32 to ø100	ø125	ø32 to ø100	ø125	ø32 to ø100			
●	●	●	●	●	●	-XA0 to 30	31
MB1W				MB1K <small>Note 2)</small>		Symbol	Page
Air		Rubber		Air	Rubber		
ø32 to ø100	ø125	ø32 to ø100	ø125	ø32 to ø100			
●						-XB5	33
●		●		●	●	-XB6	33
●		●				-XC3	34
●		●				-XC4	34
●						-XC5	35
●				●	●	-XC6	35
●		●		●	●	-XC7	35
				●	●	-XC8	36
				●	●	-XC9	37
				●	●	-XC10	38
						-XC11	39
						-XC12	40
●		●				-XC22	40
						-XC26	41
						-XC27	41
						-XC29	42
●		●		●	●	-XC30	42
●		●				-XC35	42
●	●	●	●			-XC65	43
●		●				-XC68	43
●	●	●	●	●	●	-X846	43

Standard
Double Acting, Single Rod
MB1

Double Acting, Double Rod
MB1W

Non-rotating Rod
Double Acting, Single Rod
MB1K

Auto Switch

Made to Order

Series MB1 Simple Specials

These changes are dealt with Simple Specials System.

For details, refer to the Simple Specials System in the WEB catalog.
<http://www.smcworld.com>

1 Change of Rod End Shape

Symbol

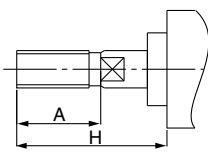
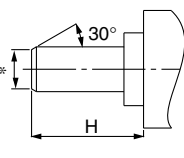
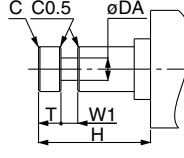
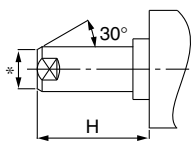
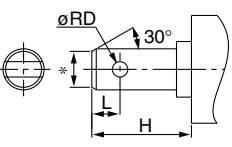
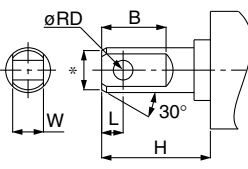
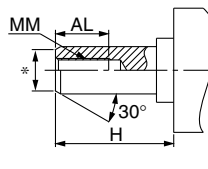
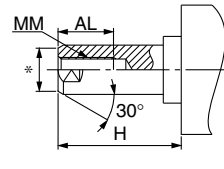
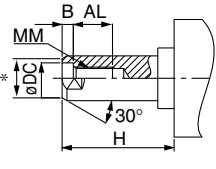
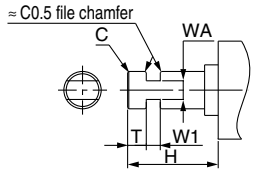
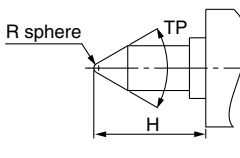
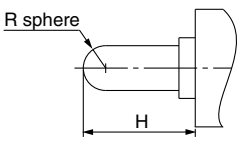
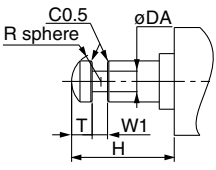
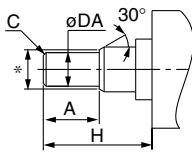
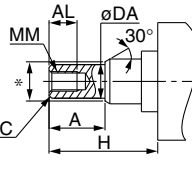
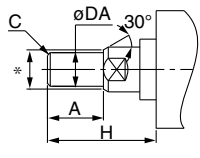
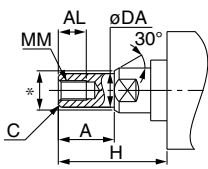
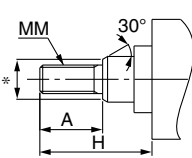
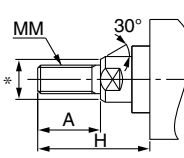
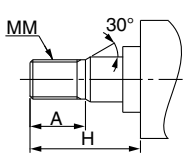
-XA0 to XA30

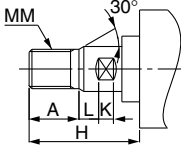
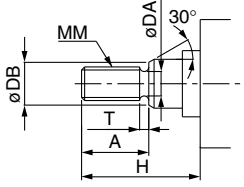
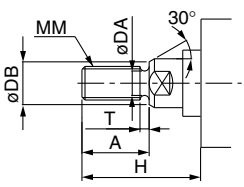
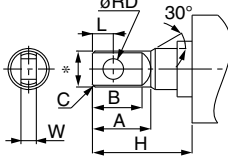
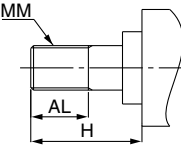
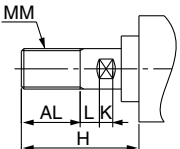
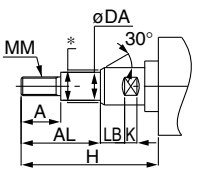
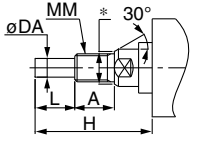
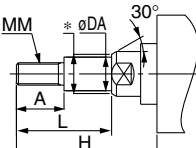
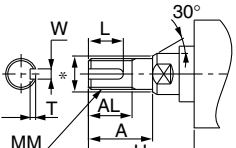
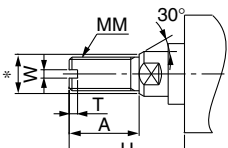
Series	Action	Symbol for change of rod end shape	Note
Standard type	MB1	Double acting, Single rod	XA0 to 30
	MB1W	Double acting, Double rod	XA0 to 30
Non-rotating rod type	MB1K	Double acting, Single rod	XA0, 1, 6, 10, 11, 13, 14, 17, 19, 21

Precautions

- SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
- Standard dimensions marked with "*" will be as follows to the rod diameter (D). Enter any special dimension you desire.

- $$D \leq 6 \rightarrow D - 1 \text{ mm} \quad 6 < D \leq 25 \rightarrow D - 2 \text{ mm} \quad D > 25 \rightarrow D - 4 \text{ mm}$$
- In the case of double rod type and single acting retraction type, enter the dimensions when the rod is retracted.

Symbol: A0 	Symbol: A1 	Symbol: A2 	Symbol: A3 
Symbol: A4 	Symbol: A5 	Symbol: A6 	Symbol: A7 
Symbol: A8 	Symbol: A9 	Symbol: A10 	Symbol: A11 
Symbol: A12 	Symbol: A13 	Symbol: A14 	Symbol: A15 
Symbol: A16 	Symbol: A17 	Symbol: A18 	Symbol: A19 

<p>Symbol: A20</p> 	<p>Symbol: A21</p> 	<p>Symbol: A22</p> 	<p>Symbol: A23</p> 
<p>Symbol: A24</p> 	<p>Symbol: A25</p> 	<p>Symbol: A26</p> 	<p>Symbol: A27</p> 
<p>Symbol: A28</p> 	<p>Symbol: A29</p> 	<p>Symbol: A30</p> 	

Standard
Double Acting, Double Rod
MB1W

Non-rotating Rod
Double Acting, Single Rod
MB1K

Auto Switch

Made to Order

Series MB1 Made to Order

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



1 Oversized Rod Cylinder

Symbol
-XB5

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

Applicable Series

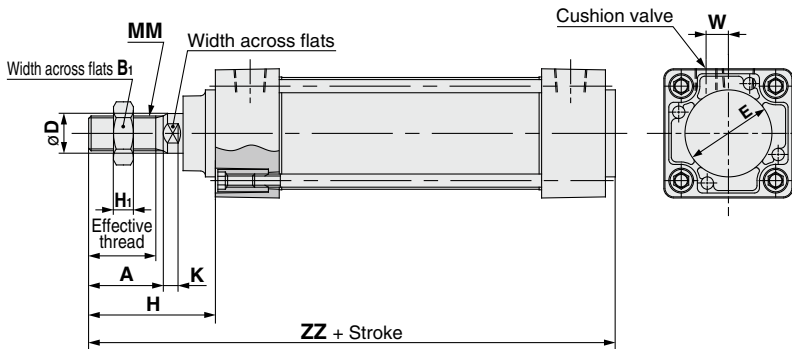
Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	

Note) The cover shape is the same as the current product.

How to Order

MB1 Mounting style Bore size - Stroke - **XB5**
Oversized rod cylinder

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



Bore size	[mm]										
	A	Effective thread length	B1	øD	H	H1	K	Width across flats	MM	W	ZZ
32	30	27	22	16	51	8	6	14	M14 x 1.5	7.2	139
40	35	32	27	20	58	11	7	18	M18 x 1.5	9.7	146
50	40	37	32	25	68	13	10	22	M22 x 1.5	10.5	166
63	40	37	32	25	68	13	10	22	M22 x 1.5	12	166
80	40	37	41	30	74	16	10	26	M26 x 1.5	14	192
100	50	47	46	36	90	18	16	31	M30 x 1.5	15	208

2 Heat Resistant Cylinder (-10 to 150°C)

Symbol
-XB6

Air cylinder which changed the seal material and grease, so that it could be used even at higher temperature up to 150 from -10°C.

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Except ø125, with rubber bumper and with auto switch
	MB1W	Double acting, Double rod	Except ø125, with rubber bumper and with auto switch

- Note 1) Operate without lubrication from a pneumatic system lubricator.
 Note 2) Please contact SMC for details on the maintenance intervals for this cylinder, which differ from those of the standard cylinder.
 Note 3) In principle, it is impossible to make built-in magnet type and the one with auto switch. But, as for the one with auto switch, and the heat resistant cylinder with heat resistant auto switch, please contact SMC.
 Note 4) Piston speed is ranged from 50 to 500 mm/s.

Specifications

Ambient temperature range	-10°C to 150°C
Seal material	Fluororubber
Grease	Heat resistant grease
Specifications other than above and external dimensions	Same as standard type

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.

How to Order

Standard model no. - **XB6**
Heat resistant cylinder

3 Special Port Location

Symbol
-XC3

Compared with the standard type, a cylinder which changes the connection port location of rod/head cover and the location of cushion valve.

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	
	MB1W	Double acting, Double rod	
Non-rotating rod type	MB1K	Double acting, Single rod	

Note) The cover shape is the same as the current product.

How to Order

MB1 Mounting style Bore size - Stroke Suffix - XC3 A C

Special port location ●
● Cushion valve location seen from the rod side
● Rod port location seen from the rod side
* For port location, refer to the following diagrams and show the symbols of A, B, C and D.

Specifications: Same as standard type

Relationship between Port Location and Cushion Valve Location

Corresponding symbol of mounting bracket (Positional relationships)

- Symbol of position for port and cushion valve has to be looked from the rod side, as figures above. (In the case of standard cylinders, port must be positioned in the upper side.) Define the upper side to be A, and then B, C, and D in a clockwise order.
- Model of combination between port and cushion valve is applicable only when the position of a port and a cushion valve on the rod cover and the head cover will be changed to the same position against the support bracket, as a rule.
- XC3AA is not available in terms of the position between port and cushion valve, since it is available in the standard products.

4 With Heavy Duty Scraper

Symbol
-XC4

It is suitable for using cylinders under the environment, where there are much dusts in a surrounding area by using a heavy duty scraper on the wiper ring, or using cylinders under earth and sand exposed to the die-casted equipment, construction machinery, or industrial vehicles.

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Except $\phi 125$
	MB1W	Double acting, Double rod	Except $\phi 125$

How to Order

Standard model no. - XC4
With heavy duty scraper ●

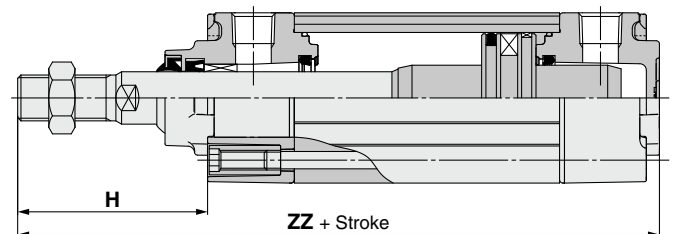
Specifications: Same as standard type

⚠ Caution

Do not replace heavy duty scrapers.

- Since heavy duty scrapers are press-fit, do not replace the cover only, but rather the entire rod cover assembly.

Construction (Dimensions are the same as standard.)



Bore size	H	ZZ
32	47	135
40	58	146
50	67	165
63	67	165
80	81	199
100	81	199

Standard Double Acting, Single Rod MB1
Double Acting, Double Rod MB1W
Non-rotating Rod Double Acting, Single Rod MB1K
Auto Switch
Made to Order

Series MB1

5 Heat Resistant Cylinder (-10 to 110°C)

Symbol
-XC5

Cylinder which changed the seal material for heat resistance (up to 110°C) in order to use under the severe ambient temperature condition which exceeds the standard specifications of -10 to 70°C.

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Except ø125, with rubber bumper and with auto switch
	MB1W	Double acting, Double rod	Except ø125, with rubber bumper and with auto switch

How to Order

Standard model no.	- XC5
--------------------	-------

Heat resistant cylinder ●

Specifications

Ambient temperature range	-10°C to 110°C
Seal material	Fluororubber
With auto switch	Unavailable Note 2)
Specifications other than above and external dimensions	Same as standard type

Note 1) Please contact SMC for details on the maintenance intervals for this cylinder, which differ from those of the standard cylinder.
 Note 2) Manufacturing built-in magnet type and the one with auto switch is impossible.
 Note 3) Rod boot material is heat resistant tarpaulin.

6 Piston Rod and Rod End Nut Made of Stainless Steel

Symbol
-XC6

Suitable for the cases it is likely to generate rust by being immersed in the water and corrosion.

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Only ø125
Non-rotating rod type	MB1K	Double acting, Single rod	

How to Order

Standard model no.	- XC6
--------------------	-------

Piston rod and rod end nut made of stainless steel ●

Specifications

Parts changed to stainless steel	Piston rod, Rod end nut
Specifications other than above and external dimensions	Same as standard type

7 Tie-rod, Cushion Valve, Tie-rod Nut, etc. Made of Stainless Steel

Symbol
-XC7

When using in locations where the rust generation or corrosion likelihood exists, the standard parts material have been partly changed to the stainless steel.

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Except ø125
	MB1W	Double acting, Double rod	Except ø125
Non-rotating rod type	MB1K	Double acting, Single rod	

How to Order

Standard model no.	- XC7
--------------------	-------

Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel ●

Specifications

Component parts changed to stainless steel	Tie-rod, Tie-rod nut, Mounting bracket nut, Cushion valve, Rod end nut
Specifications other than above	Same as standard type
Dimensions	Same as standard type

Symbol
-XC8

8 Adjustable Stroke Cylinder/Adjustable Extension Type

It adjusts the extending stroke by the stroke adjustable mechanism equipped in the head side. (After the stroke is adjusted, with cushion on both sides is altered to single-sided, with cushion.)

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Except $\phi 125$, with rubber bumper and with auto switch
Non-rotating rod type	MB1K	Double acting	Except head flange and clevis types

Specifications

Stroke adjustment symbol	A	B
Stroke adjustment range [mm]	0 to 25	0 to 50
Specifications other than above	Same as standard type	

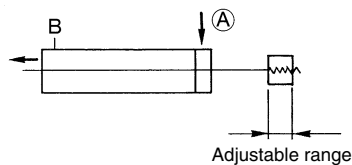
How to Order

MB1
MB1K **Mounting style** **Bore size** - **Stroke** **Suffix** **Stroke adjustment symbol** **Z - XC8**

* Except head flange and clevis types

Adjustable stroke cylinder/Adjustable extension type

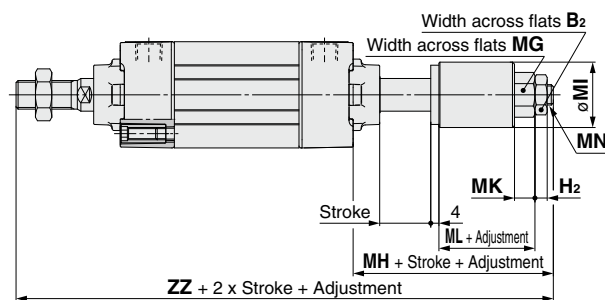
Symbol



Warning Precautions

1. When the cylinder is operating, if something gets caught between the stopper bracket for adjusting the stroke and the cylinder body, it could cause bodily injury or damage the peripheral equipment. Therefore, take preventive measures as necessary, such as installing a protective cover.
2. To adjust the stroke, make sure to secure the wrench flats of the stopper bracket by a wrench, etc. before loosening the lock nut. If the lock nut is loosened without securing the stopper bracket, be aware that the area that joins the load to the piston rod or the area in which the piston rod is joined with the load side and the stopper bracket side could loosen first. It may cause an accident or malfunction.

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



Bore size	B ₂	H ₂	MG	MH	MI	MK	ML	MN	ZZ
32	13	5	17	44	23	9	20	M8 x 1.25	175
40	17	6	19	48	32	10	22	M10 x 1.25	183
50	22	8	24	53	38	13	24	M14 x 1.5	205
63	22	8	24	53	38	13	24	M14 x 1.5	205
80	24	10	27	72	45	14	32	M16 x 1.5	258
100	30	12	32	75	55	17	35	M20 x 1.5	261

Standard Double Acting, Single Rod **MB1**
Double Acting, Double Rod **MB1W**
Non-rotating Rod Double Acting, Single Rod **MB1K**
Auto Switch
Made to Order

Series MB1

Symbol
-XC9

9 Adjustable Stroke Cylinder/Adjustable Retraction Type

The retracting stroke of the cylinder can be adjusted by the adjustment bolt.

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Except $\phi 125$, with rubber bumper and with auto switch
Non-rotating rod type	MB1K	Double acting, Single rod	Except head flange and clevis types

Specifications

Stroke adjustment symbol	A	B
Stroke adjustment range [mm]	0 to 25	0 to 50
Specifications other than above	Same as standard type	

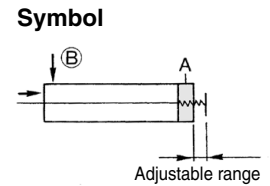
How to Order

MB1 **Mounting style** **Bore size** – **Stroke** **Suffix** **Stroke adjustment symbol** **Z – XC9**

* Except head flange and clevis types

Adjustable stroke cylinder/Adjustable retraction type

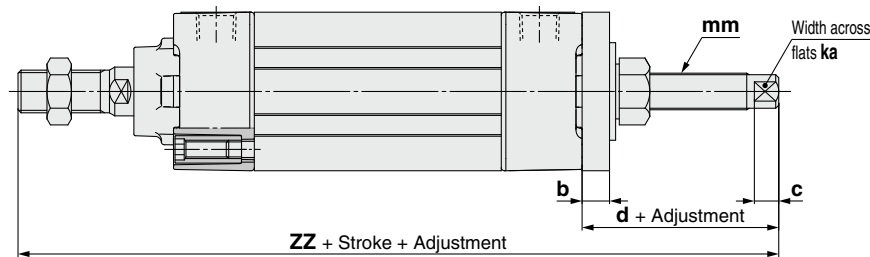
(After the stroke is adjusted, with cushion on both sides is altered to single-sided, with cushion.)



Caution Precautions

- When air is supplied to the cylinder, if the stroke adjustment bolt is loosened in excess of the allowable stroke adjustment amount, be aware that the stroke adjustment bolt could fly out or air could be discharged, which could injure personnel or damage the peripheral equipment.
- Adjust the stroke when the cylinder is not pressurized. If it is adjusted in the pressurized state, the seal of the adjustment section could become deformed, leading to air leakage.

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



MB1 [mm]						
Bore size	b	c	d	ka	mm	ZZ
32	9	8	40	8	M12 x 1.25	171
40	9	8	39.5	8	M12 x 1.25	174.5
50	11	8	46	13	M16 x 1.5	198
63	11	8	52	17	M20 x 1.5	204
80	15	10	61	19	M24 x 1.5	247
100	15	10	61.5	19	M24 x 1.5	247.5

MB1K [mm]				
Bore size	MH	MF	MM	ZZ
32	41.5	9.5	M12 x 1.25	172
40	41.5	9.5	M12 x 1.25	176
50	52.5	11.5	M20 x 1.5	204
63	52.5	11.5	M20 x 1.5	204
80	62.5	15.5	M24 x 1.5	248
100	62.5	15.5	M24 x 1.5	248

Symbol
-XC10

10 Dual Stroke Cylinder/Double Rod Type

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

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Except $\phi 125$, clevis, pivot bracket and rod end bracket
Non-rotating rod type	MB1K	Double acting, Double rod	* Except clevis type

Specifications

Max. manufacturable stroke [mm]	Stroke A + B = 1000
Specifications other than above	Same as standard type

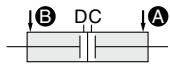
How to Order

MB1
MB1K Mounting style Bore size - Stroke A Suffix + Stroke B Suffix **Z - XC10**

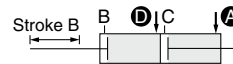
* Except clevis type

Dual stroke cylinder/Double rod type ●

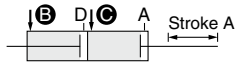
Function



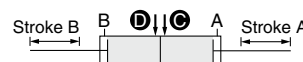
When air pressure is supplied to ports **A** and **B**, both strokes A and B retract.



When air pressure is supplied to ports **A** and **D**, B out strokes.

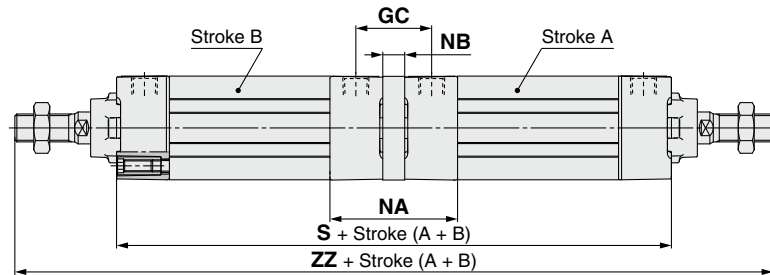


When air pressure is supplied to ports **B** and **C**, A out strokes.



When air pressure is supplied to ports **C** and **D**, both strokes A and B out strokes.

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



Bore size	GC	NA	NB	S	ZZ
32	36	62	10.6	178	272
40	38	62	10.6	178	280
50	41	71	10.6	198	314
63	43	71	10.6	198	314
80	52	88	14.6	242	386
100	52	88	14.6	242	386

Standard
Double Acting, Single Rod
MB1

Double Acting, Double Rod
MB1W

Non-rotating Rod
Double Acting, Single Rod
MB1K

Auto Switch

Made to Order

11 Dual Stroke Cylinder/Single Rod Type

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

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Except $\phi 125$

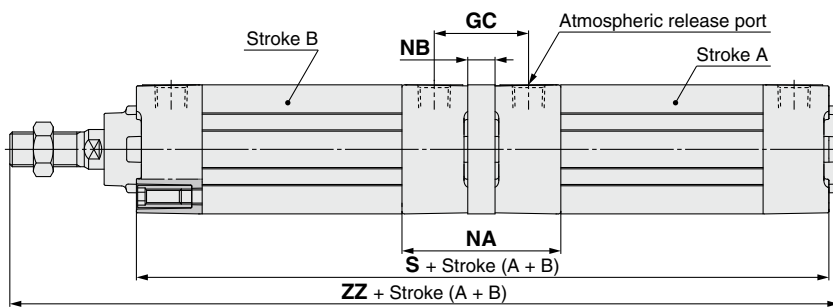
Specifications: Same as standard type

Max. manufacturable stroke [mm]	Stroke A + B = 1000
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How to Order

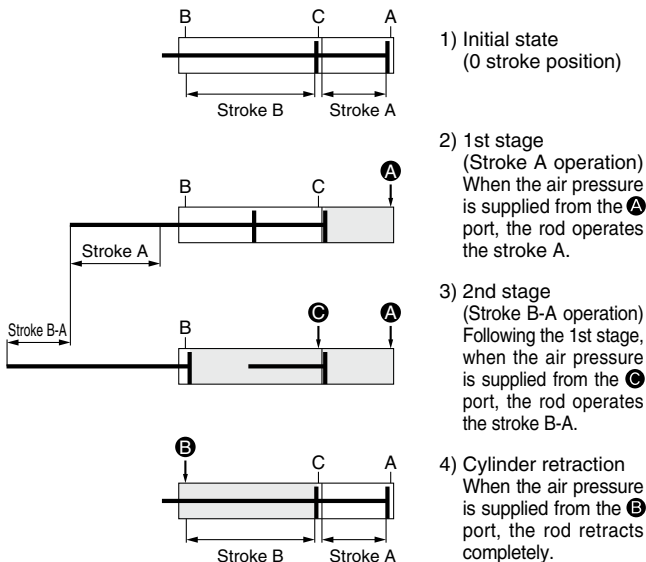
MB1 **Mounting style** **Bore size** - **Stroke A** **Suffix** + **Stroke B-A** **Suffix** **Z** - **XC11**
Dual stroke cylinder/Single rod type

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

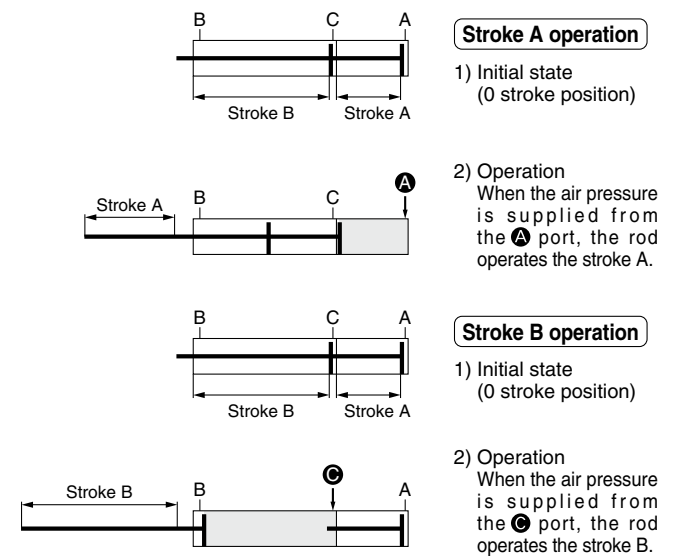


Bore size	GC	NA	NB	S	ZZ
32	36	62	10.6	179	230
40	38	62	10.6	179	234
50	41	71	10.6	199	261
63	43	71	10.6	199	261
80	52	88	14.6	243	319
100	52	88	14.6	243	319

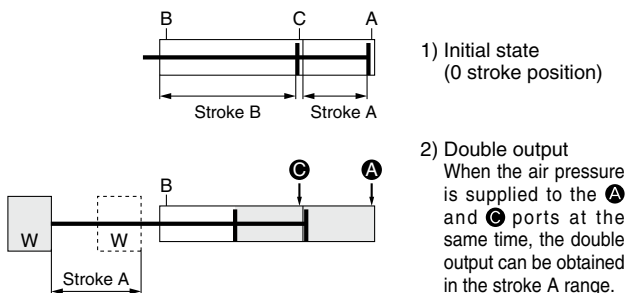
Functional description of dual stroke cylinder



Stroke A or Stroke B operation can be made individually.



Double output is possible.



Caution Precautions

1. Do not supply air until the cylinder is fixed with the attached bolt.
2. If air is supplied without securing the cylinder, the cylinder could lurch, posing the risk of bodily injury or damage to the peripheral equipment.

12 Tandem Cylinder

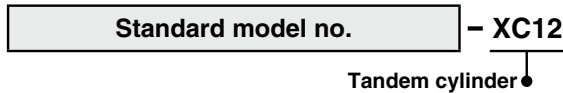
Symbol
-XC12

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

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Except ø125

How to Order

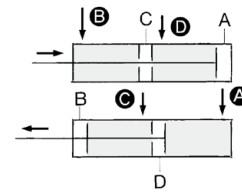


Specifications

Max. manufacturable stroke [mm]	500
Specifications other than above	Same as standard type

Function

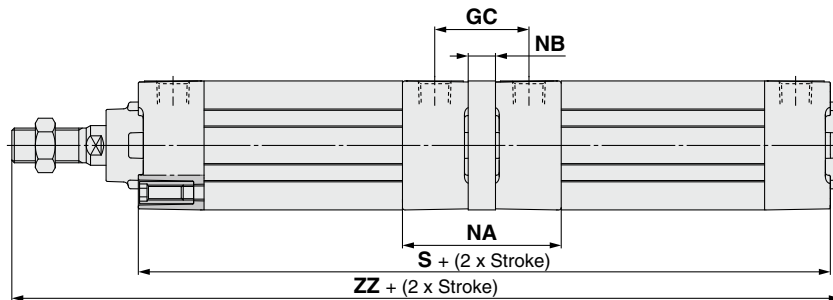
Max. manufacturable stroke: 1000 mm



When air pressure is supplied to ports **B** and **D**, the output force is doubled in the retract stroke.

When air pressure is supplied to ports **A** and **C**, the output force is doubled in the out stroke.

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



Bore size	GC	NA	NB	S	ZZ
32	36	62	10.6	180	231
40	38	62	10.6	180	235
50	41	71	10.6	200	262
63	43	71	10.6	200	262
80	52	88	14.6	244	320
100	52	88	14.6	244	320

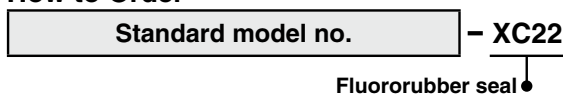
13 Fluororubber Seal

Symbol
-XC22

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Except ø125
	MB1W	Double acting, Double rod	Except ø125

How to Order



Specifications

Seal material	Fluororubber
Ambient temperature range	With auto switch ^{Note 1)} : -10°C to 60°C Without auto switch: -10°C to 70°C (No freezing)
Specifications other than above and external dimensions	Same as standard type

Note 1) Please contact SMC, as the type of chemical and the operating temperature may not allow the use of this product.

Note 2) Cylinders with auto switches can also be produced; however, auto switch related parts (auto switch units, mounting brackets, built-in magnets) are the same as standard products. Before using these, please contact SMC regarding their suitability for the operating environment.

Note 3) No cushion is equipped for N type.

Standard Double Acting, Single Rod MB1

Double Acting, Double Rod MB1W

Non-rotating Rod Double Acting, Single Rod MB1K

Auto Switch

Made to Order

Series MB1

14 With Split Pins for Double Clevis Pin/Double Knuckle Joint Pin and Flat Washers Symbol **-XC26**

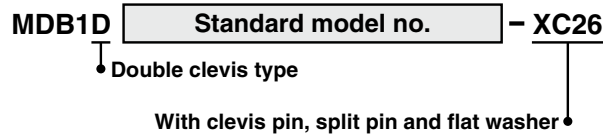
Flat washer is added for the double clevis (one of the mounting styles) or double knuckle joint (one of the accessories).

Applicable Series

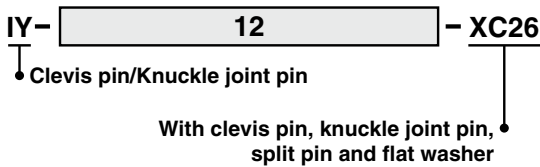
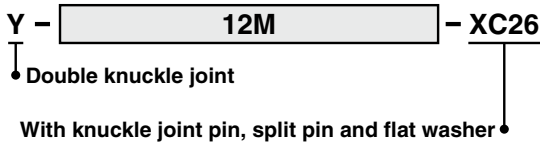
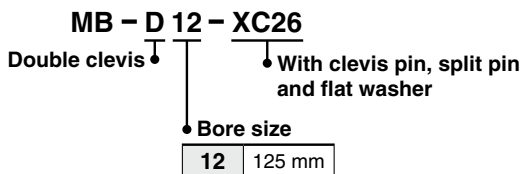
Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	ø125 only
	MB1W	Double acting, Double rod	ø125 only

How to Order

• Product



• Parts assembly

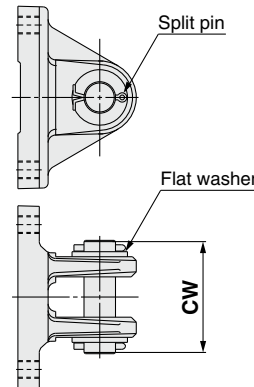


Specifications

Mounting	Only double clevis type (D), double knuckle joint
Changed parts	Clevis pin, knuckle joint pin, flat washer
Specifications other than above	Same as standard type

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

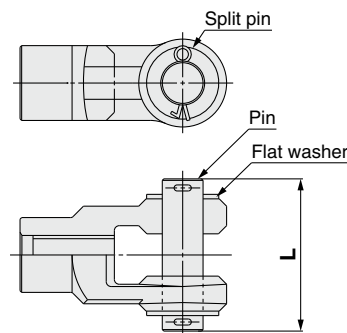
Double clevis



- * For mounting bracket, split pin, clevis pin and flat washer are shipped together, (but not assembled).
- * Mounting method is the same as standard type.

Bore size [mm]	CW
ø125	90

Double knuckle joint



- * For mounting bracket, split pin, knuckle joint pin and flat washer are shipped together, (but not assembled).
- * Mounting method is the same as standard type.

Bore size [mm]	L
ø125	90

15 Double Clevis and Double Knuckle Joint Pins Made of Stainless Steel Symbol **-XC27**

To prevent the oscillating portion of the double clevis or the double knuckle joint from rusting, the material of the pin and the retaining ring has been changed to stainless steel.

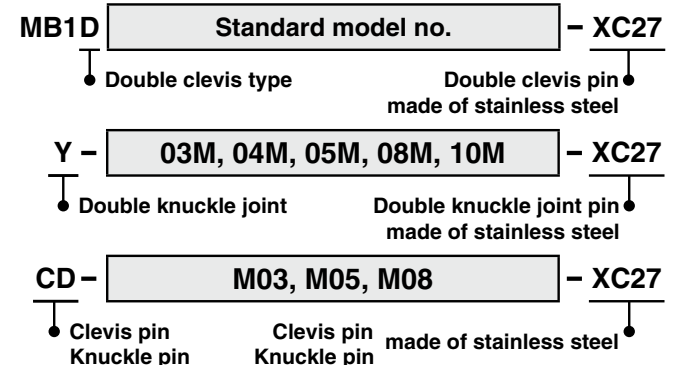
Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	

Specifications

Mounting style	Only double clevis type (D), double knuckle joint
Pin and retaining ring material	Stainless steel 304
Specifications other than above	Same as standard type

How to Order



16 Double Knuckle Joint with Spring Pin

Symbol
-XC29

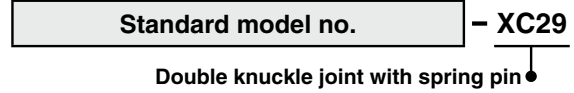
To prevent loosening of the double knuckle joint of standard air cylinder

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Except $\phi 125$

Specifications: Same as standard type

How to Order



17 Rod Trunnion

Symbol
-XC30

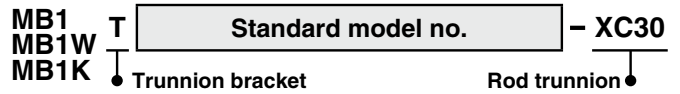
This cylinder shortens the distance between the fulcrum and the rod end by installing a trunnion bracket in front of the rod side cover.

Applicable Series

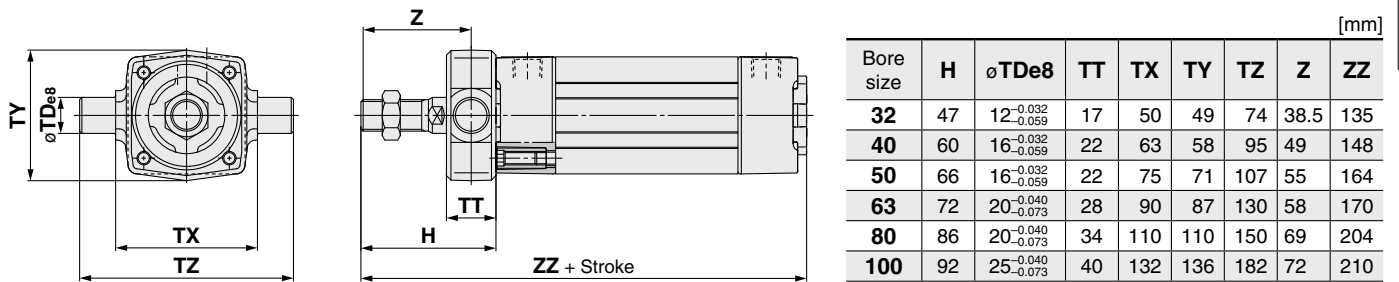
Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Except $\phi 125$
	MB1W	Double acting, Double rod	Except $\phi 125$
Non-rotating rod type	MB1K	Double acting, Single rod	

Specifications: Same as standard type

How to Order



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



18 With Coil Scraper

Symbol
-XC35

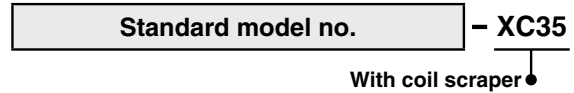
It gets rid of frost, ice, weld spatter, cutting chips adhered to the piston rod, and protects the seals etc.

Applicable Series

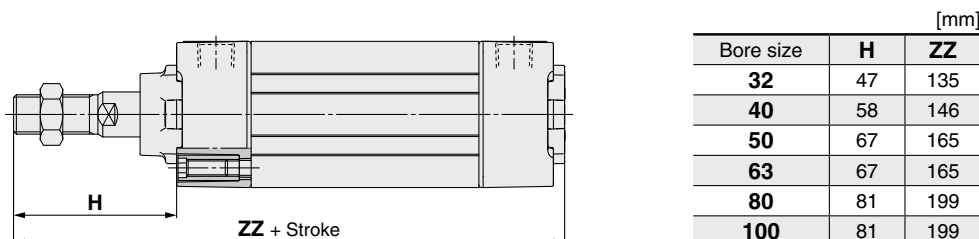
Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	
	MB1W	Double acting, Double rod	

Specifications: Same as standard type

How to Order



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



Standard
Double Acting, Single Rod
MB1

Double Acting, Double Rod
MB1W

Non-rotating Rod
Double Acting, Single Rod
MB1K

Auto Switch

Made to Order

Series MB1

19 Made of Stainless Steel (Combination of XC7 and XC68)

Symbol
-XC65

Suitable for the cases it is likely to generate rust by being immersed in the water and corrosion.

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Except $\phi 125$
	MB1W	Double acting, Double rod	Except $\phi 125$

How to Order

Standard model no. — **XC65**

Made of stainless steel
(Combination of XC7 and XC68)

Specifications

Parts changed to stainless steel	Tie-rod, Tie-rod nut, Cushion valve, Piston rod (with hard chrome plated), Rod end nut
Specifications other than above and external dimensions	Same as standard type

Maximum Stroke

Double acting, Single rod	Double acting single rod with rod boot
1600	1000

20 Piston Rod and Rod End Nut Made of Stainless Steel (With Hard Chrome Plated Piston Rod)

Symbol
-XC68

Suitable for the cases it is likely to generate rust by being immersed in the water and corrosion.

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	Except $\phi 125$
	MB1W	Double acting, Double rod	Except $\phi 125$

How to Order

Standard model no. — **XC68**

Piston rod and rod end nut made of stainless steel
(With hard chrome plated piston rod)

Specifications

Parts changed to stainless steel	Piston rod, Rod end nut
Specifications other than above and external dimensions	Same as standard type

Maximum Stroke

Double acting, Single rod	Double acting single rod with rod boot
1600	1000

21 Fastener Strips Mounted on Switch Mounting Grooves

Symbol
-X846

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

Applicable Series

Description	Model	Action	Note
Standard type	MB1	Double acting, Single rod	
	MB1W	Double acting, Double rod	
Non-rotating rod type	MB1K	Double acting, Single rod	

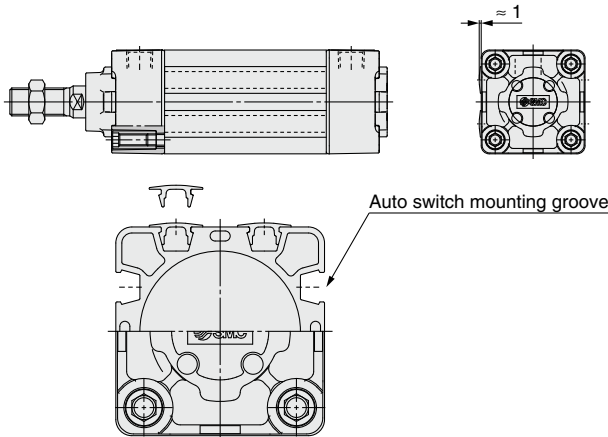
How to Order

Standard model no. — **X846**

Fastener strips mounted on switch mounting grooves

Specifications: Same as standard type

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



Sectional view

Fastener Specifications

Quantity	8 pcs. (6 pcs. when auto switches are mounted) ^{Note)}
Material	Vinyl chloride
Color	White

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



Series MB1

Specific Product Precautions

Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Actuator and Auto Switch Precautions, refer to “Handling Precautions for SMC Products” and the Operation Manual on the SMC website, <http://www.smcworld.com>

Adjustment

Warning

- Do not open the cushion valve beyond the stopper.**
Crimping (ø32) or a retaining ring (ø40 to ø125) 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 size [mm]	Cushion valve width across flats [mm]	Hexagon wrench
32, 40	2.5	JIS 4648 Hexagonal wrench key 2.5
50, 63	3	JIS 4648 Hexagonal wrench key 3
80, 100, 125	4	JIS 4648 Hexagonal wrench key 4

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

Select the cylinder with bumper if the cushion valve is to be fully opened. Otherwise, tie-rods or piston assembly may be damaged.

- When replacing mounting brackets, use a hexagon wrench.**

Bore size [mm]		Bolt	Width across flats [mm]	Tightening torque [N·m]
32, 40		MB-32-48-C1247	4	5.1
50, 63		MB-50-48-C1249	5	11
80, 100	Foot	MB-80-48AC1251	6	25
	Others	MB-80-48BC1251		
125	Foot	CE00008	8	30.1
	Others	CE00032		

- When replacing mounting brackets, 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.

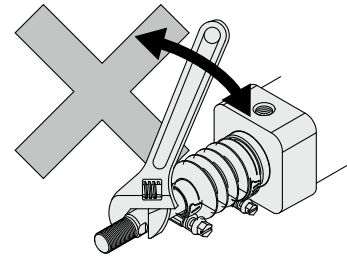
With Rod Boot

Handling

Caution

- 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.



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

Standard
Double Acting, Single Rod
MB1


Non-rotating Rod
Double Acting, Single Rod
MB1K


Auto Switch


Made to Order

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

 **Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

 **Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

 **Danger:** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

Revision history

Edition B * Non-rotating rod type: Changed from the current MB1K series to the MB1K-Z series.

TX

Safety Instructions

Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.