Square Tube Type Air Cylinder

Series MB1

ø32, ø40, ø50, ø63, ø80, ø100, ø125

Increased kinetic energy absorption

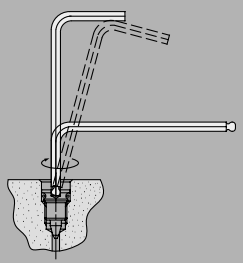
The absorption of kinetic energy has been increased by nearly 30% compared to the CA1 series, through increased cushion volume and the use of a new cushion seal. In addition, the life of the cushion seal is approximately 5 times longer.

Improved cushion capacity

Piston rod lurching, due to cracking pressure at start up, has been eliminated by means of a floating seal mechanism.

Space-saving auto switch mounting

Space is saved by setting switches into grooves provided on 4 surfaces. This is also effective to prevent loosening and damage, etc.



Port aperture

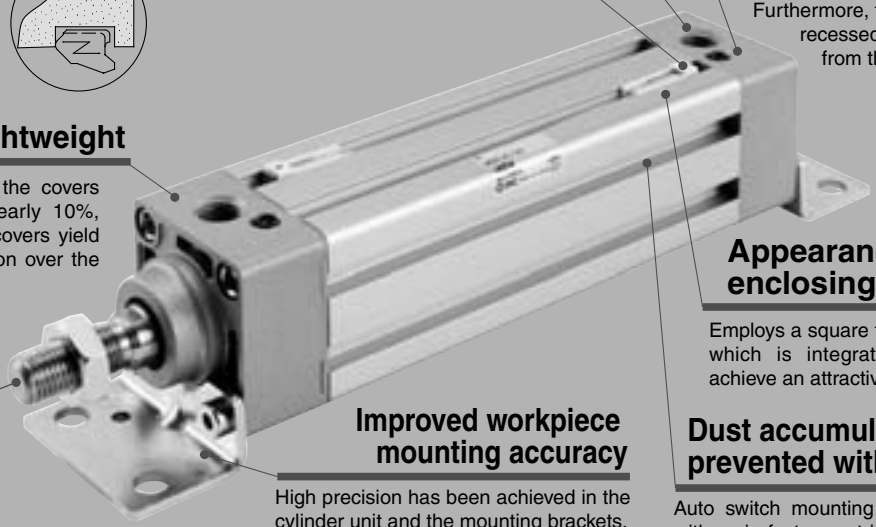
Easy cushion valve adjustment

Adjustment of the cushion valve is made with a hexagon wrench key allowing for easy fine adjustment.

Furthermore, the cushion valve has been recessed so that it does not protrud from the cover.

Compact and lightweight

The height and width of the covers has been reduced by nearly 10%, and in addition, die-cast covers yield 10 to 25% weight reduction over the CA1 series.

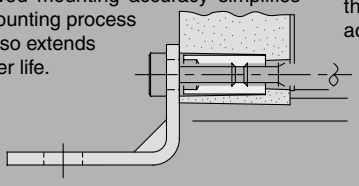


Appearance improved by enclosing the tie-rods

Employs a square tube with enclosed tie-rods which is integrated with both covers to achieve an attractive, unified appearance.

Improved workpiece mounting accuracy

High precision has been achieved in the cylinder unit and the mounting brackets. Improved mounting accuracy simplifies the mounting process and also extends cylinder life.



Dust accumulation can be prevented with fastener strips

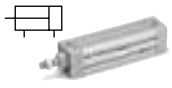
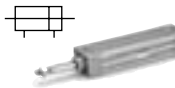
Auto switch mounting grooves can be covered with resin fastener strips, which adhere tightly to the tube (option) to prevent the entry and accumulation of dirt.

Piston rod sagging reduced

Sagging of the piston rod has been reduced by increasing the precision of the bushing and piston rod, and reducing their clearances.

Series Variations

Standard type: Double acting

		JIS Symbol	Bore size (mm)	Standard stroke (mm)	Built-in magnet	Rod boot	Mounting bracket	Accessory	
Single Rod *Series MB1*		32	25 50 75 100 125 150 175 200 250 300 350 400 450 500 600 700 800	●	●	Basic style Axial foot style Rod side flange style Head side flange style Single clevis style Double clevis style Center trunnion style	(Standard) Rod end nut (Option) Knuckle joint pin Clevis pin Single knuckle joint Double knuckle joint Trunnion pivot bracket Double clevis pivot bracket	Page 332
		40							
Double Rod *Series MB1W*		50		●	●	Basic style Foot style Flange style Center trunnion style	(Standard) Rod end nut (Option) Knuckle joint pin Single knuckle joint Double knuckle joint Trunnion pivot bracket	Page 340
		63							
Non-rotating Rod *Series MB1K*		80		●	●	Basic style Axial foot style Rod side flange style Head side flange style Single clevis style Double clevis style Center trunnion style	(Standard) Rod end nut (Option) Knuckle joint pin Clevis pin Single knuckle joint Double knuckle joint Trunnion pivot bracket Double clevis pivot bracket	Page 345
		100							
		125	900 1000						

∗ ø125 is not available for MB1K.

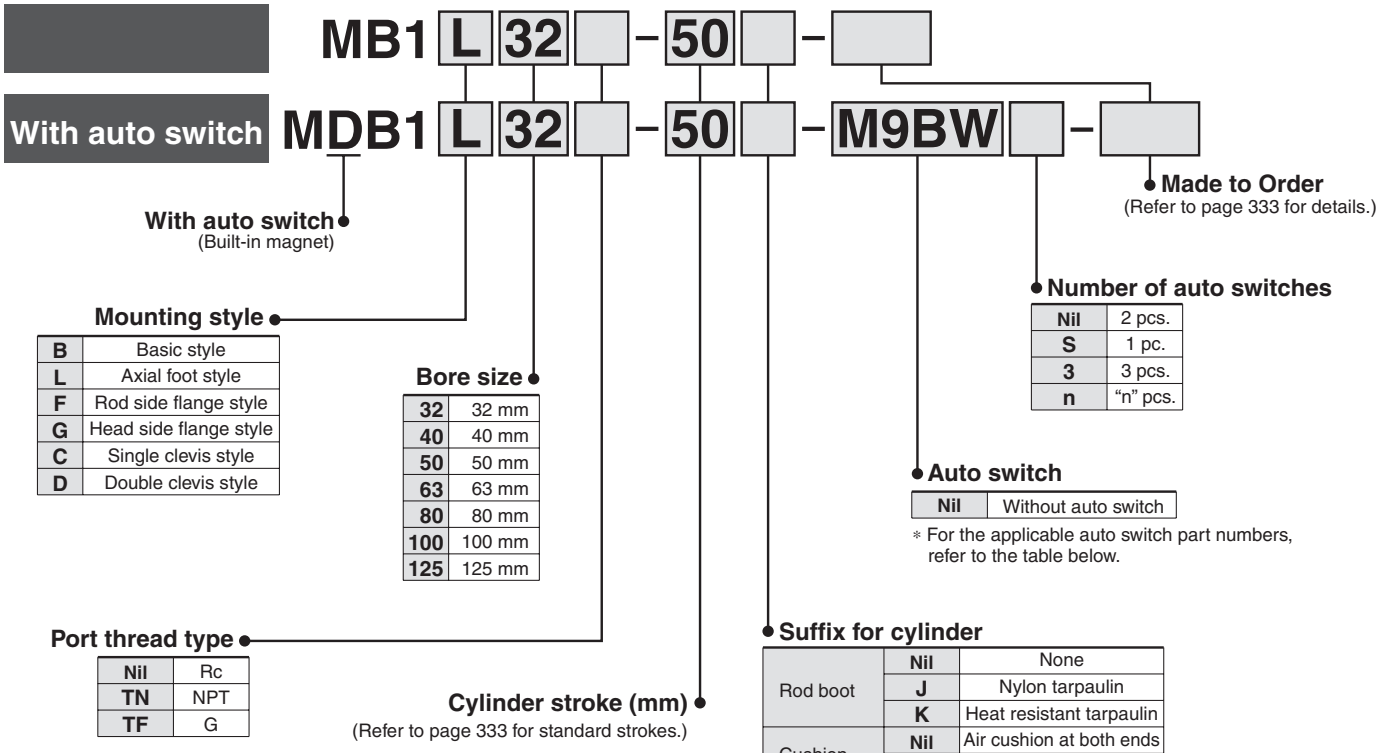
● : Standard
◎ : Made to Order specifications
○ : Special product (Contact SMC for details.)
— : Not available

Symbol	Specification	Applicable bore size	MB1 (Standard) Double acting Single rod Air ø32 to ø100	MB1 (Standard) Double acting Single rod Air ø125	MB1 (Standard) Double acting Single rod Rubber ø32 to ø100	MB1 (Standard) Double acting Single rod Rubber ø125	MB1 (Standard) Double acting Double rod Air ø32 to ø100	MB1 (Standard) Double acting Double rod Air ø125	MB1 (Standard) Double acting Double rod Rubber ø32 to ø100	MB1 (Standard) Double acting Double rod Rubber ø125	MB1K (Non-rotating) Double acting Single rod Air ø32 to ø100	MB1K (Non-rotating) Double acting Single rod Rubber ø32 to ø100	MB1K (Non-rotating) Double acting Double rod Air ø32 to ø100	MB1K (Non-rotating) Double acting Double rod Rubber ø32 to ø100
Standard	Standard	ø32 to ø125	●	●	●	●	●	●	●	●	●	●	●	●
Long st	Long stroke		○	○	○	○	○	○	○	○	○	○	○	○
D	Built-in magnet		●	●	●	●	●	●	●	●	●	●	●	●
MB1□-□ J K	With rod boot		●	●	●	●	●	●	●	●	●	●	●	●
10-	Clean series		●	○	●	○	●	○	●	○	○	○	○	○
20-	Copper and Fluorine-free		●	○	●	○	●	○	●	○	—	—	—	—
MB1□ R V	Water resistant		●	○	●	○	●	○	●	○	—	—	—	—
XA□	Change of rod end shape	ø32 to ø125	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	○
XB5	Oversized rod cylinder		◎	○	○	○	○	○	○	○	○	○	○	○
XB6	Heat-resistant cylinder (–10 to 150°C)		◎	○	○	○	◎	○	○	○	○	○	○	○
XB13	Low-speed cylinder (5 to 50 mm/s)		○	○	○	○	○	○	○	○	○	○	○	○
XC3	Special port position		◎	○	◎	○	◎	○	◎	○	◎	◎	◎	◎
XC4	With heavy duty scraper		◎	○	◎	○	◎	○	◎	○	—	—	—	—
XC5	Heat-resistant cylinder (–10 to 110°C)		◎	○	○	○	◎	○	○	○	○	○	○	○
XC6	Made of stainless steel		◎	◎	◎	◎	◎	○	◎	○	◎	◎	◎	◎
XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel		◎	○	◎	○	◎	○	◎	○	◎	◎	◎	◎
XC8	Adjustable stroke cylinder/Adjustable extension type		◎	○	◎	○	—	—	—	—	◎	◎	—	—
XC9	Adjustable stroke cylinder/Adjustable retraction type		◎	○	◎	○	—	—	—	—	◎	◎	—	—
XC10	Dual stroke cylinder/Double rod type	ø32 to ø125	◎	○	◎	○	—	—	—	—	◎ Note 2)	◎ Note 2)	—	—
XC11	Dual stroke cylinder/Single rod type		◎	○	◎	○	—	—	—	—	○	○	—	—
XC12	Tandem cylinder		◎	○	◎	○	○	○	○	○	○	○	○	○
XC22	Fluororubber seal		◎	○	◎	○	◎	○	◎	○	○	○	○	○
XC27	Double clevis pins made of Stainless steel (Stainless steel 304)		◎	◎	◎	◎	—	—	—	—	◎	◎	○	○
XC29	Double knuckle joint with spring pin		◎	○	◎	○	○	○	○	○	○	○	○	○
XC30	Rod side trunnion		◎ Note 1)	○	◎ Note 1)	○	◎ Note 1)	○	◎ Note 1)	○	◎ Note 1)	◎ Note 1)	◎ Note 1)	◎ Note 1)
XC35	With coil scraper		◎	○	◎	○	◎	○	◎	○	—	—	—	—
XC59	Fluororubber seal, Built-in hard plastic magnet		◎	○	◎	○	○	○	○	○	○	○	○	○
XC65	XC6 + XC7 specifications		◎	○	◎	○	○	○	○	○	○	○	○	○
X846	Fastener strips mounted on switch mounting grooves		◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

Note 1) For Series MB1, a T bracket can be used only when selecting XC30.
Note 2) XC10 specification for Series MBK is the non-rotating type on both sides. For only one side, submit a special order request form.

Square Tube Type Air Cylinder: Standard Type
Double Acting, Single Rod
Series MB1
ø32, ø40, ø50, ø63, ø80, ø100, ø125

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) MDB1F40-100

Note) In the case of w/o air cushion, it comes with rubber bumper.
Besides, the overall length is longer than the cylinder with air cushion as follows, because the bumpers are attached to the both sides of the piston: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm.

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model Perpendicular	Auto switch model In-line	Lead wire length (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)	24V	5V, 12V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9PV	M9P	●	●	●	○	○		
				2-wire		12V		M9BV	M9B	●	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)		5V, 12V		M9NWV	M9NW	●	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PWV	M9PW	●	●	●	○	○		
				2-wire		12V		M9BWV	M9BW	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5V, 12V		M9NAV **	M9NA **	○	○	●	○	○	IC circuit	
				3-wire (PNP)				M9PAV **	M9PA **	○	○	●	○	○		
				2-wire		12V		M9BAV **	M9BA **	○	○	●	○	○	—	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96V	A96	●	—	●	—	—	IC circuit	—
			No	2-wire	24V	12V	100V	A93V	A93	●	—	●	—	—	—	Relay, PLC
							100V or less	A90V	A90	●	—	●	—	—	IC circuit	

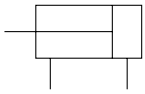
∗∗ Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. A water resistant type cylinder is recommended for use in an environment which requires water resistance. Consult with SMC regarding water resistant types for ø125.

∗ Lead wire length symbols: 0.5 m ·····Nil (Example) M9NW
1 m ····· M (Example) M9NWM
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 350 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ Auto switches are shipped together (not assembled).

JIS Symbol
Double acting



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 (No freezing)						
	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: $^{+1.8}_{0}$						
Cushion	Both ends (Air cushion) Note)						
Port size (Rc, NPT, G)	1/8	1/4		3/8		1/2	
Mounting	Basic style, Foot style, Rod side flange style, Head side flange style Single clevis style, Double clevis style						

Note) In the case of w/o air cushion, it comes with rubber bumper.

Standard Stroke

Bore size (mm)	Standard stroke (mm)	Maximum manufacturable stroke
32	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	700
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	800
50	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600	1000
63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600	1000
80	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800	1000
100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800	1000
125	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 1000	1400

Note) Intermediate strokes are available, too. (Spacer is not used.)

Accessory

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

Mounting Bracket Part No.

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

Note 1) Order two foot brackets per cylinder.
Note 2) Accessories for each mounting bracket are as follows. Foot, flange, single clevis/body mounting bolt, double clevis/body mounting bolt, clevis pins, cotter pins and flat washer. Refer to page 339 for details.

Rod Boot Material

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

* Maximum ambient temperature for the rod boot itself.

Made to Order Specifications
(For details, refer to pages 1373 to 1498 and 1514.)

Symbol	Specifications
—XA□	Change of rod end shape
—XB5	Oversized rod cylinder
—XB6	Heat resistant cylinder (150°C)
—XC3	Special port location
—XC4	With heavy duty scraper
—XC5	Heat resistant cylinder (110°C)
—XC6	Piston rod and rod end nut made of stainless steel
—XC7	Tie-rod, cushion valve, tie rod nut, etc. made of stainless steel
—XC8	Adjustable stroke cylinder/Adjustable extension type
—XC9	Adjustable stroke cylinder/Adjustable retraction type
—XC10	Dual stroke cylinder/Double rod type
—XC11	Dual stroke cylinder/Single rod type
—XC12	Tandem type cylinder
—XC22	Fluororubber seals
—XC27	Double clevis pin and double knuckle pin made of stainless steel
—XC29	Double knuckle joint with spring pin
—XC30	Rod side trunnion
—XC35	With coil scraper
—XC59	Fluororubber seals Built-in hard plastic magnet
—XC65	XC6 + XC7 specifications
—X846	Fastener strips mounted on switch mounting grooves

Refer to pages 349 and 350 for cylinders with auto switches.

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

Theoretical Output

(N) OUT IN

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm²)	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 output (N) = Pressure (MPa) x Piston area (mm²)

Mass

(kg)

Bore size (mm)		32	40	50	63	80	100	125
Basic mass	Basic style	0.53	0.72	1.24	1.54	2.84	3.83	5.68
	Foot style	0.65	0.86	1.46	1.82	3.34	4.49	7.76
	Flange style	0.82	1.09	1.69	2.33	4.29	7.14	9.84
	Single clevis style	0.78	0.95	1.58	2.17	3.95	7.0	8.25
	Double clevis style	0.79	0.99	1.67	2.33	4.24	7.52	8.45
Additional mass per each 50 mm of stroke	All mounting brackets	0.16	0.21	0.33	0.37	0.56	0.72	0.94
Accessory bracket	Single knuckle	0.15	0.23	0.26	0.26	0.60	0.83	1.10
	Double knuckle (With pin)	0.22	0.37	0.43	0.43	0.87	1.27	0.91

Calculation:
(Example) **MB1B32-100** (Basic style/ø32, 100 st)
- Basic mass·····················0.53 (Basic style, ø32)
- Additional mass··············0.16/50 mm stroke
- Cylinder stroke···············100 mm stroke

0.53 + 0.16 x 100/50 = 0.85 kg

Consideration of the Cushion

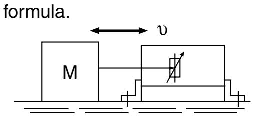
For details about the kinetic energy absorbable by the cushion mechanism and w/ air cushion, refer to page 1571.

Kinetic Energy Absorbable by the Cushion Mechanism

Bore size (mm)	Effective cushion length (mm)	Kinetic energy absorbable (J)
32	18.8	2.2
40	18.8	3.4
50	21.3	5.9
63	21.3	11
80	30.3	20
100	29.3	29
125	Rod side 31.4 Head side 29.4	43

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.

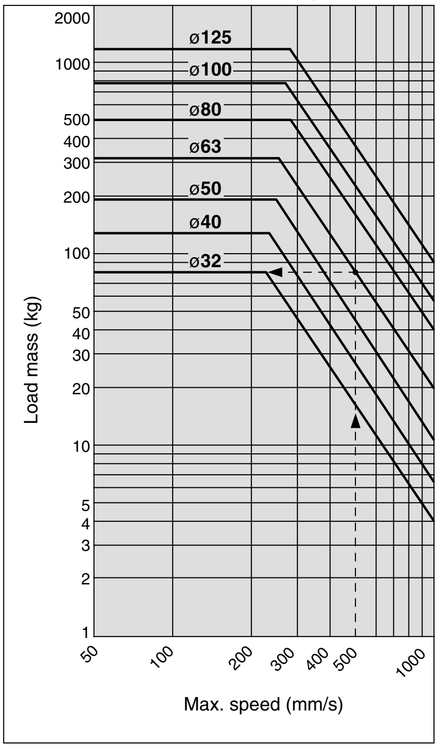


$$Ek = \frac{M}{2}\upsilon^2$$

Ek : Kinetic energy (J)
M : Mass of load (kg)
υ : Piston speed (m/s)

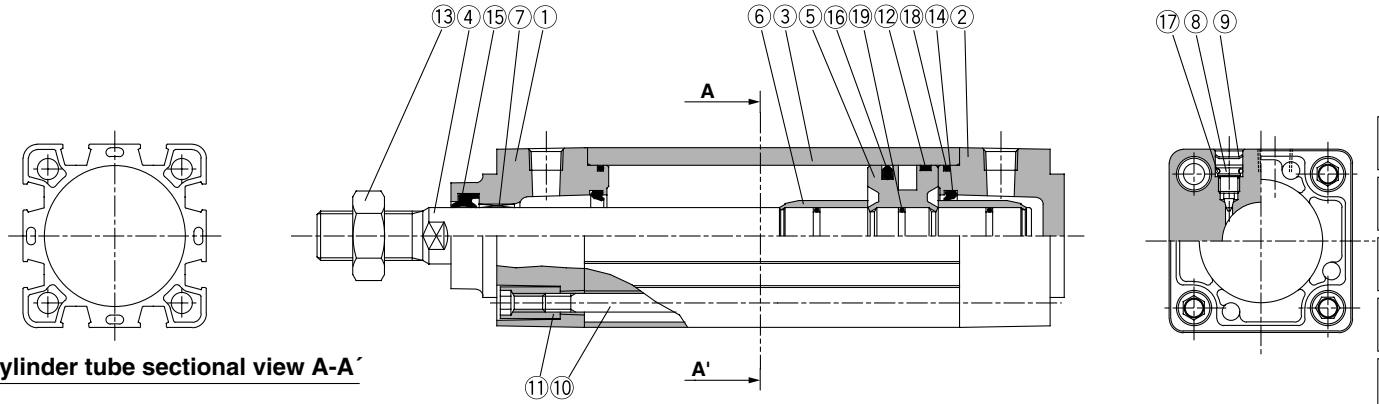
If the kinetic energy obtained is no greater than the absorbable kinetic energy shown in the table above, the life of the cushion seal will be 10 million cycles or more.

Allowable Kinetic Energy



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

Construction



Cylinder tube sectional view A-A´

Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum die-casted	Metallic painted
2	**Head cover**	Aluminum die-casted	Metallic painted
3	**Cylinder tube**	Aluminum alloy	Hard anodized
4	**Piston rod**	Carbon steel	Hard chrome plated
5	**Piston**	Aluminum alloy	Chromated
6	**Cushion ring**	Aluminum alloy	Anodized
7	**Bushing**	Lead-bronze casted	
8	**Cushion valve**	Steel wire	Nickel plated
9	**Retaining ring**	Spring steel	ø40 to ø100
10	**Tie-rod**	Carbon steel	Zinc chromated
11	**Tie-rod nut**	Carbon steel	Nickel plated
12	**Wear ring**	Resin	
13	**Rod end nut**	Carbon steel	Nickel plated
14*	**Cushion seal**	Urethane	
15*	**Rod seal**	NBR	
16*	**Piston seal**	NBR	
17	**Cushion valve seal**	NBR	
18*	**Cylinder tube gasket**	NBR	
19	**Piston gasket**	NBR	

Replacement Parts/ Seal Kit

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

∗ Seal kit includes 14 to 16, 18. Order the seal kit, based on each bore size.
∗ Seal kit includes a grease pack (ø32 to 50 : 10 g, ø63, 80 : 20 g, ø100 : 30g). Order with the following part number when only the grease pack is needed.
Grease pack part number : GR-S-010 (10g)**, GR-S-020** (20g)

Water Resistant Air Cylinders

As compared to the standard cylinder, anti-coolant performance has been improved, and suitable for using under the atmosphere having coolant in the machine tools. Improved water resistant air cylinder, Series MB is also available, which is compliant for the environment having water splashed on the food machinery, or car washing machine, etc. Refer to page 899 for details.

Copper/Fluorine-free

20-MB1 | Mounting style | Bore size | Port thread type | – | Stroke | Suffix

• Copper/Fluorine-free

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

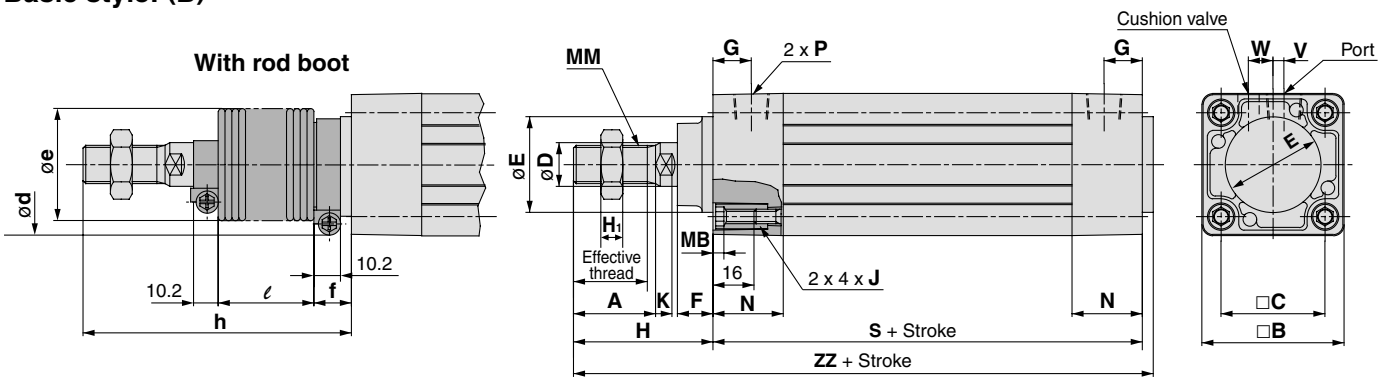
Specifications

Action	Double acting, Single rod
Bore size (mm)	ø32, ø40, ø50, ø63, ø80, ø100
Max. operating pressure	1.0 MPa
Min. operating pressure	0.05 MPa
Cushion	Air cushion*
Piping	Screw-in type
Piston speed	50 to 1000 mm/s
Mounting	Basic style, Axial foot style, Rod side flange style Head side flange style, Single clevis style, Double clevis style, Center trunnion style

∗ Auto switch can be mounted.
★Use within the energy absorption. (Refer to page 334.)
∗ When there is no air cushion, the unit is equipped with rubber bumpers.

Standard Type

Basic style: (B)



Without Air Cushion

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

∗ In the case of w/o air cushion, it comes with rubber bumper. Besides, the overall length is longer than the cylinder with air cushion as follows, because the bumpers are attached to the both sides of the piston: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm.

Bore size (mm)	Stroke range	Effective thread length	Width across flats	A	B	C	D	Ee11	F	G	H1	H	MA	MB	J	K	MM	N	P	S*	V	W	ZZ*
32	Up to 500	19.5	10	22	46	32.5	12	30	13	13	6	47	16	4	M6 x 1	6	M10 x 1.25	27	1/8	84	4	6.5	135
40	Up to 500	27	14	30	52	38	16	35	13	14	8	51	16	4	M6 x 1	6	M14 x 1.5	27	1/4	84	4	9	139
50	Up to 600	32	18	35	65	46.5	20	40	14	15.5	11	58	16	5	M8 x 1.25	7	M18 x 1.5	31.5	1/4	94	5	10.5	156
63	Up to 600	32	18	35	75	56.5	20	45	14	16.5	11	58	16	5	M8 x 1.25	7	M18 x 1.5	31.5	3/8	94	9	12	156
80	Up to 800	37	22	40	95	72	25	45	20	19	13	72	16	5	M10 x 1.5	10	M22 x 1.5	38	3/8	114	11.5	14	190
100	Up to 800	37	26	40	114	89	30	55	20	19	16	72	16	5	M10 x 1.5	10	M26 x 1.5	38	1/2	114	17	15	190
125	Up to 1000	50	27	54	136	110	32	60	27	19	16	97	20	6	M12 x 1.75	13	M27 x 2	38	1/2	120	17	15	223

With Rod Boot

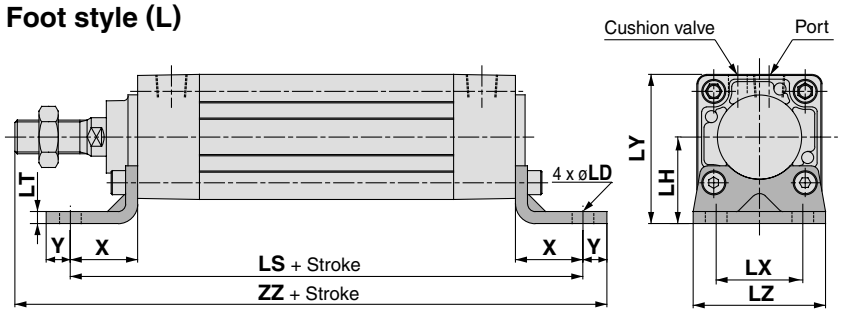
(mm)

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	—	—	—	—	—	73	86	98	111	136	161	186	—	—	—	—	—
40	56	41	23	12.5	25	37.5	50	75	100	125	—	—	—	—	—	81	94	106	119	144	169	194	—	—	—	—	—
50	64	51	25	12.5	25	37.5	50	75	100	125	150	—	—	—	—	89	102	114	127	152	177	202	227	—	—	—	—
63	64	51	25	12.5	25	37.5	50	75	100	125	150	—	—	—	—	89	102	114	127	152	177	202	227	—	—	—	—
80	68	56	29	12.5	25	37.5	50	75	100	125	150	175	200	—	—	101	114	126	139	164	189	214	239	264	289	—	—
100	76	61	29	12.5	25	37.5	50	75	100	125	150	175	200	—	—	101	114	126	139	164	189	214	239	264	289	—	—
125	82	75	27	10	20	30	40	60	80	100	120	140	160	180	200	120	130	140	150	170	190	210	230	250	270	290	310

Standard Type: With Mounting Bracket

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

Foot style (L)



Without Air Cushion

Bore size (mm)	LS	ZZ
32	134	168
40	138	176
50	156	198
63	156	201
80	184	240
100	188	244
125	222	294

Foot Style

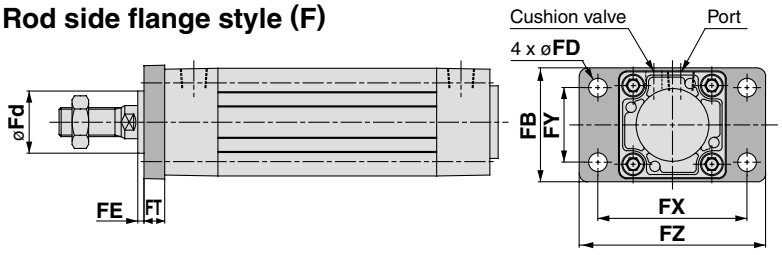
(mm)

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

∗ In the case of w/o air cushion, it comes with rubber bumper. Besides, the overall length is longer than the cylinder with air cushion as follows, because the bumpers are attached to the both sides of the piston: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm.

Standard Type: With Mounting Bracket

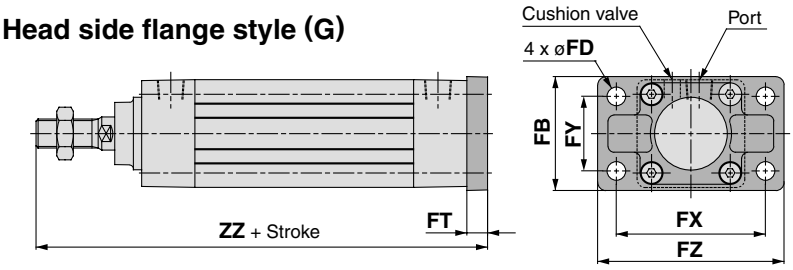
Rod side flange style (F)



Rod Side Flange Style

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

Head side flange style (G)



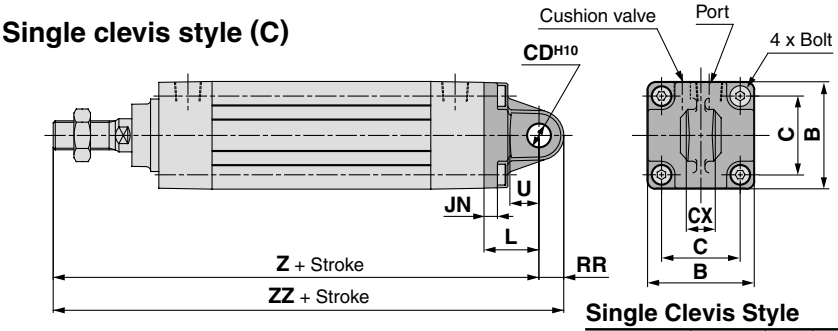
Without Air Cushion

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

Head Side Flange Style

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

Single clevis style (C)



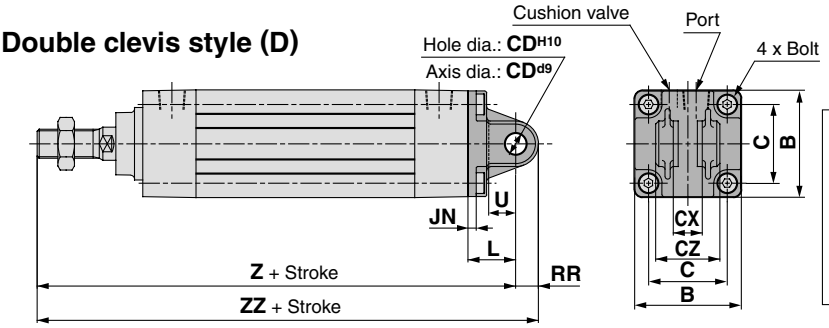
Without Air Cushion

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

Single Clevis Style

Bore size (mm)	Stroke range	B	C	JN	L	RR	U	CD H10	CX +0.3 +0.1	Z*	ZZ*	Bolt
32	to 500	46	32.5	5	23	10.5	13	10	14	154	164.5	MB-32-48-C1247
40	to 500	52	38	5	23	11	13	10	14	158	169	(M6 x 1 x 16L, Low head)
50	to 600	65	46.5	6	30	15	17	14	20	182	197	MB-50-48-C1249
63	to 600	75	56.5	6	30	15	17	14	20	182	197	(M8 x 1.25 x 18L, Low head)
80	to 800	95	72	8	42	23	26	22	30	228	251	MB-80-48BC1251
100	to 800	114	89	8	42	23	26	22	30	228	251	(M10 x 1.5 x 22L, Low head)
125	to 1000	136	110	10	50	28	30	25	32	267	295	M12 x 1.75 x 28L, Low head

Double clevis style (D)



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

* When there is no air cushion, the unit is equipped with rubber bumpers.
Besides, the overall length is longer than the cylinder with air cushion as follows, because the bumpers are attached to the both sides of the piston: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm.

Without Air Cushion

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

Double Clevis Style

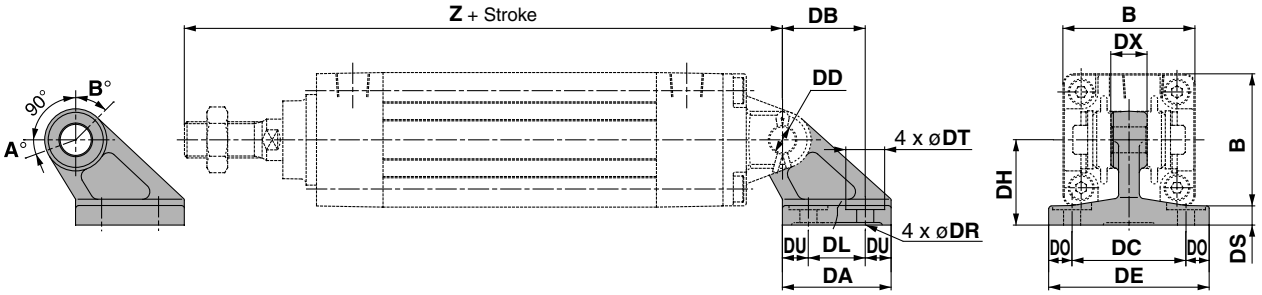
Bore size (mm)	Stroke range	B	C	JN	L	RR	U	CD H10	CX +0.3 +0.1	CZ	Z*	ZZ*	Bolt
32	to 500	46	32.5	5	23	10.5	13	10	14	28	154	164.5	MB-32-48-C1247
40	to 500	52	38	5	23	11	13	10	14	28	158	169	(M6 x 1 x 16L, Low head)
50	to 600	65	46.5	6	30	15	17	14	20	40	182	197	MB-50-48-C1249
63	to 600	75	56.5	6	30	15	17	14	20	40	182	197	(M8 x 1.25 x 18L, Low head)
80	to 800	95	72	8	42	23	26	22	30	60	228	251	MB-80-48BC1251
100	to 800	114	89	8	42	23	26	22	30	60	228	251	(M10 x 1.5 x 22L, Low head)
125	to 1000	136	110	10	50	28	30	25	32	64	267	295	M12 x 1.75 x 28L, Low head

Pivot Bracket/Double Clevis Pivot Bracket

Type

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

Double clevis pivot bracket



(mm)

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

Without Air Cushion

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

Rotating Angle

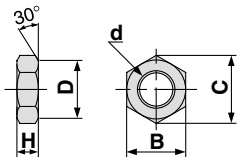
Bore size (mm)	A°	B°	A° + B° + 90°
32, 40	25°	45°	160°
50, 63	40°	60°	190°
80, 100	30°	55°	175°
125	30°	50°	170°

Method for longitudinal mounting of clevis pivot bracket

* In the case of w/o air cushion, it comes with rubber bumper. Besides, the overall length is longer than the cylinder with air cushion as follows, because the bumpers are attached to the both sides of the piston: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm.

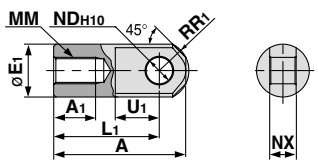
Accessory Bracket Dimensions

Rod end nut (Standard equipment)



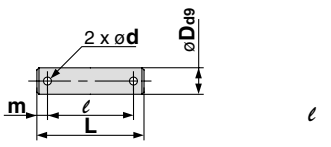
Part no.	Bore size (mm)	d	H	B	C	D
NT-03	32	M10 x 1.25	6	17	19.6	16.5
NT-04	40	M14 x 1.5	8	22	25.4	21
NT-05	50, 63	M18 x 1.5	11	27	31.2	26
NT-08	80	M22 x 1.5	13	32	37.0	31
NT-10	100	M26 x 1.5	16	41	47.3	39
NT-12M	125	M27 x 2	16	41	47.3	39

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	$10^{+0.058}_{0.0}$	$14^{-0.10}_{-0.30}$
I-04M	40	50	19	22	40	M14 x 1.5	12.5	19	$10^{+0.058}_{0.0}$	$14^{-0.10}_{-0.30}$
I-05M	50, 63	64	24	28	50	M18 x 1.5	16.5	24	$14^{+0.070}_{0.0}$	$20^{-0.10}_{-0.30}$
I-08M	80	80	26	40	60	M22 x 1.5	23.5	34	$22^{+0.084}_{0.0}$	$30^{-0.10}_{-0.30}$
I-10M	100	80	26	40	60	M26 x 1.5	23.5	34	$22^{+0.084}_{0.0}$	$30^{-0.10}_{-0.30}$
I-12M	125	119	36	46	92	M27 x 2	28.5	34	$25^{+0.084}_{0.0}$	$32^{-0.10}_{-0.30}$

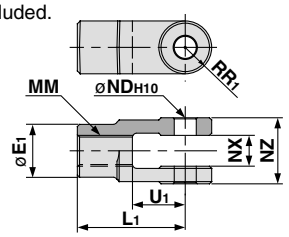
Knuckle joint pin Clevis pin



Part no.	Bore size (mm) Clevis	Bore size (mm) Knuckle	D_{d9}	L	ℓ	m	d (Drill through)	Cotter pin
CD-M03(1)	32, 40		$10^{-0.040}_{-0.076}$	44	36	4	3	ø3 x 18ℓ
CD-M05(1)	50, 63		$14^{-0.050}_{-0.093}$	60	51	4.5	4	ø4 x 25ℓ
CD-M08(1)	80, 100		$22^{-0.065}_{-0.117}$	82	72	5	4	ø4 x 35ℓ
IY-12(2)	125		$25^{-0.065}_{-0.117}$	79.5	69.5	5	4	ø4 x 40ℓ

Note 1) Cotter pins and flat washers are included.
Note 2) Only pins are included.

Y type double Knuckle joint



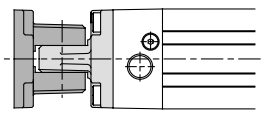
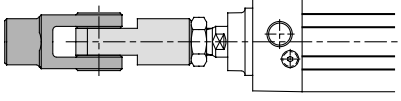
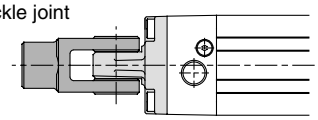
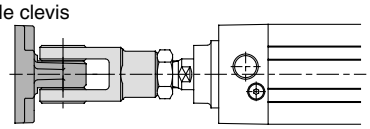
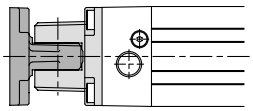
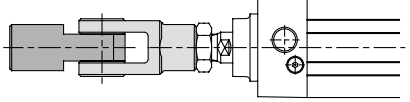
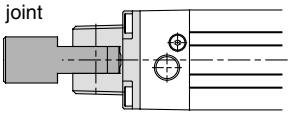
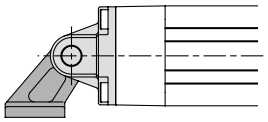
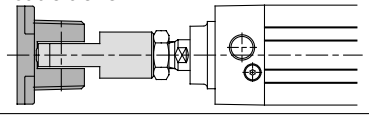
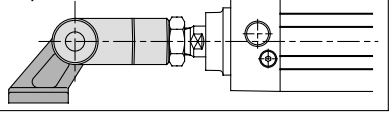
Part no.	Bore size (mm)	E_1	L_1	MM	R_1	U_1	ND_{H10}	NX	NZ
Y-03M(1)	32	20	30	M10 x 1.25	10	16	$10^{+0.058}_{0.0}$	$14^{+0.30}_{+0.10}$	$28^{-0.10}_{-0.30}$
Y-04M(1)	40	22	40	M14 x 1.5	11	19	$10^{+0.058}_{0.0}$	$14^{+0.30}_{+0.10}$	$28^{-0.10}_{-0.30}$
Y-05M(1)	50, 63	28	50	M18 x 1.5	14	24	$14^{+0.070}_{0.0}$	$20^{+0.30}_{+0.10}$	$40^{-0.10}_{-0.30}$
Y-08M(1)	80	40	65	M22 x 1.5	20	34	$22^{+0.084}_{0.0}$	$30^{+0.30}_{+0.10}$	$60^{-0.10}_{-0.30}$
Y-10M(1)	100	40	65	M26 x 1.5	20	34	$22^{+0.084}_{0.0}$	$30^{+0.30}_{+0.10}$	$60^{-0.10}_{-0.30}$
Y-12M(1)	125	46	100	M27 x 2	27	42	$25^{+0.084}_{0.0}$	$32^{+0.30}_{+0.10}$	$64^{-0.10}_{-0.30}$

Note 1) Pins, cotter pins, and flat washers are included.
Note 2) Pins and cotter pins are included.

Bracket Combinations

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

Cylinder mounting bracket \ Support bracket for work mounting side	Single clevis	Double clevis	Single knuckle joint	Double knuckle joint	Clevis pivot bracket
Single clevis	—	①	—	②	—
Double clevis	③	—	④	—	⑨
Single knuckle joint	—	⑤	—	⑥	—
Double knuckle joint	⑦	—	⑧	—	⑩

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

Square Tube Type Air Cylinder: Standard Type
Double Acting, Double Rod
Series MB1W
ø32, ø40, ø50, ø63, ø80, ø100, ø125

How to Order

MB1W L 32 □ – 150 □ – □

With auto switch MDB1W L 32 □ – 150 □ – M9BW □ – □

With auto switch
(Built-in magnet)

Mounting style

B	Basic style
L	Foot style
F	Flange style

Bore size

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

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
(Refer to page 341 for standard strokes.)

Suffix for cylinder

Rod boot	**Nil**	None
	J	Nylon tarpaulin (One end)
	JJ	Nylon tarpaulin (Both ends)
	K	Heat resistant tarpaulin (One end)
	KK	Heat resistant tarpaulin (Both ends)
Cushion	**Nil**	Air cushion at both ends
	N Note)	Without air cushion

Note) In the case of w/o air cushion, it comes with rubber bumper.
Besides, the overall length is longer than the cylinder with air cushion as follows, because the bumpers are attached to the both sides of the piston: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm.

Auto switch

Nil	Without auto switch

∗ For the applicable auto switch part numbers, refer to the table below.

Number of auto switches

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

Made to Order
(Refer to page 342 for details.)

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) MDB1WB40-100

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)	24V	5V, 12V	—	**M9NV**	**M9N**	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9PV**	**M9P**	●	●	●	○	○		
				2-wire		12V		**M9BV**	**M9B**	●	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)		5V, 12V		**M9NWV**	**M9NW**	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PWV**	**M9PW**	●	●	●	○	○		
				2-wire		12V		**M9BWV**	**M9BW**	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5V, 12V		**M9NAV** ∗∗	**M9NA** ∗∗	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PAV** ∗∗	**M9PA** ∗∗	○	○	●	○	○		
				2-wire		12V		**M9BAV** ∗∗	**M9BA** ∗∗	○	○	●	○	○	—	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	**A96V**	**A96**	●	—	●	—	—	IC circuit	—
			No	2-wire	24V	12V	100V	**A93V**	**A93**	●	—	●	—	—	—	Relay, PLC
							100V or less	**A90V**	**A90**	●	—	●	—	—	IC circuit	

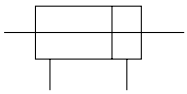
∗∗ Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

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

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

∗ Since there are other applicable auto switches than listed above, refer to page 350 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ Auto switches are shipped together (not assembled).

JIS Symbol
Double acting



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 (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 800: $^{+1.4}_{0}$						
Cushion Note)	Both ends (Air cushion) Note)						
Port size (Rc, NPT, G)	1/8	1/4		3/8		1/2	
Mounting	Basic style, Foot style, Flange style						

Note) In the case of w/o air cushion, it comes with rubber bumper.
Kinetic energy absorbable by the cushion mechanism is identical to double acting, single rod.

Standard Stroke

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

Intermediate strokes are available, too.
(Spacer is not used.)

Rod Boot Material

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

* Maximum ambient temperature for the rod boot itself.

Mounting Bracket Part No.

Bore size (mm)	32	40	50
Foot	MB-L03	MB-L04	MB-L05
Flange	MB-F03	MB-F04	MB-F05

Bore size (mm)	63	80	100
Foot	MB-L06	MB-L08	MB-L10
Flange	MB-F06	MB-F08	MB-F10

Bore size (mm)	125
Foot	MB-L12
Flange	MB-F12

Note) Order two foot brackets per cylinder.

Refer to pages 349 and 350 for cylinders with auto switches.

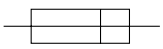
- Minimum auto switch mounting stroke
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Accessory

Mounting		Basic style	Foot style	Flange style
Standard equipment	Rod end nut	●	●	●
Option	Single knuckle joint	●	●	●
	Double knuckle (With pin)	●	●	●
	Rod boot	●	●	●

Theoretical Output

OUT ←
IN →



(N)

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm²)	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 output (N) = Pressure (MPa) x Piston area (mm²)

Mass

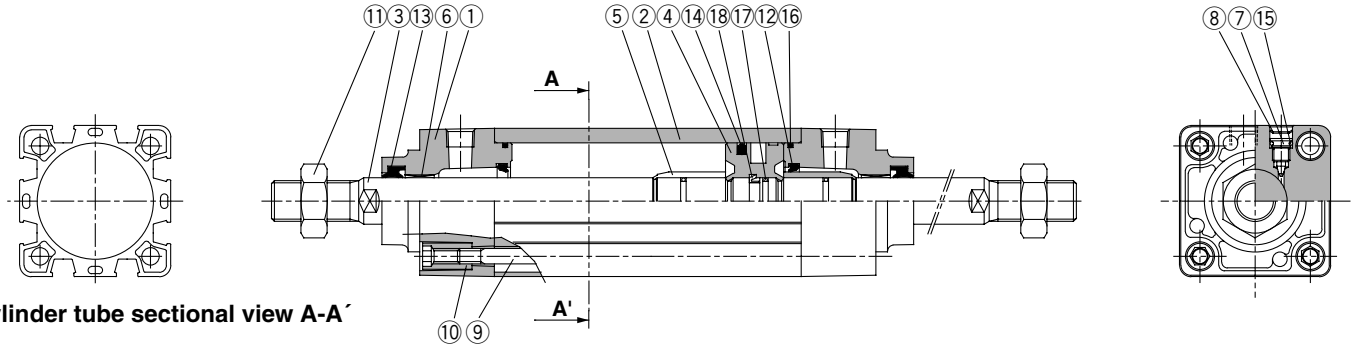
(kg)

Bore size (mm)		32	40	50	63	80	100	125
Basic mass	Basic style	0.59	0.82	1.39	1.72	3.22	4.27	6.68
	Foot style	0.71	0.96	1.61	2.0	3.72	4.93	8.76
	Flange style	0.88	1.19	1.84	2.51	4.67	7.58	10.86
Additional mass per each 50 mm of stroke	All mounting brackets	0.20	0.29	0.41	0.45	0.75	1.0	1.25
Accessory bracket	Single knuckle	0.15	0.23	0.26	0.26	0.60	0.83	1.10
	Double knuckle (With pin)	0.22	0.37	0.43	0.43	0.87	1.27	0.91

Calculation:
(Example) **MB1WB32-100** (Basic style/ø32, 100 st)
- Basic mass·····0.59 kg
- Additional mass·····0.20/50 stroke
- Cylinder stroke·····100 stroke

0.59 + 0.20 x 100/50 = 0.99 kg

Construction



Cylinder tube sectional view A-A´

Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum die-casted	Metallic painted
2	**Cylinder tube**	Aluminum alloy	Hard anodized
3	**Piston rod**	Carbon steel	Hard chrome plated
4	**Piston**	Aluminum alloy	Chromated
5	**Cushion ring**	Aluminum alloy	Anodized
6	**Bushing**	Lead-bronze casted	
7	**Cushion valve**	Steel wire	Nickel plated
8	**Retaining ring**	Spring steel	ø40 to ø100
9	**Tie-rod**	Carbon steel	Zinc chromated
10	**Tie-rod nut**	Carbon steel	Nickel plated
11	**Rod end nut**	Carbon steel	Nickel plated
12*	**Cushion seal**	Urethane	
13*	**Rod seal**	NBR	
14*	**Piston seal**	NBR	
15	**Cushion valve seal**	NBR	
16*	**Cylinder tube gasket**	NBR	
17	**Piston gasket**	NBR	
18	**Piston holder**	Urethane	

Replacement Parts/Seal Kit

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

∗ Seal kit includes ⑫ to ⑭, ⑯. Order the seal kit, based on each bore size.
∗ Seal kit includes a grease pack (ø32 to 50: 10 g, ø63, 80: 20 g, ø100: 30 g). Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g), **GR-S-020** (20 g)

Made to Order Specifications (For details, refer to pages 1395 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XB6	Heat resistant cylinder (150°C)
—XC3	Special port location
—XC4	With heavy duty scraper
—XC5	Heat resistant cylinder (110°C)
—XC6	Piston rod and rod end nut made of stainless steel
—XC7	Tie-rod, cushion valve, tie rod nut, etc. made of stainless steel
—XC22	Fluororubber seals
—XC30	Rod side trunnion
—XC35	With coil scraper
—X846	Fastener strips mounted on switch mounting grooves

Copper/Fluorine-free

20-MB1W Mounting style | Bore size | Port thread type – Stroke | Suffix

•Copper/fluorine-free
The type which prevents copper based ions from generating by changing the copper based materials into non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.

Specifications

Action	Double acting, Double rod
Bore size	ø32, ø40, ø50, ø63, ø80, ø100
Max. operating pressure	1.0 MPa
Min. operating pressure	0.05 MPa
Cushion	Air cushion *
Piping	Screw-in type
Piston speed	50 to 1000 mm/s
Mounting	Basic style, Axial foot style, Rod side flange style Head side flange style, Single clevis style Double clevis style, Center trunnion style

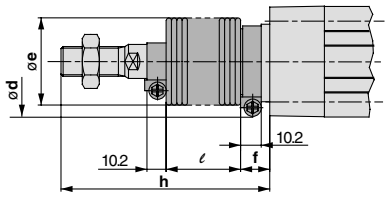
∗ Auto switch can be mounted.
∗ Use within the energy absorption. (Refer to page 334.)
∗ When there is no air cushion, the unit is equipped with rubber bumpers.

Water Resistant Air Cylinders

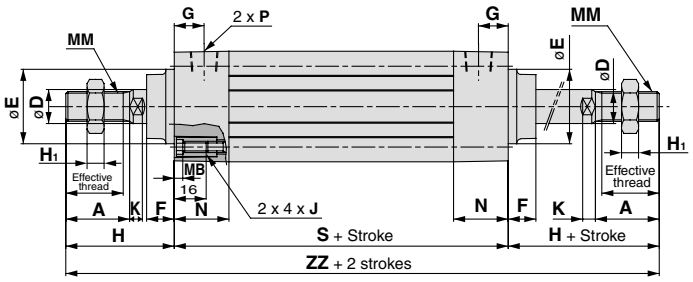
As compared to the standard cylinder, anti-coolant performance has been improved, and suitable for using under the atmosphere having coolant in the machine tools. Improved water resistant air cylinder, Series MB is also available, which is compliant for the environment having water splashed on the food machinery, or car washing machine, etc. Refer to page 899 for details.

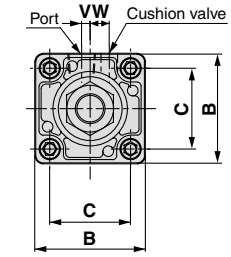
Standard Type

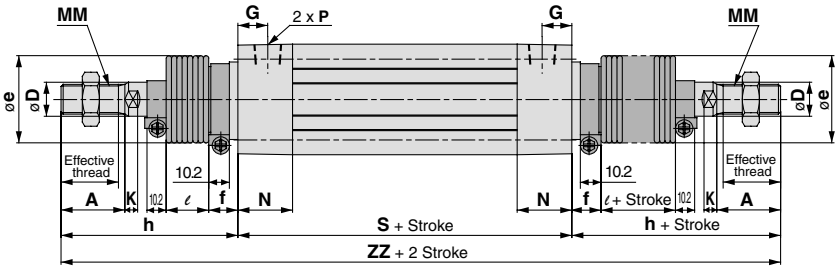
Basic style: (B)



With rod boot







* In the case of w/o air cushion, it comes with rubber bumper.
Besides, the overall length is longer than the cylinder with air cushion as follows, because the bumpers are attached to the both sides of the piston: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm.

** In the case of w/o air cushion, it comes with rubber bumper.
Besides, the overall length is longer than the cylinder with air cushion as follows, because the bumpers are attached to the both sides of the piston: ø32, ø40: +3 mm, ø50, ø63: +4 mm, ø80, ø100: +5 mm, ø125: +6 mm (In the case of trunnion style and trunnion pivot bracket).

Bore size (mm)	Stroke range	Effective thread length	Width across flats	A	B	C	D	Ee11	F	G	H1	H	MA	MB	J	K	MM	N	P	S*	V	W	ZZ*	Without Air Cushion S	Without Air Cushion ZZ
32	Up to 500	19.5	10	22	46	32.5	12	30	13	13	6	47	16	4	M6 x 1	6	M10 x 1.25	26.5	1/8	84	4	6.5	178	90	184
40	Up to 500	27	14	30	52	38	16	35	13	14	8	51	16	4	M6 x 1	6	M14 x 1.5	26.5	1/4	84	4	9	186	90	192
50	Up to 600	32	18	35	65	46.5	20	40	14	15.5	11	58	16	5	M8 x 1.25	7	M18 x 1.5	31	1/4	94	5	10.5	210	102	218
63	Up to 600	32	18	35	75	56.5	20	45	14	16.5	11	58	16	5	M8 x 1.25	7	M18 x 1.5	31	3/8	94	9	12	210	102	218
80	Up to 800	37	22	40	95	72	25	45	20	19	13	72	16	5	M10 x 1.5	10	M22 x 1.5	37.5	3/8	114	11.5	14	258	124	268
100	Up to 800	37	26	40	114	89	30	55	20	19	16	72	16	5	M10 x 1.5	10	M26 x 1.5	37.5	1/2	114	17	15	258	124	268
125	Up to 1000	50	27	54	136	110	32	60	27	19	16	97	20	6	M12 x 1.75	13	M27 x 2.0	38	1/2	120	17	15	314	132	316

With Rod Boot

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	—	—	—	—	—	73	86	98	111	136	161	186	—	—	—	—	—
40	56	41	23	12.5	25	37.5	50	75	100	125	—	—	—	—	—	81	94	106	119	144	169	194	—	—	—	—	—
50	64	51	25	12.5	25	37.5	50	75	100	125	150	—	—	—	—	89	102	114	127	152	177	202	227	—	—	—	—
63	64	51	25	12.5	25	37.5	50	75	100	125	150	—	—	—	—	89	102	114	127	152	177	202	227	—	—	—	—
80	68	56	29	12.5	25	37.5	50	75	100	125	150	175	200	—	—	101	114	126	139	164	189	214	239	264	276	—	—
100	76	61	29	12.5	25	37.5	50	75	100	125	150	175	200	—	—	101	114	126	139	164	189	214	239	264	276	—	—
125	82	75	27	10	20	30	40	60	80	100	120	140	160	180	200	120	130	140	150	170	190	210	230	250	270	290	310

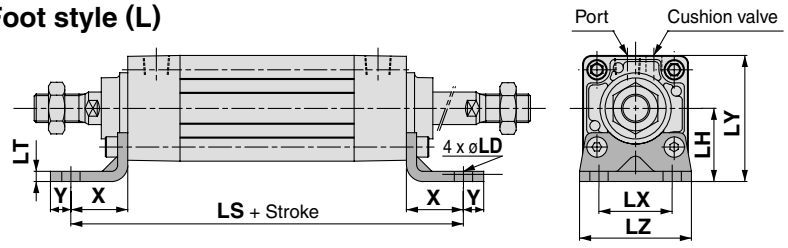
Note) ZZ indicates dimensions for double side rod boot.

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	—	—	—	—	—
40	246	272	296	322	372	422	472	—	—	—	—	—
50	272	298	322	348	398	448	498	548	—	—	—	—
63	272	298	322	348	398	448	498	548	—	—	—	—
80	316	342	366	392	442	492	542	592	642	692	—	—
100	316	342	366	392	442	492	542	592	642	692	—	—
125	340	360	380	400	440	480	520	560	600	640	680	720

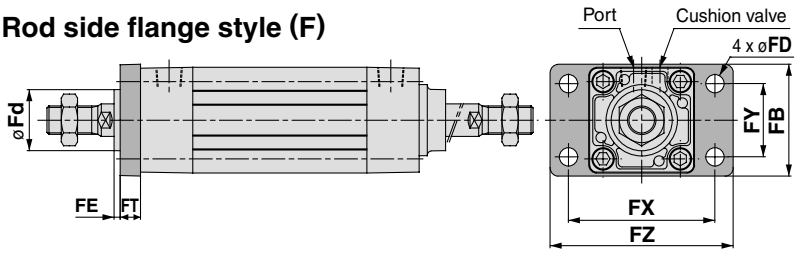
Standard Type: With Mounting Bracket

∗ Dimensions not indicated are the same as the standard type (page 343).

Foot style (L)



Rod side flange style (F)



Foot Style

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

Rod Side Flange Style

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

Square Tube Type Air Cylinder: Non-rotating Rod
Double acting, Single Rod
Series MB1K
ø32, ø40, ø50, ø63, ø80, ø100

How to Order

	MB1K L 32 ☐ – 50 ☐ – ☐
With auto switch	MDB1K L 32 ☐ – 50 ☐ – M9BW ☐ – ☐

With auto switch
(Built-in magnet)

Mounting style

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

Bore size

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

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
(Refer to page 346 for standard strokes.)

Auto switch

Nil	Without auto switch

∗ For the applicable auto switch part numbers, refer to the table below.

Number of auto switches

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

Made to Order
(Refer to page 346 for details.)

Suffix for cylinder

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

Note) In the case of w/o air cushion, it comes with rubber bumper.
Besides, the overall length is longer than the cylinder with air cushion as follows, because the bumpers are attached to the both sides of the piston: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm.

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) MDB1KB40-100

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model Perpendicular	Auto switch model In-line	Lead wire length (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)	24V	5V, 12V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9PV	M9P	●	●	●	○	○		
				2-wire		12V		M9BV	M9B	●	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)		5V, 12V		M9NWV	M9NW	●	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PWV	M9PW	●	●	●	○	○		
				2-wire		12V		M9BWV	M9BW	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5V, 12V		M9NAV **	M9NA **	○	○	●	○	○	IC circuit	
				3-wire (PNP)				M9PAV **	M9PA **	○	○	●	○	○		
				2-wire		12V		M9BAV **	M9BA **	○	○	●	○	○	—	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96V	A96	●	—	●	—	—	IC circuit	—
			No	2-wire	24V	12V	100V	A93V	A93	●	—	●	—	—	—	Relay, PLC
							100V or less	A90V	A90	●	—	●	—	—	IC circuit	

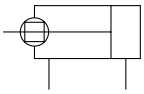
** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

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

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

∗ Since there are other applicable auto switches than listed above, refer to page 350 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ Auto switches are shipped together (not assembled).

JIS Symbol



Made to Order Specifications
(For details, refer to pages 1373 to 1565.)

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 pin and double knuckle pin made of stainless steel
—XC30	Rod side trunnion
—X846	Fastener strips mounted on switch mounting grooves

Mounting Bracket Part No.

Bore size (mm)	32	40	50
Foot (1)	MB-L03	MB-L04	MB-L05
Flange	MB-F03	MB-F04	MB-F05
Single clevis	MB-C03	MB-C04	MB-C05
Double clevis	MB-D03	MB-D04	MB-D05

Bore size (mm)	63	80	100
Foot (1)	MB-L06	MB-L08	MB-L10
Flange	MB-F06	MB-F08	MB-F10
Single clevis	MB-C06	MB-C08	MB-C10
Double clevis	MB-D06	MB-D08	MB-D10

Note 1) Order two foot brackets per cylinder.
Note 2) Accessories for each mounting bracket are as follows: Foot, flange, single clevis/body mounting bolt, double clevis/body mounting bolt, clevis pins, cotter pins and flat washer. Refer to page 339 for details.

Refer to pages 349 and 350 for cylinders with auto switches.

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

Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting, Single rod					
Fluid	Air					
Proof pressure	1.5 MPa					
Maximum operating pressure	1.0 MPa					
Minimum operating pressure	0.05 MPa					
Ambient and fluid temperature	Without auto switch –10 to 70°C (No freezing)					
	With auto switch –10 to 60°C (No freezing)					
Lubrication	Not required (Non-lube)					
Piston speed	50 to 1000 mm/s					
Stroke length tolerance Note)	Up to 250: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$, 1001 to 1500: $^{+1.8}_{0}$					
Cushion	Both ends (Air cushion) Note)					
Port size (Rc, NPT, G)	1/8	1/4		3/8		1/2
Mounting	Basic style, Foot style, Rod side flange style, Head side flange style Single clevis style, Double clevis style					

Rod non-rotating accuracy	ø32, ø40	±0.5°
	ø50, ø63	±0.5°
	ø80, ø100	±0.3°

Allowable rotational torque (N·m or less)	ø32	0.25	ø80	0.79
	ø40	0.45	ø100	0.93
	ø50, ø63	0.64	—	—

Note) In the case of w/o air cushion, it comes with rubber bumper.
Kinetic energy absorbable by the cushion mechanism is identical to double acting, single rod.

Accessory

Mounting		Basic style	Foot style	Rod side Flange style	Head side flange style	Single clevis style	Double clevis style
Standard equipment	Rod end nut	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●
Option	Single knuckle joint	●	●	●	●	●	●
	Double knuckle joint (With pin)	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●

Standard Stroke

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

Intermediate strokes are available, too.
(Spacer is not used.)

Rod Boot Material

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

* Maximum ambient temperature for the rod boot itself.

Theoretical Output

OUT side is the same value as double acting, single rod. But, IN side is different. For IN side, refer to the table below.

Bore size (mm)	Piston area (mm^2)	Bore size (mm)	Piston area (mm^2)
32	675	63	2804
40	1082	80	4568
50	1651	100	7223

Theoretical output (N) = Pressure (MPa) x Piston area (mm^2)

Mass

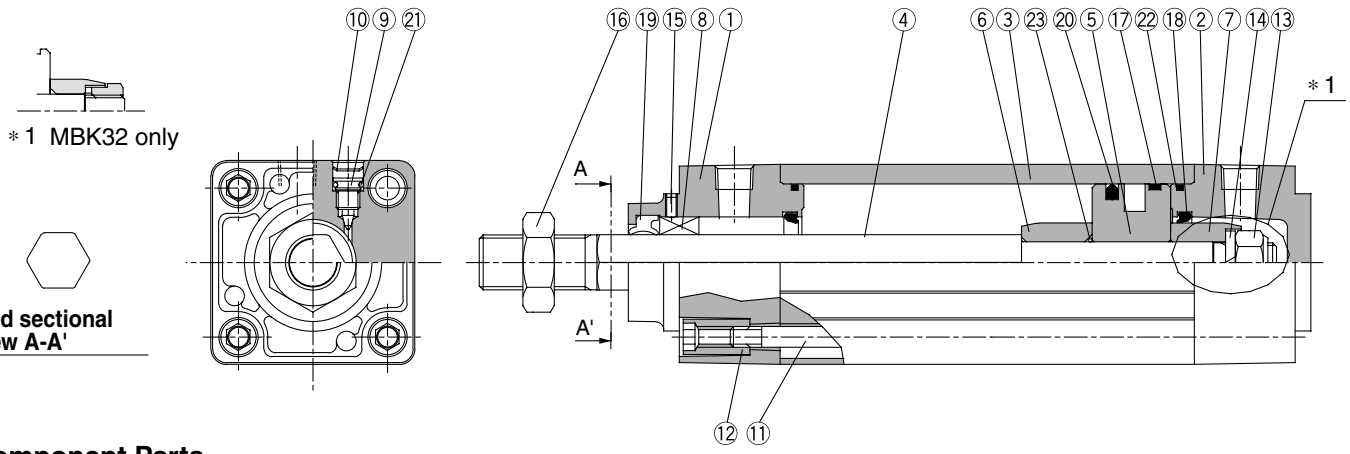
(kg)

Bore size (mm)		32	40	50	63	80	100
Basic mass	Basic style	0.53	0.69	1.26	1.58	2.69	3.86
	Foot style	0.65	0.83	1.48	1.86	3.19	4.52
	Flange style	0.82	1.06	1.69	2.37	4.14	7.17
	Single clevis style	0.78	0.92	1.60	2.21	3.8	7.03
	Double clevis style	0.79	0.96	1.69	2.37	4.09	7.55
Additional mass per each 50 mm of stroke	All mounting brackets	0.16	0.21	0.33	0.37	0.56	0.72
Accessory bracket	Single knuckle	0.15	0.23	0.26	0.26	0.60	0.83
	Double knuckle (With pin)	0.22	0.37	0.43	0.43	0.87	1.27

Calculation:
(Example) **MB1K32-100** (Basic style/ø32, 100 st)
- Basic mass·····0.53 kg
- Additional mass·····0.16/50 stroke
- Cylinder stroke·····100 stroke

0.53 + 0.16 x 100/50 = 0.85 kg

Construction



Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum die-casted	Metallic painted
2	**Head cover**	Aluminum die-casted	Metallic painted
3	**Cylinder tube**	Aluminum alloy	Hard anodized
4	**Piston rod**	Stainless steel	
5	**Piston**	Aluminum alloy	Chromated
6	**Cushion ring A**	Rolled steel	
7	**Cushion ring B**	Rolled steel	
8	**Non-rotating guide**	Oil-impregnated sintered alloy	
9	**Cushion valve**	Steel wire	Nickel plated
10	**Retaining ring**	Spring steel	ø40 to ø100
11	**Tie-rod**	Carbon steel	Zinc chromated
12	**Tie-rod nut**	Carbon steel	Nickel plated

No.	Description	Material	Note
13	**Piston nut**	Rolled steel	
14	**Spring washer**	Steel wire	
15	**Set screw**	Steel wire	
16	**Rod end nut**	Carbon steel	Nickel plated
17	**Wear ring**	Resin	
18*	**Cushion seal**	Urethane	
19*	**Rod seal**	NBR	
20*	**Piston seal**	NBR	
21	**Cushion valve seal**	NBR	
22*	**Cylinder tube gasket**	NBR	
23	**Piston gasket**	NBR	

Replacement Parts/Seal Kit

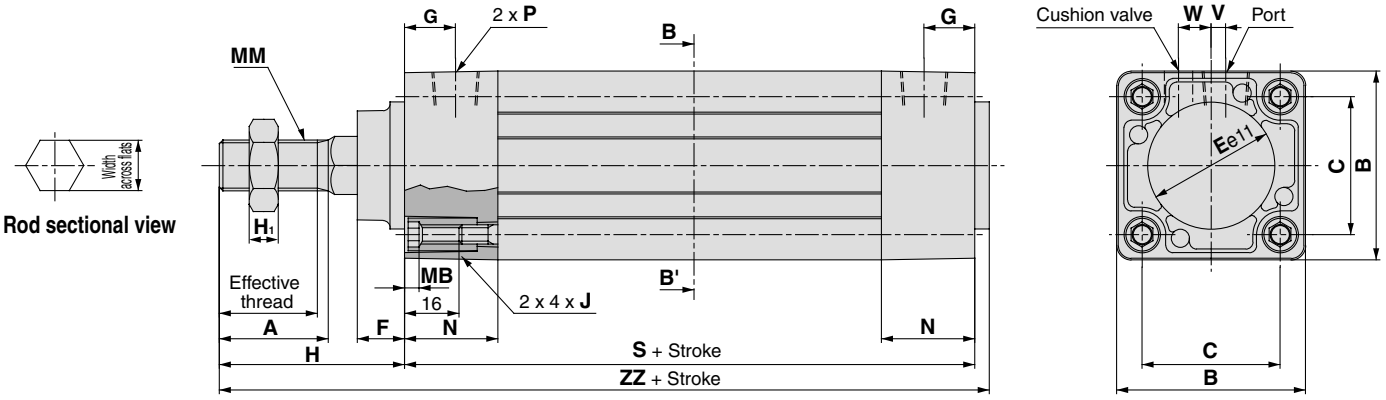
Bore size (mm)	Kit no.	Contents
32	MBK32 — PS	Set of the above nos. ⑱, ⑲, ⑳, ㉒
40	MBK40 — PS	
50	MBK50 — PS	
63	MBK63 — PS	
80	MBK80 — PS	
100	MBK100 — PS	

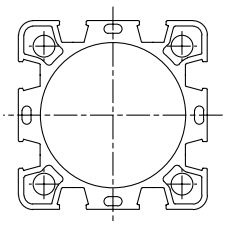
∗ Seal kit includes 18 to 20, 22. Order the seal kit, based on each bore size.
∗ Seal kit includes a grease pack (ø32 to 50 : 10 g, ø63, 80 : 20 g, ø100 : 30 g). Order with the following part number when only the grease pack is needed.
Grease pack part number : GR-S-010 (10 g)**, GR-S-020** (20 g)

∗ In the case of w/o air cushion, it comes with rubber bumper.
Besides, the overall length is longer than the cylinder with air cushion as follows, because the bumpers are attached to the both sides of the piston: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm.

Standard Type

Basic style: (B)





Cylinder tube sectional view B-B´

Bore size (mm)	Stroke range	Effective thread length	Width across flats	A	B	C	E	F	G	H_1	MB	J	MM	N	P	S	V	W	H	ZZ
32	Up to 500	19.5	12.2	22	46	32.5	30	13	13	6	4	M6 x 1	M10 x 1.25	26.5	1/8	84	4	6.5	47	135
40	Up to 500	27	14.2	30	52	38	35	13	14	8	4	M6 x 1	M14 x 1.5	26.5	1/4	84	4	9	51	139
50	Up to 600	32	19	35	65	46.5	40	14	15.5	11	5	M8 x 1.25	M18 x 1.5	31	1/4	94	5	10.5	58	156
63	Up to 600	32	19	35	75	56.5	45	14	16.5	11	5	M8 x 1.25	M18 x 1.5	31	3/8	94	9	12	58	156
80	Up to 800	37	23	40	95	72	45	20	19	13	5	M10 x 1.5	M22 x 1.5	37.5	3/8	114	11.5	14	72	190
100	Up to 800	37	27	40	114	89	55	20	19	16	5	M10 x 1.5	M26 x 1.5	37.5	1/2	114	17	15	72	190

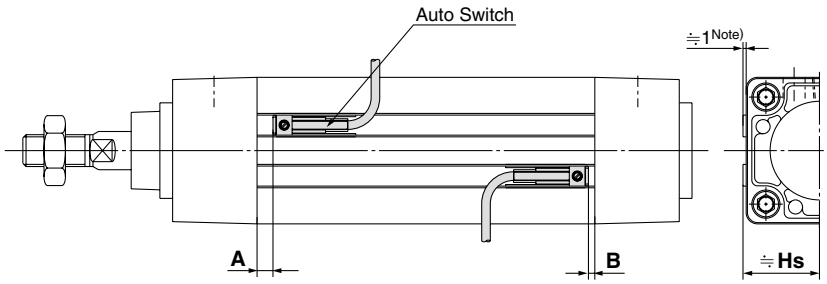
Minimum Auto Switch Mounting Stroke

(mm)

Auto switch model	No. of auto switch mounted	ø32	ø40	ø50	ø63	ø80	ø100	ø125
D-A9□ D-A9□V	2 (Different surfaces, Same surface)	15						
	1	15				10		
	n	15 + 10 (n−2)		15 + 15 (n−2)				15 + 20 (n−2)
D-M9□ D-M9□V	2 (Different surfaces, Same surface)	15				10		
	1	15				10		
	n	15 + 5 (n−2)				10 + 10 (n−2)		
D-M9□W D-M9□WV D-M9□AL D-M9□AVL	2 (Different surfaces, Same surface)	15				10		
	1	15				10		
	n	15 + 10 (n−2)				10 + 10 (n−2)		10 + 15 (n−2)
D-Z7□ D-Z80	2 (Different surfaces, Same surface)	25				15		
	1	25				15		
	n	25 + 15 (n−2)				15 + 15 (n−2)		15 + 20 (n−2)
D-Y59□/Y69□ D-Y7P/Y7PV	2 (Different surfaces, Same surface)	25				15		
	1	25				15		
	n	25 + 10 (n−2)				15 + 10 (n−2)		15 + 15 (n−2)
D-Y7□W D-Y7□WV	2 (Different surfaces, Same surface)	25				20		
	1	25				20		
	n	25 + 10 (n−2)				20 + 10 (n−2)		20 + 15 (n−2)
D-Y7BAL	2 (Different surfaces, Same surface)	30				20		
	1	30				20		
	n	30 + 10 (n−2)				20 + 10 (n−2)		20 + 15 (n−2)

Note 1) n = 3, 4, 5 ···
Note 2) Center trunnion type is not included.

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



Proper Auto Switch Mounting Position

(mm)

Auto switch model / Bore size	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□AL D-M9□AVL		D-A9□ D-A9□V		D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BAL	
	A	B	A	B	A	B
32	9	6	5	2	4	1
40	9	6	5	2	4	1
50	9	7	5	3	4	2
63	9	7	5	3	4	2
80	12.5	10.5	8.5	6.5	7.5	5.5
100	12.5	10.5	8.5	6.5	7.5	5.5
125	14.5	14.5	10.5	10.5	9.5	9.5

Note) Adjust the auto switch after confirming the operation to set actually.

Auto Switch Mounting Height

(mm)

Auto switch model / Bore size	D-A9□V D-Y69□ D-Y7PV D-Y7□WV	D-M9□V D-M9□WV D-M9□AVL
	Hs	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 in-line types D-A9□/M9□/M9□W/M9□AL/Z7□/Z80/Y59□/Y7P/Y7□W/Y7BAL are mounted.

Operating Range

(mm)

Auto switch model	Bore size						
	32	40	50	63	80	100	125
D-A9□/A9□V	7	7.5	8	9	9.5	10.5	12.5
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	4	4.5	5	6	6	6	7
D-Z7□Z80	10	10	10	11	11	12	14
D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BAL	6.5	6.5	6	7	7	8	7

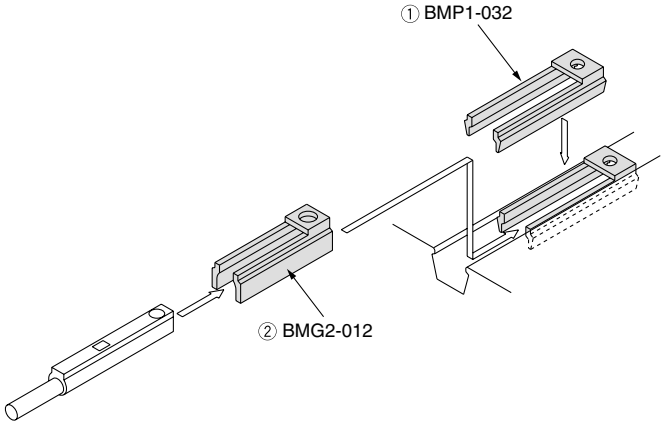
∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion.) There may be the case it will vary substantially depending on an ambient environment.

Switch Mounting Bracket: Part No.

Auto switch model	Bore size (mm)
	ø32 to ø125
D-A9□/A9□V D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	Note) ① BMP1-032 ② BMG2-012
D-Z7□/Z80 D-Y5□/Y7P D-Y7□W D-Y6□/Y7PV D-Y7□WV D-Y7BAL	① BMP1-032

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

D-A9□ (V)/M9□ (V)/M9□W (V)/M9□A (V)L



Besides the models listed in How to Order, the following auto switches are applicable.
Refer to pages 1263 to 1371 for the detailed specifications.

Auto switch type	Part no.	Electrical entry (Entry direction)	Features
Reed	D-Z73, Z76	Grommet (in-line)	–
	D-Z80		With indicator light
Sold state	D-Y69A, Y69B, Y7PV	Grommet (perpendicular)	–
	D-Y7NWV, Y7PWV, Y7BWV		Diagnosis indication (2 colors)
	D-Y59A, Y59B, Y7P	Grommet (in-line)	–
	D-Y7NW, Y7PW, Y7BW		Diagnosis indication (2 colors)

∗ For solid state switches, auto switches with a pre-wired connector are also available. Refer to pages 1328 and 1329 for details.
∗ Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H/Y7G/Y7H types) are also available. Refer to pages 1290 and 1292 for details.

Specific Product Precautions

Be sure to read before handling.
Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Adjustment

⚠ Warning

1. Do not open the cushion valve beyond the stopper.
Crimping (ø32) or a snap ring (ø40 to ø100) is provided to prevent the accidental removal of the cushion valve. Do not open the valve beyond the mechanism.
If not operated in accordance with the above precautions, the cushion valve may be ejected from the cover when air pressure is supplied.

Bore size (mm)	Cushion valve width across flats	Hexagon wrench
32, 40	2.5	JIS 4648 Hexagon wrench key 2.5
50, 63	3	JIS 4648 Hexagon wrench key 3
80, 100	4	JIS 4648 Hexagon wrench key 4
125	4	JIS 4648 Hexagon wrench key 4

2. Use the air cushion at the end of cylinder stroke.
When it is intended to use the cushion valve in the fully open position, select the type with damper. If this is not done, the tie-rods or piston rod assembly will be damaged.

3. When replacing mounting bracket, use a hexagon wrench.

Bore size (mm)		Bolt	Width across flats	Tightening torque (N·m)
32, 40		MB-32-48-C1247	4	5.1
50, 63		MB-50-48-C1249	5	11
80, 100	Foot	MB-80-48AC1251	6	25
	Others	MB-80-48BC1251		
125	Foot	M12 x 1.75 x 25L	8	30.1
	Others	M12 x 1.75 x 28L		

4. When replacing a bracket, tie-rod nuts on the cylinder body may become loosened.
After retightening the tie-rod nuts with the proper tightening torque (Refer to Adjustment 3.), mount a mounting bracket.

Non-rotating rod type (Double acting, Single rod)

Operating Precautions

⚠ Caution

1. Avoid using the air cylinder in such a way that more than allowable rotational torque would be applied to the piston rod.
If rotational torque is applied, the non-rotating guide will deform, thus affecting the non-rotating accuracy. This may cause damage to machinery.

Mounting/Piping

⚠ Caution

1. Mounting a workpiece on rod end
To screw a bracket or a nut onto the threaded portion at the tip of the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes.
Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.