Air Cylinder

Series MB

ø32, ø40, ø50, ø63, ø80, ø100, ø125

Variations

Standard/Double acting

		Bore	Standard stroke (mm)	Built-in-magnet	Rod boot	Mounting	Accessory	
Single rod *Series MB*	JIS Symbol	32	25 50 75 100 125 150 175 200 250 300 350 400 450 500 600 700 800 900 1000	●	●	Basic Axial foot Rod side flange Head side flange Single clevis Double clevis Center trunnion	**Standard** Rod end nut **Option** Knuckle joint pin Clevis pin Single knuckle joint Double knuckle joint Trunnion pivot bracket Double clevis pivot bracket	Page 290
Double rod *Series MBW*	JIS Symbol	40		●	●	Basic Foot Flange Center trunnion	**Standard** Rod end nut **Option** Kuckle joint pin Single knuckle joint Double knuckle joint Trunnion pivot bracket	Page 299
* Non-rotating rod *Series MBK*	JIS Symbol	50		●	●	Basic Axial foot Rod side flange Head side flange Single clevis Double clevis Center trunnion	**Standard** Rod end nut **Option** Knuckle joint pin Clevis pin Single knuckle joint Double knuckle joint Trunnion pivot bracket Double clevis pivot bracket	Page 305
		63						
* Low friction *Series MB□Q*	JIS Symbol	80	(1)	●		Basic Axial foot Rod side flange Head side flange Single clevis Double clevis Center trunnion	**Standard** Rod end nut **Option** Knuckle joint pin Clevis pin Single knuckle joint Double knuckle joint Trunnion pivot bracket Double clevis pivot bracket	Page 309
* End lock *Series MBB*		100	(1)	●	●	Basic Axial foot Rod side flange Head side flange Single clevis Double clevis Center trunnion	**Standard** Rod end nut Locking release bolt (N only) **Option** Knuckle joint pin Clevis pin Single knuckle joint Double knuckle joint Trunnion pivot bracket Double clevis pivot bracket	Page 315
		125						

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

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

Symbol	Specification	Applicable bore size	MB (Standard) Double acting Single rod Air ø32 to ø100	MB (Standard) Double acting Single rod Air ø125	MB (Standard) Double acting Single rod Rubber ø32 to ø100	MB (Standard) Double acting Single rod Rubber ø125	MB (Standard) Double acting Double rod Air ø32 to ø100	MB (Standard) Double acting Double rod Air ø125	MB (Standard) Double acting Double rod Rubber ø32 to ø100	MB (Standard) Double acting Double rod Rubber ø125	MBK (Non-rotating) Double acting Single rod Air ø32 to ø100	MBK (Non-rotating) Double acting Single rod Rubber ø32 to ø100	MBK (Non-rotating) Double acting Double rod Air ø32 to ø100	MBK (Non-rotating) Double acting Double rod Rubber ø32 to ø100	MB□Q (Low friction) Single rod —	MBB (End lock) Single rod Air
Standard	Standard	ø32 to ø125	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Long st	Long stroke		●	●	●	●	●	○	●	○	●	●	●	●	○	○
D	Built-in magnet		●	●	●	●	●	●	●	●	●	●	●	●	●	●
MB□-□ J K	With rod boot		●	●	●	●	●	●	●	●	●	●	●	●	○	●
10-	Clean series		●	○	●	○	●	○	●	○	○	○	○	○	○	○
20-	Copper and Fluorine-free		●	○	●	○	●	○	●	○	—	—	—	—	—	○
MB□ R V	Water resistant		●	○	●	○	●	○	●	○	—	—	—	—	○	○
XA□	Change of rod end shape	ø32 to ø125	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	○	◎	◎
XB5	Oversized rod cylinder		◎	○	○	○	○	○	○	○	○	○	○	○	○	○
XB6	Heat-resistant cylinder (–10 to 150°C)		◎	○	○	○	◎	○	○	○	○	○	○	○	—	○
XB13	Low-speed cylinder (5 to 50 mm/s)		◎	○	◎	○	○	○	○	○	○	○	○	○	—	○
XC3	Special port position		◎	○	◎	○	◎	○	◎	○	◎	◎	◎	◎	◎	○
XC4	With heavy duty scraper		◎	○	◎	○	◎	○	◎	○	—	—	—	—	—	○
XC5	Heat-resistant cylinder (–10 to 110°C)		◎	○	○	○	◎	○	○	○	○	○	○	○	—	○
XC6	Made of stainless steel		◎	◎	◎	◎	◎	○	◎	○	◎	◎	◎	◎	◎	○
XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel		◎	○	◎	○	◎	○	◎	○	◎	◎	◎	◎	◎	◎
XC8	Adjustable stroke cylinder/Adjustable extension type		◎	○	◎	○	—	—	—	—	◎	◎	—	—	○	○
XC9	Adjustable stroke cylinder/Adjustable retraction type		◎	○	◎	○	—	—	—	—	◎	◎	—	—	○	○
XC10	Dual stroke cylinder/Double rod type		◎	○	◎	○	—	—	—	—	◎ Note 2)	◎ Note 2)	—	—	○	◎
XC11	Dual stroke cylinder/Single rod type		◎	○	◎	○	—	—	—	—	○	○	—	—	○	○
XC12	Tandem cylinder		◎	○	◎	○	○	○	○	○	○	○	○	○	○	○
XC14	Change of trunnion bracket mounting position		◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	○	◎	◎ Note 1)
XC22	Fluororubber seal		◎	○	◎	○	◎	○	◎	○	○	○	○	○	—	○
XC27	Double clevis pins made of stainless steel (Stainless steel 304)		◎	◎	◎	◎	—	—	—	—	◎	◎	○	○	◎	◎
XC29	Double knuckle joint with spring pin		◎	○	◎	○	○	○	○	○	○	○	○	○	◎	◎
XC30	Rod side trunnion		◎	○	◎	○	◎	○	◎	○	◎	◎	◎	◎	◎	◎
XC35	With coil scraper		◎	○	◎	○	◎	○	◎	○	—	—	—	—	○	○
XC59	Fluororubber seal, Built-in hard plastic magnet		◎	○	◎	○	○	○	○	○	○	○	○	○	○	○
XC65	XC6 + XC7 specifications		◎	○	◎	○	○	○	○	○	○	○	○	○	○	○
X1184	Cylinder with reed, heat-resistant auto switch		◎	○	○	○	○	○	○	○	—	—	—	—	—	○

Note 1) Simple specials except XC14A and XC14B.
Note 2) XC10 specification for Series MBK is the non-rotating type on both sides. When the non-rotating type is applicable on one side, submit a special order request form.

Series MB, MBW, MBK, MB□Q, MBB

Double acting, Single rod
Double acting, Double rod
Double acting, Non-rotating rod
Low friction
End lock type

ø32, ø40, ø50, ø63, ø80, ø100, ø125

Improved cushion capacity

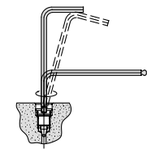
"Floating" cushion seal design eliminates piston rod "bouncing" due to cracking pressure at beginning of stroke.

Increased kinetic energy absorption

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

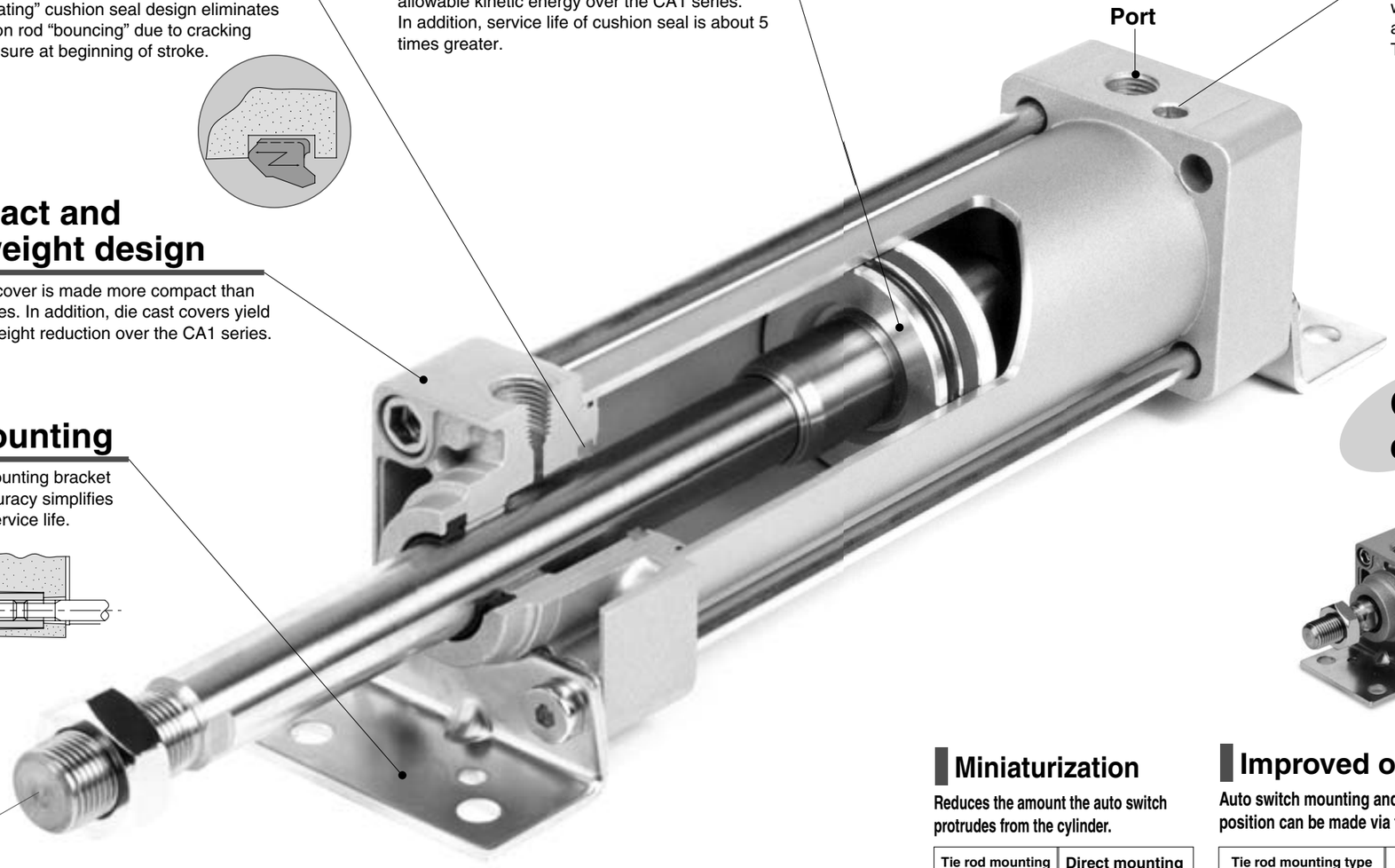
Easy adjustment of cushion valve

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



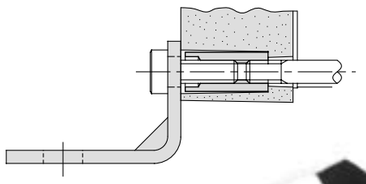
Compact and lightweight design

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



Accurate mounting

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



Minimal rod deflection

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

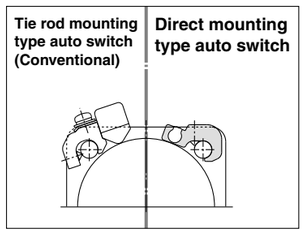
Compact type auto switches can be fitted.

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

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

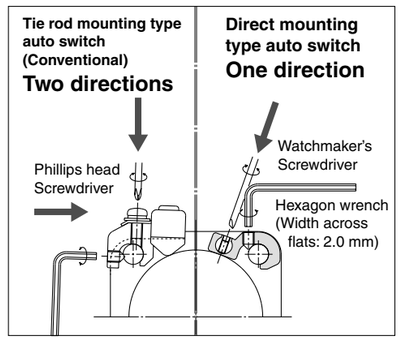
Miniaturization

Reduces the amount the auto switch protrudes from the cylinder.



Improved operability

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



Auto switch inventory control can be simplified.

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

Air Cylinder: Single Rod

Series MB

ø32, ø40, ø50, ø63, ø80, ø100, ø125

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

How to Order

MB L 32 □ – 50 □ – □

With auto switch MDB L 32 □ – 50 □ – M9BW □ – □

With auto switch
(Built-in magnet)

Made to Order
For details, refer to page 291.

Mounting

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

Bore size

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

Auto switch

Nil	Without auto switch

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

Number of auto switches

Nil	2
S	1
3	3
n	n

Rod boot/Cushion

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

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

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to page 291 for standard strokes.

Built-in Magnet Cylinder Model

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

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

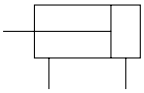
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Tie-rod mounting	Auto switch model: Band mounting	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet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

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

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

∗ Besides the above models, there are some other auto switches that are applicable. For detailed information, please refer to page 327.
∗ Solid state auto switches are also available with a pre-wired connector. Refer to pages 1328 and 1329 for details. Refer to pages 1317-1 and 1317-2 for D-P3DW□.
∗ D-A9□/M9□□□/P3DW□ auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled for D-A9□/M9□□□ when being shipped.)

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						
Max. operating pressure	1.0 MPa						
Min. operating pressure	0.05 MPa						
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)						
Lubrication	Not required (Non-lube)						
Operating piston speed	50 to 1000 mm/s						50 to 700 mm/s
Allowable stroke tolerance	up to 250: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$, 1001 to 1500: $^{+1.8}_{0}$						
Cushion Note 1)	Both ends (Air cushion)						
Port size (Rc, NPT, G)	1/8	1/4		3/8		1/2	
Mounting	Basic, Foot, Rod side flange, Head side flange, Single clevis, Double clevis, Center trunnion						

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

Standard Stroke

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

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

Accessory

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

Material of Rod Boot

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

* Max. ambient temperature for rod boot itself.

Mounting Bracket Part No.

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

Note 1) Two foot brackets required for one cylinder.
Note 2) Accessories for each mounting bracket are as follows:
Foot, flange, single clevis/body mounting bolt, double clevis/body mounting bolt, clevis pins, flat washer and cotter pins. → Refer to page 298 for details.

Made to Order Specifications
(For details, refer to pages 1373 to 1498 and 1515.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB5	Oversized rod cylinder
-XB6	Heat resistant cylinder (150°C)
-XB13	Low speed cylinder (5 to 50 mm/s)
-XC3	Special port position
-XC4	With heavy duty scraper
-XC5	Heat resistant cylinder (110°C)
-XC6	Piston rod and rod end nut made of stainless steel
-XC7	Tie rod, cushion valve, tie rod nut, etc. made of stainless steel
-XC8	Adjustable stroke cylinder/Adjustable extend stroke
-XC9	Adjustable stroke cylinder/Adjustable retract stroke
-XC10	Dual stroke cylinder/Double rod
-XC11	Dual stroke cylinder/Single rod
-XC12	Tandem cylinder
-XC14	Change of trunnion bracket mounting position
-XC22	Fluororubber seals
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC29	Double knuckle joint with spring pin
-XC30	Rod side trunnion
-XC35	With coil scraper
-XC59	Fluororubber seal, Built-in hard plastic magnet
-XC65	XC6 + XC7 specifications
-X1184	Cylinder with reed, heat-resistant auto switch

Refer to pages 322 and 327 for cylinders with auto switches.

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

Theoretical Force

(Unit: N) OUT IN

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

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

Mass/Aluminum Tube

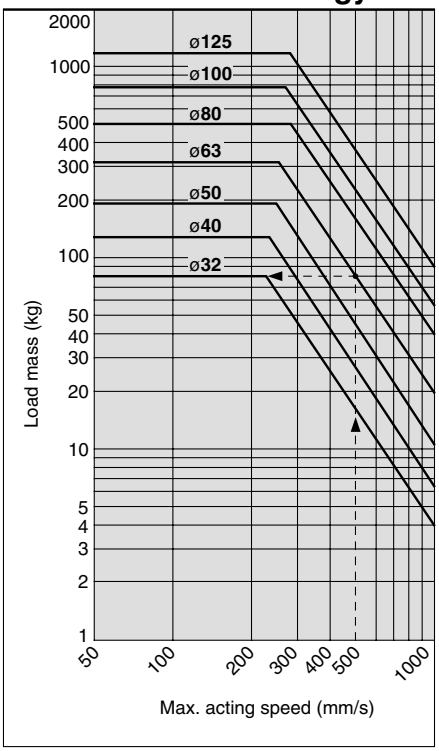
(kg)

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

Calculation example: **MBB32-100** (Basic, ø32, 100 st)
- Basic mass ····· 0.50 (Basic, ø32)
- Additional mass ····· 0.11/50 stroke
- Cylinder stroke ····· 100 stroke

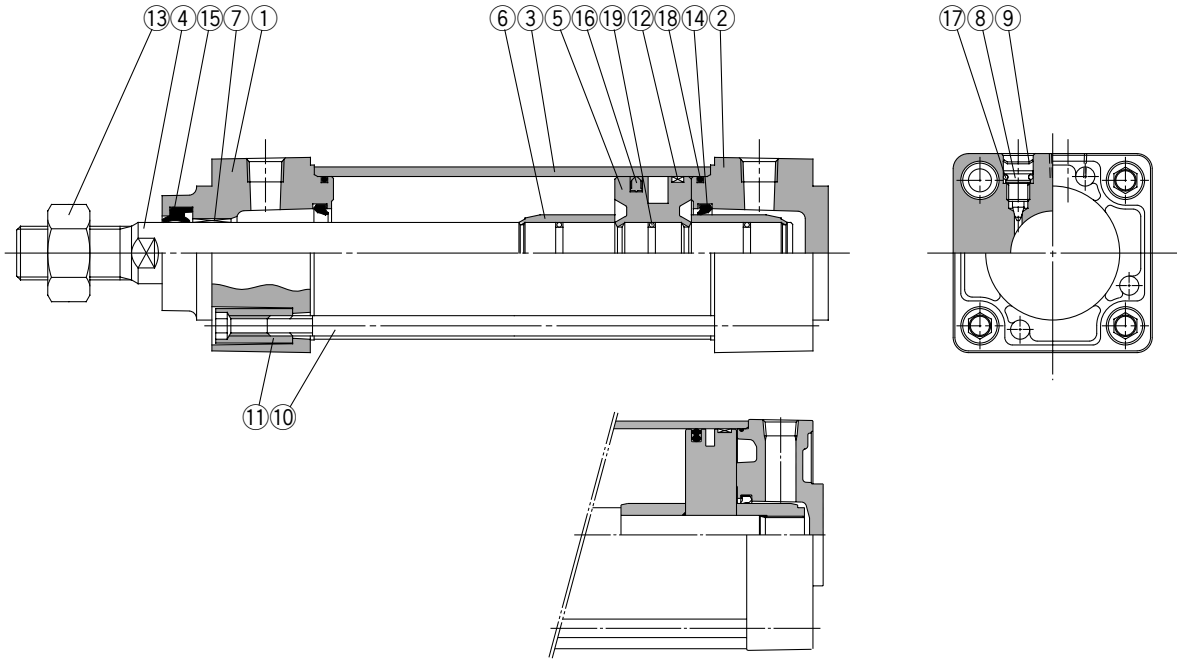
0.50 + 0.11 x 100/50 = 0.72 kg

Allowable Kinetic Energy



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

Construction



MB125

Component Parts

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

Replacement Parts/Seal Kit

Bore size (mm)	Kit no.	Contents
32	MB32-PS	Set of the No. ⑭, ⑮, ⑯ and ⑱
40	MB40-PS	
50	MB50-PS	
63	MB63-PS	
80	MB80-PS	
100	MB100-PS	
125	MB125-PS	

* Seal kits consist of items ⑭, ⑮, ⑯ and ⑱, and can be ordered by using the seal kit number corresponding to each bore size.
* Trunnion type should not be disassembled. (Refer to page 328.)
* Seal kit includes a grease pack (ø32 to 50: 10 g, ø63, 80: 20 g, ø100, 125: 30 g).
  Order with the following part number when only the grease pack is needed.
  Grease pack part number: GR-S-010 (10 g), **GR-S-020** (20 g)

Water Resistant Air Cylinder

Water resistant air cylinders are also available in Series MB, which are suitable for use on machine tools, where exposure to coolant is possible and applicable for food machinery and automobile washing equipment in an environment where water splashes. Please refer to page 899 for more information.

Copper/Fluorine-free

20 – MB | Mounting bracket | Bore size | Port thread type | – | Stroke | Suffix

Copper/Fluorine-free

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

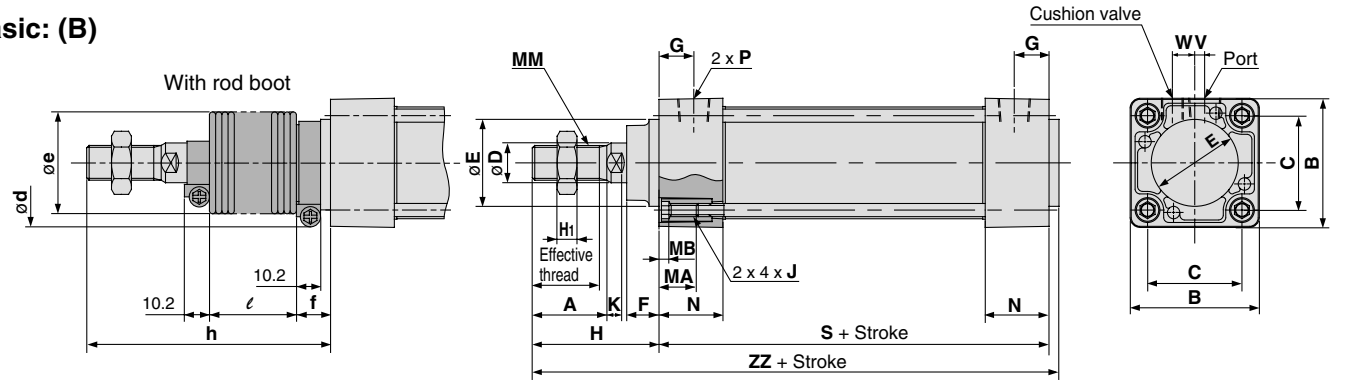
Specifications

Action	Double acting single 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 piping
Operating piston speed	50 to 1000 mm/s
Mounting bracket	Basic, Axial foot, Rod side flange, Head side flange, Single clevis, Double clevis, Center trunnion

* Auto switch capable.
★The cylinder should be operated within its allowable kinetic energy. (Refer to page 292.)
* In case of types with no air cushion, a rubber bumper is used.

Without Mounting Bracket

Basic: (B)



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

With Rod Boot

(mm)

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

(mm)

Bore size (mm)	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
32	73	86	98	111	136	161	186	—	—	—	—	—
40	81	94	106	119	144	169	194	—	—	—	—	—
50	89	102	114	127	152	177	202	227	—	—	—	—
63	89	102	114	127	152	177	202	227	—	—	—	—
80	101	114	126	139	164	189	214	239	264	289		
100	101	114	126	139	164	189	214	239	264	289	—	—
125	120	130	140	150	170	190	210	230	250	270	290	310

Without Air Cushion

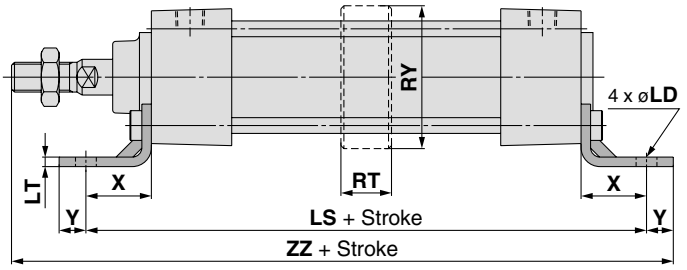
Bore size (mm)	S	ZZ
32	90	141
40	90	145
50	102	164
63	102	164
80	124	200
100	124	200
125	132	235

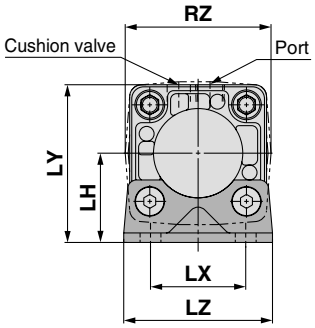
* Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston;
ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

With Mounting Bracket

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

Foot: (L)





Foot (mm)

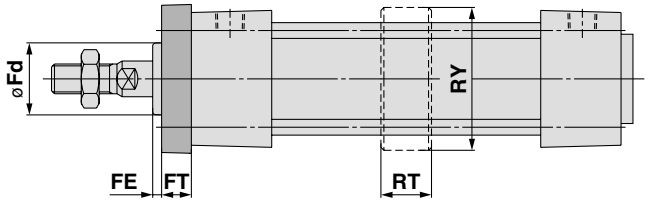
Bore size (mm)	Stroke range	X	Y	LD	LH	LS∗	LT	LX	LY	LZ	RT	RY	RZ	ZZ∗
32	to 700	22	9	7	30	128	3.2	32	53	50	—	—	—	162
40	to 800	24	11	9	33	132	3.2	38	59	55	—	—	—	170
50	to 1000	27	11	9	40	148	3.2	46	72.5	70	—	—	—	190
63	to 1000	27	14	12	45	148	3.6	56	82.5	80	—	—	—	193
80	to 1000	30	14	12	55	174	4.5	72	102.5	100	—	—	—	230
100	to 1000	32	16	14	65	178	4.5	89	122	120	—	—	—	234
125	to 1400	45	20	14	81	210	8	90	149	136	50	148	160	282

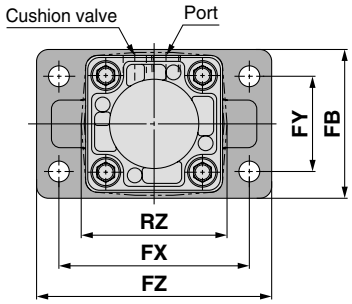
Without Air Cushion

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

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

Rod side flange: (F)

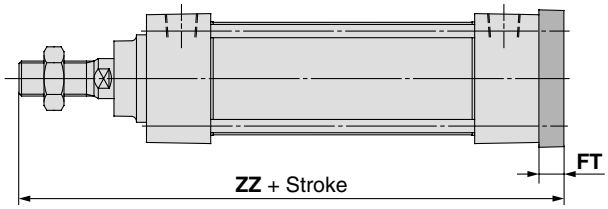


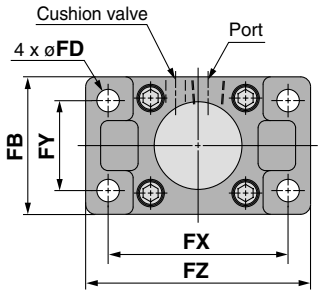


Rod Side Flange

Bore size (mm)	Stroke range	FB	FD	FE	FT	FX	FY	FZ	Fd	RT	RY	RZ
32	to 700	50	7	3	10	64	32	79	25	—	—	—
40	to 800	55	9	3	10	72	36	90	31	—	—	—
50	to 1000	70	9	2	12	90	45	110	38.5	—	—	—
63	to 1000	80	9	2	12	100	50	120	39.5	—	—	—
80	to 1000	100	12	4	16	126	63	153	45	—	—	—
100	to 1000	120	14	4	16	150	75	178	54	—	—	—
125	to 1400	138	14	7	20	180	102	216	57.5	50	148	160

Head side flange: (G)





Head Side Flange

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

Without Air Cushion

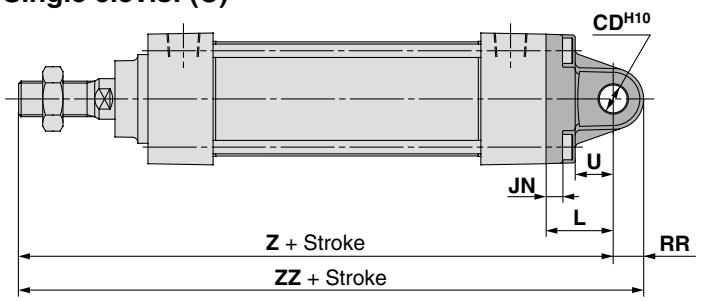
Bore size (mm)	ZZ
32	147
40	151
50, 63	172
80, 100	212
125	249

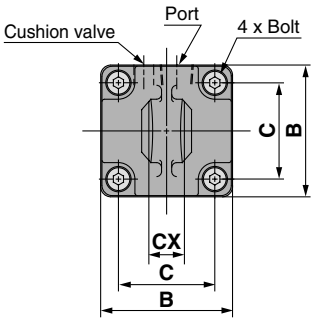
∗ **Rod/Head side flange**
Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston;
ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

With Mounting Bracket

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

Single clevis: (C)





Without Air Cushion

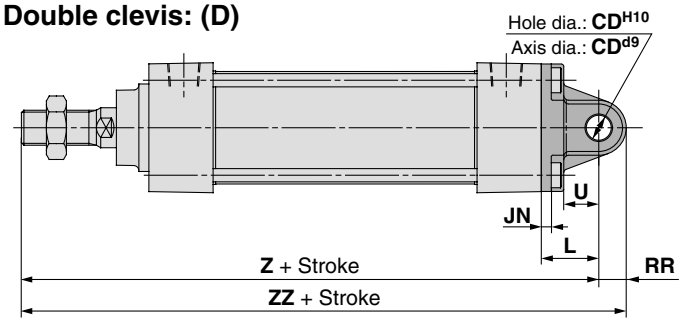
Bore size (mm)	Z	ZZ
32	160	170.5
40	164	175
50, 63	190	205
80, 100	238	261
125	279	307

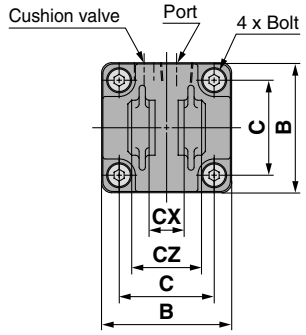
Single Clevis

Bore size (mm)	Stroke range	B	C	JN	L	RR	U	CD^{H10}	$CX^{-0.1}_{-0.3}$	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

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

Double clevis: (D)





Without Air Cushion

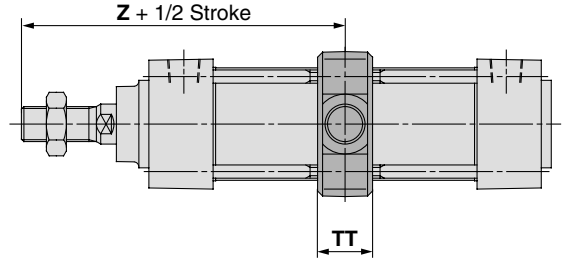
Bore size (mm)	Z	ZZ
32	160	170.5
40	164	175
50, 63	190	205
80, 100	238	261
125	279	307

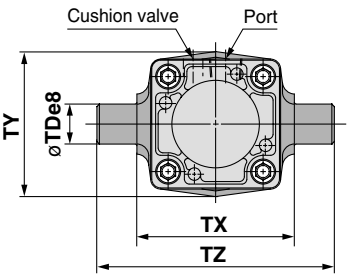
Double Clevis

Bore size (mm)	Stroke range	B	C	JN	L	RR	U	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

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

Center trunnion: (T)





Center Trunnion

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

Without Air Cushion

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

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

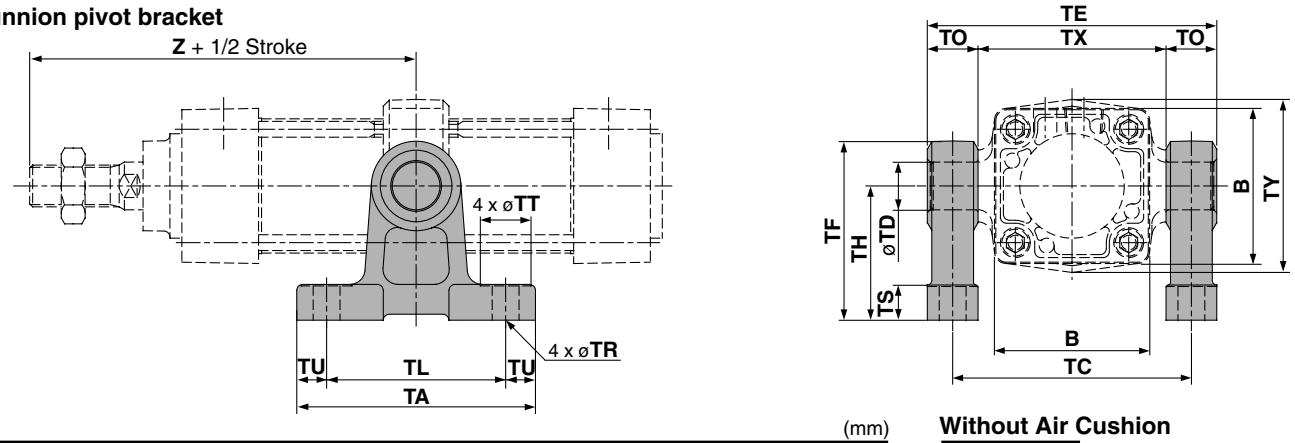
Trunnion/Double Clevis Pivot Bracket

Part No.

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

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

Trunnion pivot bracket



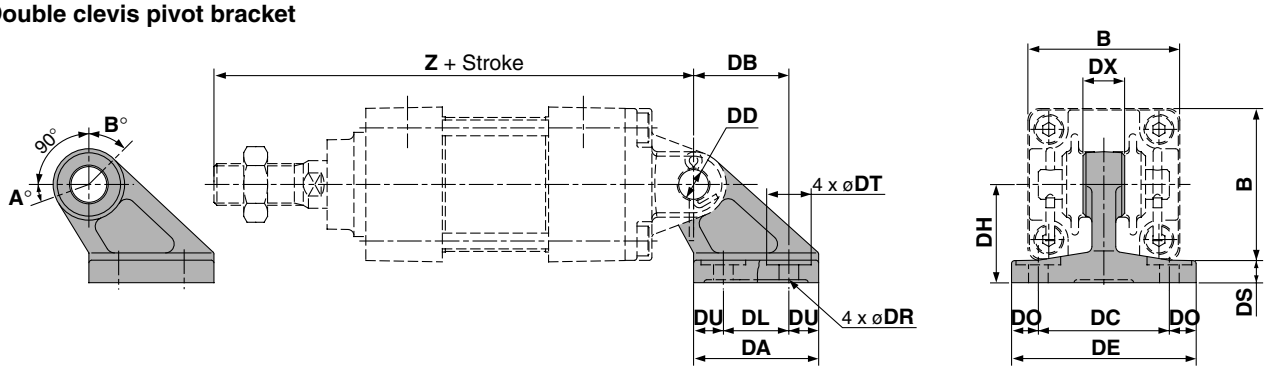
(mm)

Part no.	Bore size (mm)	B	TA	TL	TU	TC	TX	TE	TO	TR	TT	TS	TH	TF	Z**	TD H10
MB-S03	32	46	62	45	8.5	62	50	74	12	7	13	10	35	47	89	12 +0.070 0
MB-S04	40	52	80	60	10	80	63	97	17	9	17	12	45	60	93	16 +0.070 0
	50	65	80	60	10	92	75	109	17	9	17	12	45	60	105	16 +0.070 0
MB-S06	63	75	100	70	15	110	90	130	20	11	22	14	60	80	105	20 +0.084 0
	80	95	100	70	15	130	110	150	20	11	22	14	60	80	129	20 +0.084 0
MB-S10	100	114	120	90	15	158	132	184	26	13.5	24	17	75	100	129	25 +0.084 0
MB-S12	125	136	142	105	18.5	186	160	212	26	13.5	24	25	85	115	157	25 +0.084 0

Without Air Cushion

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

Double clevis pivot bracket



(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

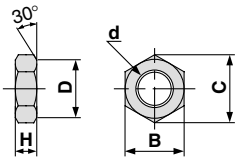
Bore size (mm)	A°	B°	A° + B° + 90°
32, 40	25°	45°	160°
50, 63	40°	60°	190°
80, 100	30°	55°	175°
125	30°	50°	170°

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

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

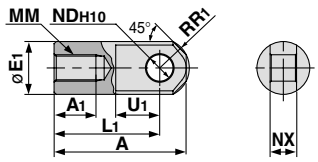
Dimensions for Accessories

Rod end nut
(Standard)



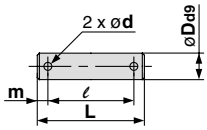
Part no.	Bore size (mm)	d	H	B	C	D
NT-03	**32**	M10 x 1.25	6	17	19.6	16.5
NT-04	**40**	M14 x 1.5	8	22	25.4	21
NT-05	**50, 63**	M18 x 1.5	11	27	31.2	26
NT-08	**80**	M22 x 1.5	13	32	37.0	31
NT-10	**100**	M26 x 1.5	16	41	47.3	39
NT-12M	**125**	M27 x 2	16	41	47.3	39

I type
Single knuckle joint



Part no.	Bore size (mm)	A	A_1	E_1	L_1	MM	R_1	U_1	ND_{H10}	NX
I-03M	**32**	40	14	20	30	M10 x 1.25	12	16	$10^{+0.058}_{0}$	$14^{-0.10}_{-0.30}$
I-04M	**40**	50	19	22	40	M14 x 1.5	12.5	19	$10^{+0.058}_{0}$	$14^{-0.10}_{-0.30}$
I-05M	**50, 63**	64	24	28	50	M18 x 1.5	16.5	24	$14^{+0.070}_{0}$	$20^{-0.10}_{-0.30}$
I-08M	**80**	80	26	40	60	M22 x 1.5	23.5	34	$22^{+0.084}_{0}$	$30^{-0.10}_{-0.30}$
I-10M	**100**	80	26	40	60	M26 x 1.5	23.5	34	$22^{+0.084}_{0}$	$30^{-0.10}_{-0.30}$
I-12M	**125**	119	36	46	92	M27 x 2.0	28.5	34	$25^{+0.084}_{0}$	$32^{-0.10}_{-0.30}$

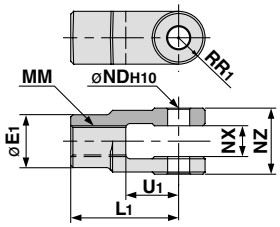
Knuckle joint pin
Clevis pin



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

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

Y type
Double knuckle joint



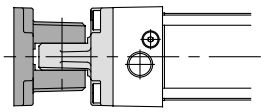
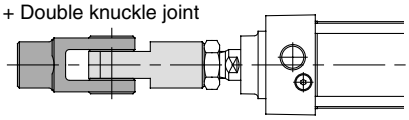
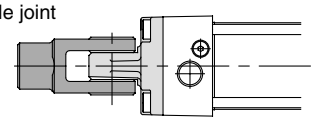
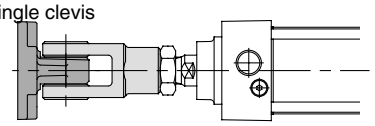
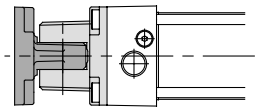
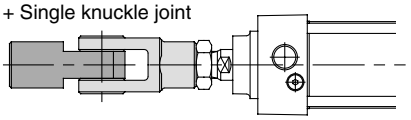
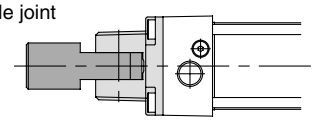
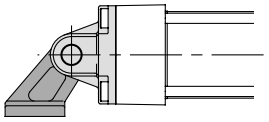
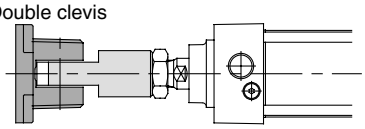
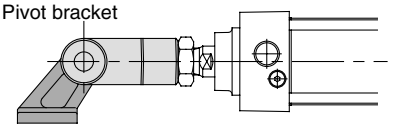
Part no.	Bore size (mm)	E_1	L_1	MM	R_1	U_1	ND_{H10}	NX	NZ
Y-03M Note 1)	**32**	20	30	M10 x 1.25	10	16	$10^{+0.058}_{0}$	$14^{+0.30}_{+0.10}$	$28^{-0.10}_{-0.30}$
Y-04M Note 1)	**40**	22	40	M14 x 1.5	11	19	$10^{+0.058}_{0}$	$14^{+0.30}_{+0.10}$	$28^{-0.10}_{-0.30}$
Y-05M Note 1)	**50, 63**	28	50	M18 x 1.5	14	24	$14^{+0.070}_{0}$	$20^{+0.30}_{+0.10}$	$40^{-0.10}_{-0.30}$
Y-08M Note 1)	**80**	40	65	M22 x 1.5	20	34	$22^{+0.084}_{0}$	$30^{+0.30}_{+0.10}$	$60^{-0.10}_{-0.30}$
Y-10M Note 1)	**100**	40	65	M26 x 1.5	20	34	$22^{+0.084}_{0}$	$30^{+0.30}_{+0.10}$	$60^{-0.10}_{-0.30}$
Y-12M Note 2)	**125**	46	100	M27 x 2	27	42	$25^{+0.084}_{0}$	$32^{+0.30}_{+0.10}$	$64^{-0.10}_{-0.30}$

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

Combinations of Support Brackets

Available Combination ▶ Refer to below picture together.

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

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

Air Cylinder: Double Rod

Series MBW

ø32, ø40, ø50, ø63, ø80, ø100, ø125

How to Order

MBW **L** **32** **□** – **150** **□** – **□**

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

With auto switch
(Built-in magnet)

Mounting

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

Bore size

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

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to page 300 for standard strokes.

Auto switch

Nil	Without auto switch

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

Number of auto switches

Nil	2
S	1
3	3
n	n

Made to Order
For details, refer to page 300.

Rod boot/Cushion

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	—	Both ends
	N∗	None

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

Built-in Magnet Cylinder Model

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

Applicable Auto 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: Tie-rod mounting	Auto switch model: Band mounting	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)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9P	—	●	●	●	○	○		
				2-wire		12 V		M9B	—	●	●	●	○	○		
					—	—	100 V, 200 V	J51	—	●	—	●	○	—		
		Terminal conduit		3-wire (NPN)	24 V	5 V, 12 V	—	—	G39	—	—	—	—	—		
				2-wire		12 V		—	K39	—	—	—	—	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		M9NW	—	●	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PW	—	●	●	●	○	○		
				2-wire		12V		M9BW	—	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5 V, 12 V		M9NA ∗∗	—	○	○	●	○	○	IC circuit	
				3-wire (PNP)				M9PA ∗∗	—	○	○	●	○	○		
				2-wire		12 V		M9BA ∗∗	—	○	○	●	○	○	—	
	Diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		F59F	—	●	—	●	○	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire (Non-polar)		—		P3DW	—	●	—	●	●	○	—	
								P4DW	—	—	—	●	●	○		
Reed switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	—	5 V	—	A96	—	●	—	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	A93	—	●	—	●	—	—	—	Relay, PLC
			No				100 V or less	A90	—	●	—	●	—	—	IC circuit	
			Yes				100 V, 200 V	A54	—	●	—	●	●	—	—	
			No				200 V or less	A64	—	●	—	●	—	—		
		Terminal conduit	Yes				—	—	A33	—	—	—	—	—	—	PLC
		DIN terminal					100 V, 200 V	—	A34	—	—	—	—	—		
								—	A44	—	—	—	—	—		Relay, PLC
	Diagnostic indication (2-color indication)	Grommet				—	—	A59W	—	●	—	●	—	—		

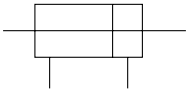
∗∗ Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

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

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

∗ Besides the above models, there are some other auto switches that are applicable. For detailed information, please refer to page 327.
∗ Solid state auto switches are also available with a pre-wired connector. Refer to pages 1328 and 1329 for details. Refer to pages 1317-1 and 1317-2 for D-P3DW□.
∗ D-A9□/M9□□□/P3DW□ auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled for D-A9□/M9□□□ when being shipped.)

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						
Max. operating pressure	1.0 MPa						
Min. operating pressure	0.05 MPa						
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)						
Lubrication	Not required (Non-lube)						
Operating piston speed	50 to 1000 mm/s						50 to 700 mm/s
Allowable stroke tolerance	up to 250: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$						
Cushion Note)	Both ends (Air cushion)						
Port size (Rc, NPT, G)	1/8	1/4		3/8		1/2	
Mounting	Basic, Foot, Flange, Center trunnion						

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

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

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat resistant cylinder (150°C)
-XC3	Special port position
-XC4	With heavy duty scraper
-XC5	Heat resistant cylinder (110°C)
-XC6	Piston rod and rod end nut made of stainless steel
-XC7	Tie rod, cushion valve, tie rod nut, etc. made of stainless steel
-XC14	Change of trunnion bracket mounting position
-XC22	Fluororubber seals
-XC30	Rod side trunnion
-XC35	With coil scraper

Standard Stroke

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

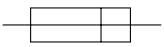
Intermediate strokes are available.
(No spacer is used)

Accessory

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

Theoretical Force

(Unit: N) OUT ← IN →



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

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

Mass/Aluminum Tube

(kg)

Bore size (mm)		32	40	50	63	80	100	125
Basic mass	Basic	0.56	0.79	1.34	1.65	3.11	4.14	6.48
	Foot	0.6	0.93	1.56	1.93	3.61	4.8	8.56
	Flange	0.85	1.16	1.79	2.44	4.56	7.45	10.64
	Trunnion	0.85	1.15	1.82	2.45	4.66	7.81	9.46
Add'l mass per each 50 mm stroke	All mounting bracket	0.15	0.24	0.34	0.35	0.61	0.84	1.02
Accessory	Single knuckle	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: **MBWB32-100** (Basic, ø32, 100 st)
- Basic mass ····· 0.56 (Basic, ø32)
- Additional mass ····· 0.15/50 stroke
- Cylinder stroke ····· 100 stroke

0.56 + 0.15 x 100/50 = 0.86 kg

Material of Rod Boot

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

* Max. ambient temperature for rod boot itself.

Refer to pages 322 and 327 for cylinders with auto switches.

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

Mounting Bracket Part No.

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

∗ Two foot brackets required for one cylinder.

Water Resistant Air Cylinder

Water resistant air cylinders are also available in Series MB, which are suitable for use on machine tools in an atmosphere with coolant and applicable to food machinery and automobile washing equipment in an environment with water splashes. Please refer to page 899 for more information.

Copper/Fluorine-free

20 – MBW | Mounting bracket | Bore size | Port thread type | – | Stroke | Suffix

Copper/Fluorine-free

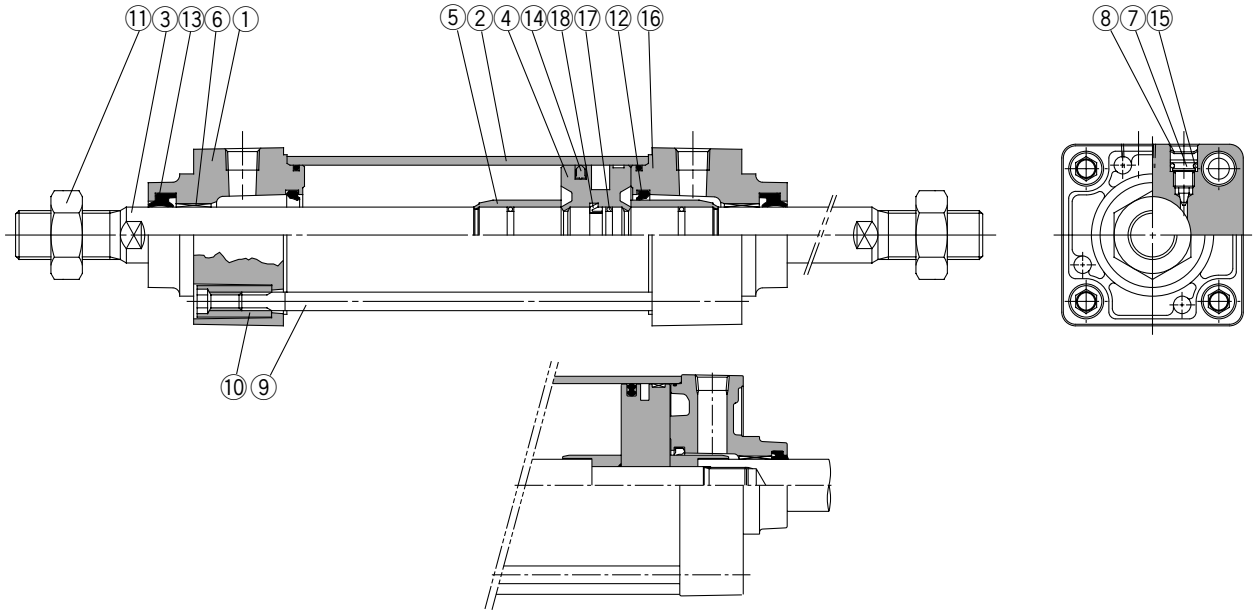
Copper material has been replaced with non-copper material to prevent generation of copper ions. This is to eliminate influence of copper ions and fluororesin upon color CRT.

Specifications

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

∗ Auto switch capable.
★The cylinder should be operated within the allowable kinetic energy. (Refer to page 292.)
∗ In case of types with no air cushion, a rubber bumper is used.

Construction



MBW125

Component Parts

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

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

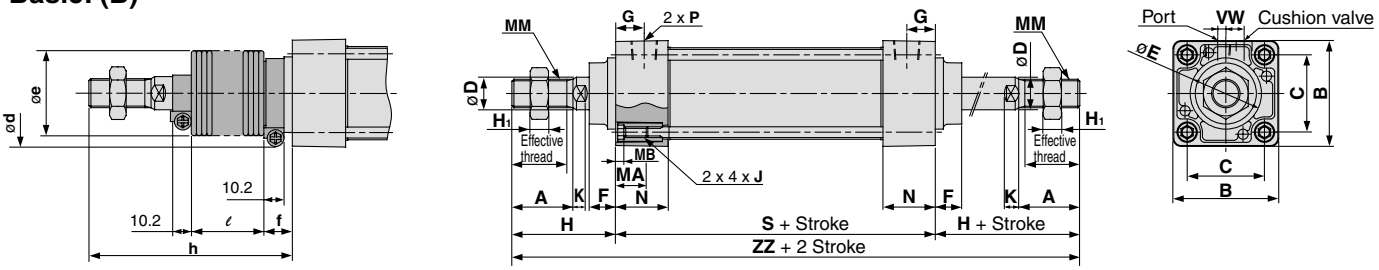
Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
32	MBW32–PS	Set of the No. ⑫, ⑬, ⑭ and ⑯.
40	MBW40–PS	
50	MBW50–PS	
63	MBW63–PS	
80	MBW80–PS	
100	MBW100–PS	
125	MBW125–PS	

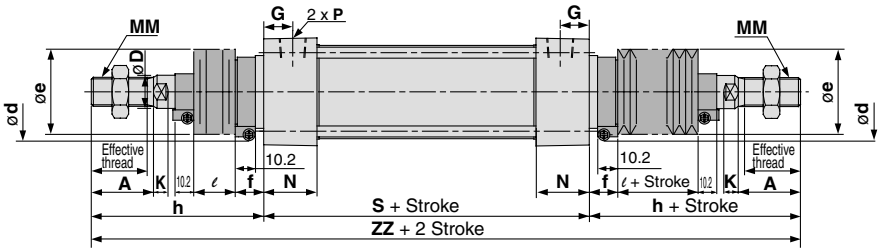
* Seal kits consist of items ⑫, ⑬, ⑭ and ⑯, and can be ordered by using the seal kit number corresponding to each bore size.
* Trunnion type should not be disassembled. (Refer to page 328.)
* Seal kit includes a grease pack (ø32 to 50: 10 g, ø63, 80: 20 g, ø100, 125: 30 g).
  Order with the following part number when only the grease pack is needed.
  Grease pack part number: GR-S-010 (10 g), **GR-S-020** (20 g)

With Mounting Bracket

Basic: (B)



With rod boot



Bore (mm)	Stroke range	Eff. thread length	Width across flats	A	B	C	D	Ee11	F	G	H_1	H	MA	MB	J	K	MM	N	P	S*	V	W	ZZ*	Without Air Cushion S	Without Air Cushion ZZ
32	to 500	19.5	10	22	46	32.5	12	30	13	13	6	47	16	4	M6 x 1	6	M10 x 1.25	27	1/8	84	4	6.5	178	90	184
40	to 500	27	14	30	52	38	16	35	13	14	8	51	16	4	M6 x 1	6	M14 x 1.5	2	1/4	84	4	9	186	90	192
50	to 600	32	18	35	65	46.5	20	40	14	15.5	11	58	16	5	M8 x 1.25	7	M18 x 1.5	31.5	1/4	94	5	10.5	210	102	218
63	to 600	32	18	35	75	56.5	20	45	14	16.5	11	58	16	5	M8 x 1.25	7	M18 x 1.5	31.5	3/8	94	9	12	210	102	218
80	to 800	37	22	40	95	72	25	45	20	19	13	72	16	5	M10 x 1.5	10	M22 x 1.5	38	3/8	114	11.5	14	258	124	268
100	to 800	37	26	40	114	89	30	55	20	19	16	72	16	5	M10 x 1.5	10	M26 x 1.5	38	1/2	114	17	15	258	124	268
125	to 1000	50	27	54	136	110	32	60	27	19	16	97	20	6	M12 x 1.75	13	M27 x 2.0	38	1/2	120	17	15	314	132	326

With Rod Boot

Bore (mm)	d	e	f	ℓ												h											
				1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000
32	54	36	23	12.5	25	37.5	50	75	100	125	—	—	—	—	—	73	86	98	111	136	161	186	—	—	—	—	—
40	56	41	23	12.5	25	37.5	50	75	100	125	—	—	—	—	—	81	94	106	119	144	169	194	—	—	—	—	—
50	64	51	25	12.5	25	37.5	50	75	100	125	150	—	—	—	—	89	102	114	127	152	177	202	227	—	—	—	—
63	64	51	25	12.5	25	37.5	50	75	100	125	150	—	—	—	—	89	102	114	127	152	177	202	227	—	—	—	—
80	68	56	29	12.5	25	37.5	50	75	100	125	150	175	200	—	—	101	114	126	139	164	189	214	239	264	289	—	—
100	76	61	29	12.5	25	37.5	50	75	100	125	150	175	200	—	—	101	114	126	139	164	189	214	239	264	289	—	—
125	82	75	27	10	20	30	40	60	80	100	120	140	160	180	200	120	130	140	150	170	190	210	230	250	270	290	310

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

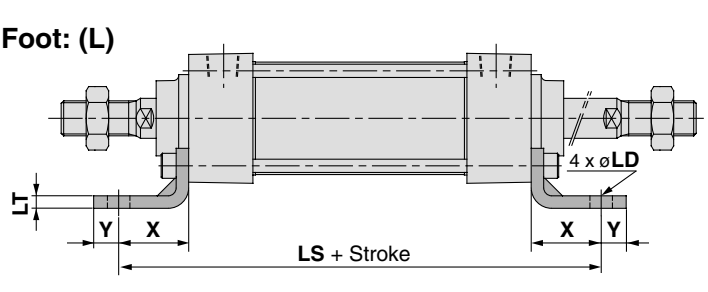
Bore (mm)	ZZ Note)											
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000
32	230	256	280	306	356	406	456	—	—	—	—	—
40	246	272	296	322	372	422	472	—	—	—	—	—
50	272	298	322	348	398	448	498	548	—	—	—	—
63	272	298	322	348	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

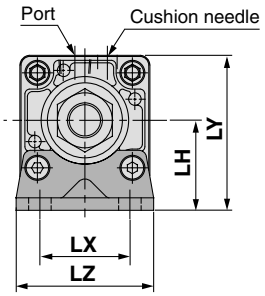
* Model without air cushion is designed to include rubber bumpers. The overall length is longer than the cylinder with air cushion as follows because the bumpers are attached to the both sides of the piston;
ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

With Mounting Bracket

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

Foot: (L)

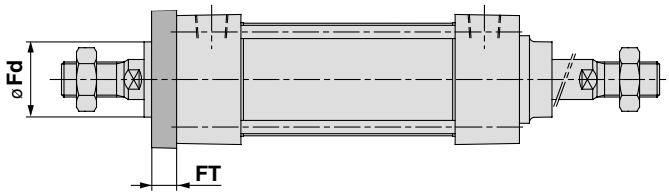


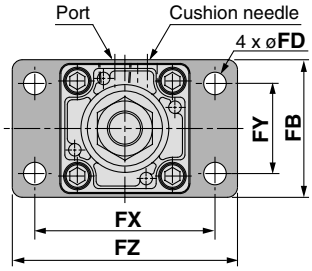


Foot

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

Front flange: (F)

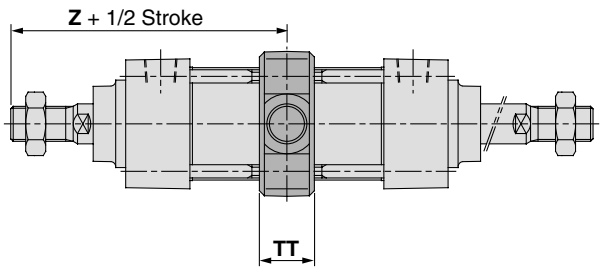


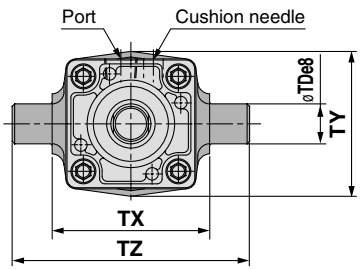


Front Flange

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

Center trunnion: (T)





Center Trunnion

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

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

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

Air Cylinder: Non-rotating Rod Type

Series MBK

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

MBK **L** **32** □ – **50** □ – □

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

With auto switch
(Built-in magnet)

Mounting

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

Bore size

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

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to page 306 for standard strokes.

Auto switch

Nil	Without auto switch

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

Rod boot/Cushion

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

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

Number of auto switches

Nil	2
S	1
3	3
n	n

Made to Order
For details, refer to page 306.

Built-in Magnet Cylinder Model

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

Applicable Auto 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: Tie-rod mounting	Auto switch model: Band mounting	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)	24 V	5 V, 12 V	—	**M9N**	—	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9P**	—	●	●	●	○	○		
				2-wire		12 V		**M9B**	—	●	●	●	○	○		
					—	—	100 V, 200 V	**J51**	—	●	—	●	○	—		
		Terminal conduit		3-wire (NPN)	24 V	5 V, 12 V	—	—	**G39**	—	—	—	—	—		
				2-wire		12 V		—	**K39**	—	—	—	—	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		**M9NW**	—	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PW**	—	●	●	●	○	○		
				2-wire		12V		**M9BW**	—	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5 V, 12 V		**M9NA** **	—	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PA** **	—	○	○	●	○	○		
				2-wire		12 V		**M9BA** **	—	○	○	●	○	○	—	
	Diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		**F59F**	—	●	—	●	○	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire (Non-polar)		—		**P3DW**	—	●	—	●	●	○	—	
								P4DW	—	—	—	●	●	○		
Reed switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	—	5 V	—	**A96**	—	●	—	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	**A93**	—	●	—	●	—	—	—	Relay, PLC
			No				100 V or less	**A90**	—	●	—	●	—	—	IC circuit	
			Yes				100 V, 200 V	**A54**	—	●	—	●	●	—	—	
			No				200 V or less	**A64**	—	●	—	●	—	—		
		Terminal conduit	Yes				—	—	**A33**	—	—	—	—	—	—	
		DIN terminal					100 V, 200 V	—	**A34**	—	—	—	—	—		PLC
								—	**A44**	—	—	—	—	—		Relay, PLC
	Diagnostic indication (2-color indication)	Grommet				—	—	**A59W**	—	●	—	●	—	—		

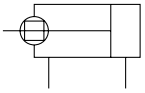
∗∗ Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

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

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

∗ Besides the above models, there are some other auto switches that are applicable. For detailed information, please refer to page 327.
∗ Solid state auto switches are also available with a pre-wired connector. Refer to pages 1328 and 1329 for details. Refer to pages 1317-1 and 1317-2 for D-P3DW□.
∗ D-A9□/M9□□□/P3DW□ auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled for D-A9□/M9□□□ when being shipped.)

JIS Symbol
Double acting



Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting, Single rod					
Fluid	Air					
Proof pressure	1.5 MPa					
Max. operating pressure	1.0 MPa					
Min. operating pressure	0.05 MPa					
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)					
Lubrication	Not required (Non-lube)					
Operating piston speed	50 to 1000 mm/s					
Allowable stroke tolerance	up to 250: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$, 1001 to 1500: $^{+1.8}_{0}$					
Cushion Note 1)	Both ends (Air cushion)					
Port size (Rc, NPT, G)	1/8	1/4		3/8		1/2
Mounting	Basic, Foot, Rod side flange, Head side flange, Single clevis, Double clevis, Center trunnion					
Non-rotating accuracy	±0.5°		±0.5°		±0.3°	
Allowable rotating torque N·m max.	0.25	0.45	0.64		0.79	0.93

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

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

Symbol	Specifications
-XA□	Change of rod end shape
-XC3	Special port position
-XC6	Piston rod and rod end nut made of stainless steel
-XC7	Tie rod, cushion valve, tie rod nut, etc. made of stainless steel
-XC8	Adjustable stroke cylinder/Adjustable extend stroke
-XC9	Adjustable stroke cylinder/Adjustable retract stroke
-XC10	Dual stroke cylinder/Double rod
-XC14	Change of trunnion bracket mounting position
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC30	Rod side trunnion

Standard Stroke

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

Intermediate strokes are available.
(No spacer is used)

Accessory

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

Mass/Aluminum Tube

(kg)

Bore size (mm)		32	40	50	63	80	100
Basic mass	Basic	0.50	0.66	1.21	1.51	2.58	3.73
	Foot	0.62	0.83	1.41	1.75	3.23	4.36
	Flange	0.79	1.03	1.64	2.30	4.03	7.04
	Single clevis	0.75	0.89	1.55	2.14	3.69	6.90
	Double clevis	0.76	0.93	1.64	2.30	3.98	7.42
	Trunnion	0.79	1.02	1.69	2.31	4.13	7.40
Add'l mass per each 50 mm stroke	All mounting bracket	0.11	0.15	0.26	0.27	0.40	0.52
Accessory	Single knuckle	0.15	0.23	0.26	0.26	0.60	0.83
	Double knuckle (with pin)	0.22	0.37	0.43	0.43	0.87	1.27

Calculation example: **MBKB32-100** (Basic, ø32, 100 st)
- Basic mass ····· 0.50 (Basic ø32)
- Additional mass ····· 0.11/50 stroke
- Cylinder stroke ····· 100 stroke

0.50 + 0.11 x 100/50 = 0.72 kg

Refer to pages 322 and 327 for cylinders with auto switches.

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

Material of Rod Boot

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

* Max. ambient temperature for rod boot itself.

Theoretical Force

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

Bore size (mm)	Rod diameter (mm^2)	Bore size (mm)	Rod diameter (mm^2)
32	675	**63**	2804
40	1082	**80**	4568
50	1651	**100**	7223

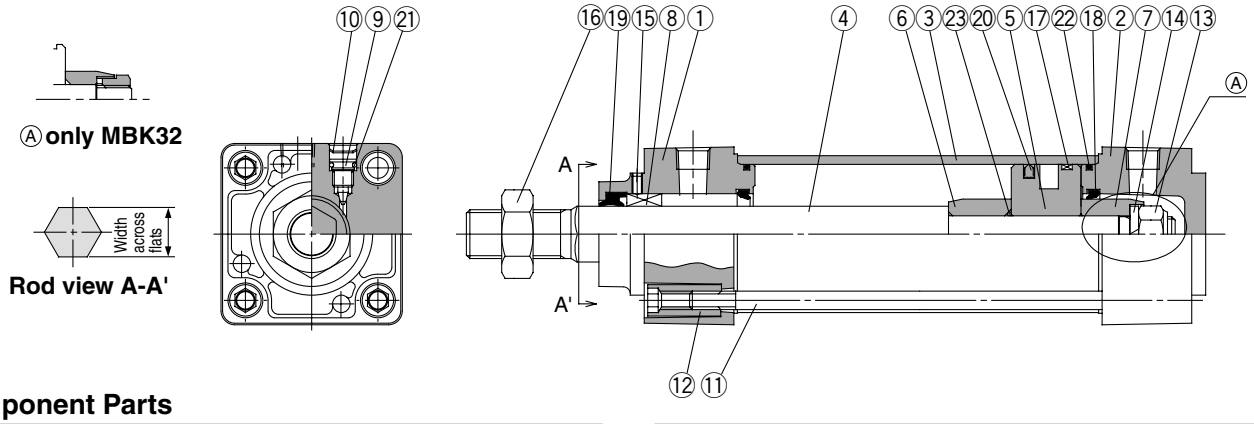
Theoretical force (N) =
Pressure (MPa) x Piston area (mm^2)

Mounting Bracket Part No.

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

Note 1) Two foot brackets required for one cylinder.
Note 2) Accessories for each mounting bracket are as follows:
Foot, flange, single clevis/body mounting bolt, double clevis/body mounting bolt, clevis pins, flat washer and cotter pins. → Refer to page 298 for details.

Construction



Component Parts

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

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

Replacement Parts/Seal Kit

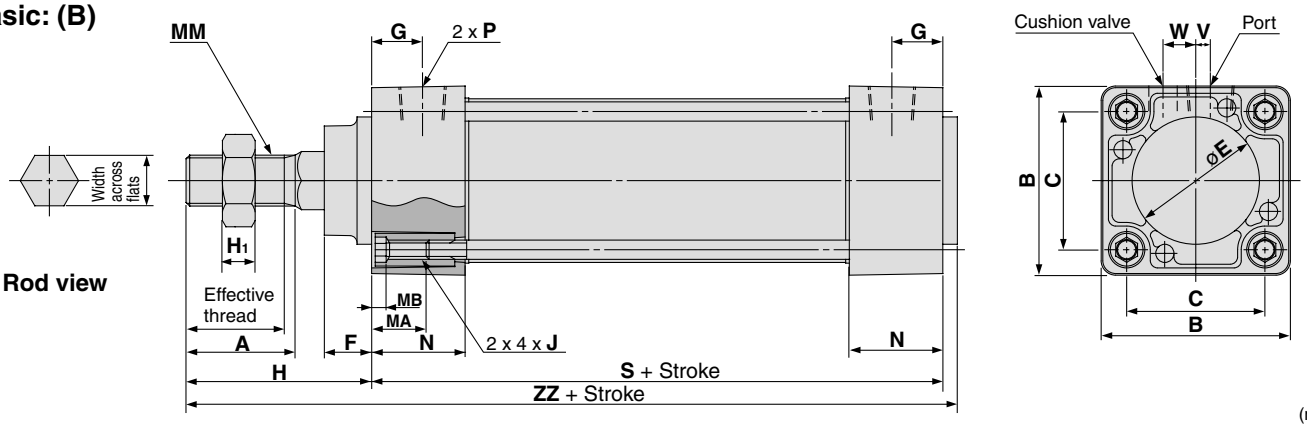
Bore size (mm)	Kit no.	Contents
32	MBK32-PS	Set of the No. ⑱, ⑲, ⑳ and ㉒.
40	MBK40-PS	
50	MBK50-PS	
63	MBK63-PS	
80	MBK80-PS	
100	MBK100-PS	

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

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

Without Mounting Bracket

Basic: (B)



(mm)

Bore (mm)	Stroke range	Effective thread length	Width across flats	A	B	C	E	F	G	H_1	H	MA	MB	J	MM	N	P	S*	V	W	ZZ*
32	up to 500	19.5	12.2	22	46	32.5	30	13	13	6	47	16	4	M6 x 1	M10 x 1.25	27	1/8	84	4	6.5	135
40	up to 500	27	14.2	30	52	38	35	13	14	8	51	16	4	M6 x 1	M14 x 1.5	27	1/4	84	4	9	139
50	up to 600	32	19	35	65	46.5	40	14	15.5	11	58	16	5	M8 x 1.25	M18 x 1.5	31.5	1/4	94	5	10.5	156
63	up to 600	32	19	35	75	56.5	45	14	16.5	11	58	16	5	M8 x 1.25	M18 x 1.5	31.5	3/8	94	9	12	156
80	up to 800	37	23	40	95	72	45	20	19	13	72	16	5	M10 x 1.5	M22 x 1.5	38	3/8	114	11.5	14	190
100	up to 800	37	27	40	114	89	55	20	19	16	72	16	5	M10 x 1.5	M26 x 1.5	38	1/2	114	17	15	190

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

Air Cylinder: Low Friction Type

Series MB□Q

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

MB L Q 32 □ – 50 F –

With auto switch MDB L Q 32 □ – 50 F – M9BW □ – □

With auto switch
(Built-in magnet)

Mounting

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

Bore size

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

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to page 310 for standard strokes.

Direction of low friction

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

Auto switch

Nil	Without auto switch

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

Number of auto switches

Nil	2
S	1
3	3
n	n

Made to Order
For details, refer to page 310.

Built-in Magnet Cylinder Model

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

Applicable Auto 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: Tie-rod mounting	Auto switch model: Band mounting	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)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9P	—	●	●	●	○	○		
				2-wire		12 V		M9B	—	●	●	●	○	○		
					—	—	100 V, 200 V	J51	—	●	—	●	○	—		
		Terminal conduit		3-wire (NPN)	24 V	5 V, 12 V	—	—	G39	—	—	—	—	—		
				2-wire		12 V		—	K39	—	—	—	—	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		M9NW	—	●	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PW	—	●	●	●	○	○		
				2-wire		12V		M9BW	—	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5 V, 12 V		M9NA **	—	○	○	●	○	○	IC circuit	
				3-wire (PNP)				M9PA **	—	○	○	●	○	○		
				2-wire		12 V		M9BA **	—	○	○	●	○	○	—	
	Diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		F59F	—	●	—	●	○	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire (Non-polar)		—		P3DW	—	●	—	●	●	○	—	
								P4DW	—	—	—	●	●	○		
Reed switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	—	5 V	—	A96	—	●	—	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	A93	—	●	—	●	—	—	—	Relay, PLC
			No				100 V or less	A90	—	●	—	●	—	—	IC circuit	
			Yes				100 V, 200 V	A54	—	●	—	●	●	—	—	
			No				200 V or less	A64	—	●	—	●	—	—		
		Terminal conduit	Yes				—	—	A33	—	—	—	—	—	—	
		DIN terminal					100 V, 200 V	—	A34	—	—	—	—	—		PLC
								—	A44	—	—	—	—	—		Relay, PLC
	Diagnostic indication (2-color indication)	Grommet				—	—	A59W	—	●	—	●	—	—		

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

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

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

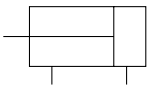
∗ Besides the above models, there are some other auto switches that are applicable. For detailed information, please refer to page 327.
∗ Solid state auto switches are also available with a pre-wired connector. Refer to pages 1328 and 1329 for details. Refer to pages 1317-1 and 1317-2 for D-P3DW□.
∗ D-A9□/M9□□□/P3DW□ auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled for D-A9□/M9□□□ when being shipped.)

Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting single rod					
Direction of low friction	One direction Note 1)					
Fluid	Air					
Proof pressure	1.05 MPa					
Max. operating pressure	0.7 MPa					
Min. operating pressure	0.025 MPa (ø32)	0.01 MPa (ø40 to ø100)				
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)					
Lubrication	Not required (Non-lube)					
Cushion	None					
Port size (Rc, NPT, G)	1/8	1/4		3/8		1/2
Mounting	Basic, Foot, Rod side flange, Head side flange, Single clevis, Double clevis, Center trunnion					
Allowable leakage	0.5 ℓ/min (ANR) or less					

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

JIS Symbol
Double acting



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

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

Refer to pages 322 and 327 for cylinders with auto switches.

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

Standard Stroke

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

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

Accessory

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

Mounting Bracket Part No.

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

Note 1) Two foot brackets required for one cylinder.
Note 2) Accessories for each mounting bracket are as follows:
Foot, flange, single clevis/body mounting bolt, double clevis/body mounting bolt, clevis pins, flat washer and cotter pins. → Refer to page 298 for details.

Mass/Aluminum Tube

(kg)

Bore size (mm)		32	40	50	63	80	100
Basic mass	Basic	0.50	0.69	1.19	1.47	2.73	3.7
	Foot	0.68	0.93	1.56	1.93	3.61	4.8
	Flange	0.79	1.06	1.64	2.26	4.18	7.01
	Single clevis	0.75	0.92	1.53	2.1	3.84	6.87
	Double clevis	0.76	0.96	1.62	2.26	4.13	7.39
	Trunnion	0.79	1.05	1.67	2.27	4.28	7.37
Additional mass per each 50 mm stroke	All mounting bracket	0.11	0.16	0.26	0.27	0.42	0.56
Accessory	Single rod clevis	0.15	0.23	0.26	0.26	0.60	0.83
	Double rod clevis (with pin)	0.22	0.37	0.43	0.43	0.87	1.27

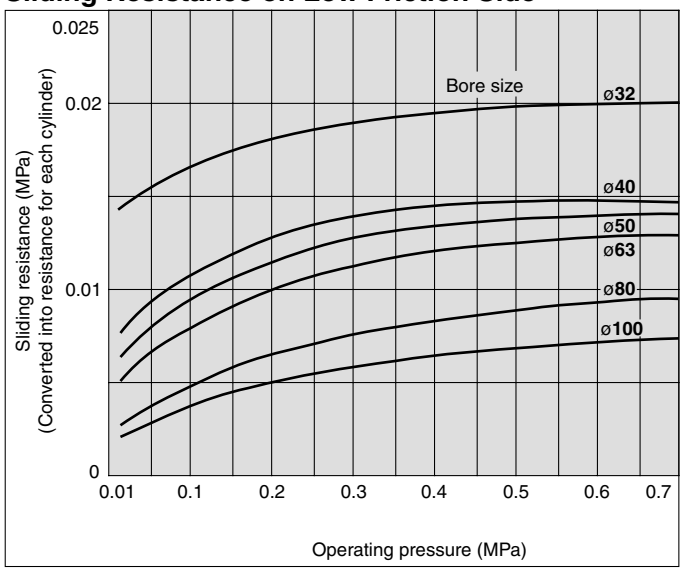
Calculation example: **MBBQ32-100** (Basic, ø32, 100 st)
- Basic mass ····· 0.50 (Basic, ø32)
- Additional mass ····· 0.11/50 stroke
- Cylinder stroke ····· 100 stroke

0.50 + 0.11 x 100/50 = 0.72 kg

Selection Guide for the Low Friction Side

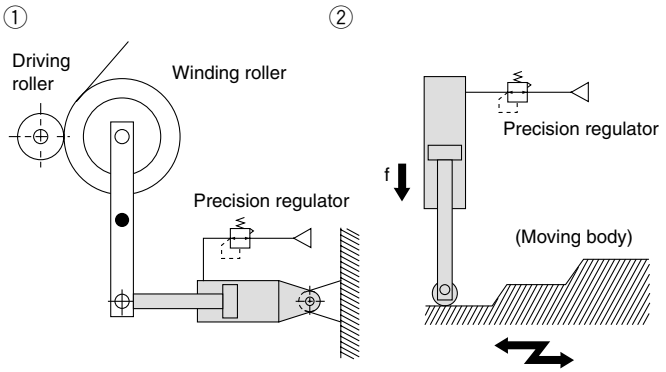
1. When used as a balancer etc., follow the example of the application mentioned earlier applying pressure at one port while leaving the other port open to atmosphere.
   With pressure at rod cover port
   ····· Low friction side B (Example of application ①)
   With pressure at head cover port
   ·····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

Sliding Resistance on Low Friction Side



Application Example

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



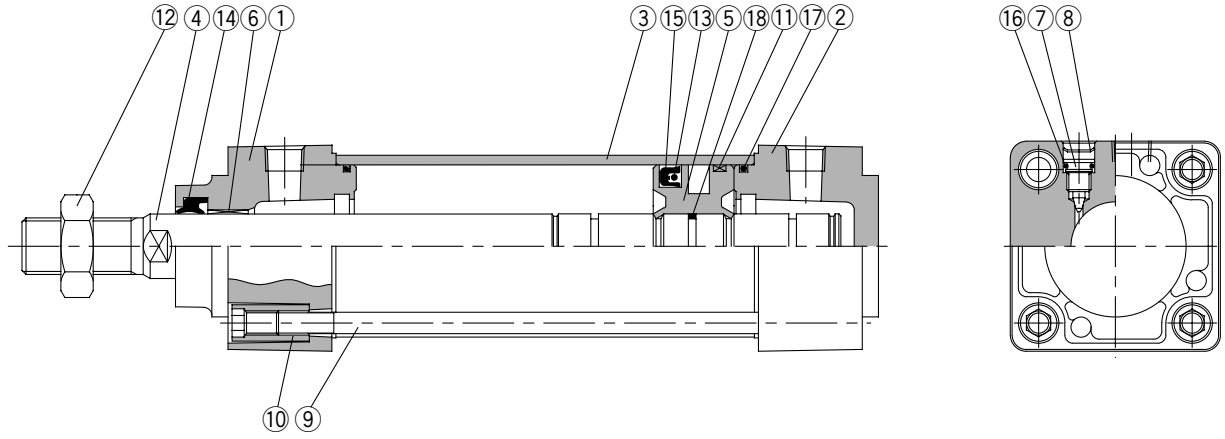
Caution on Use

⚠ Warning

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

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

Construction



Component Parts

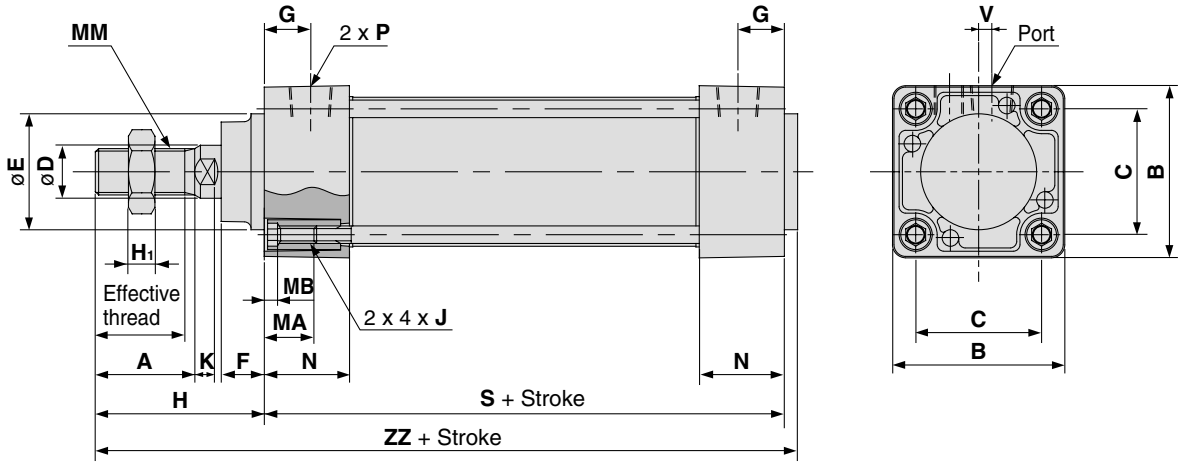
No.	Description	Material	Note
①	Rod cover	Aluminum die-cast	Metallic painted
②	Head cover	Aluminum die-cast	Metallic painted
③	Cylinder tube	Aluminum alloy	Hard anodized
④	Piston rod	Carbon steel	Hard chrome plated
⑤	Piston	Aluminum alloy	Chromated
⑥	Bushing	Babbitt	
⑦	Cushion valve	Steel wire	Nickel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

Replacement Parts/Seal Kit

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

* Seal kits consist of items ⑬, ⑭, ⑮ and ⑰, and can be ordered by using the seal kit number corresponding to each bore size.
* Trunnion type should not be disassembled. (Refer to page 328.)
* Since the seal kit does not include a grease pack, order it separately.
  Grease pack part no.: GR-L-005 (5 g), **GR-L-010** (10 g), **GR-L-150** (150 g)

Basic: (B)



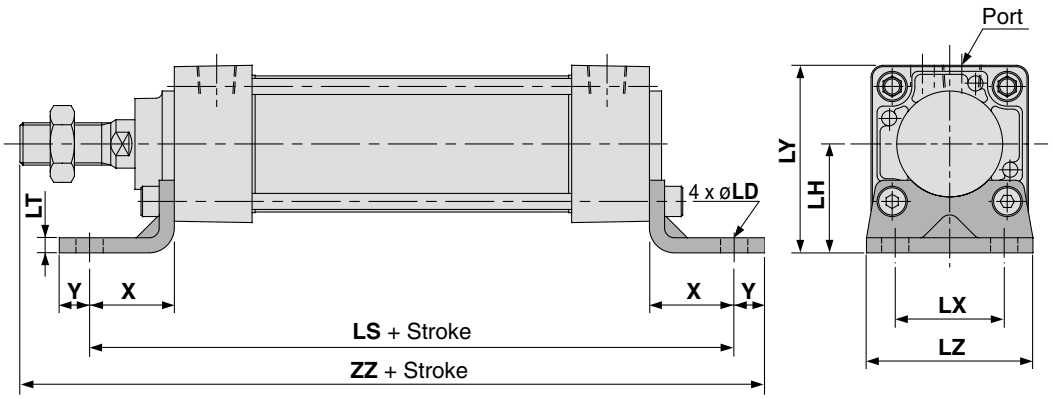
(mm)

Bore (mm)	Stroke range	Effective thread length	Width across flats	A	B	C	D	Ee11	F	G	H_1	H	MA	MB	J	K	MM	N	P	S	V	ZZ
32	up to 500	19.5	10	22	46	32.5	12	30	13	13	6	47	16	4	M6 x 1	6	M10 x 1.25	27	1/8	84	4	135
40	up to 500	27	14	30	52	38	16	35	13	14	8	51	16	4	M6 x 1	6	M14 x 1.5	27	1/4	84	4	139
50	up to 600	32	18	35	65	46.5	20	40	14	15.5	11	58	16	5	M8 x 1.25	7	M18 x 1.5	31.5	1/4	94	5	156
63	up to 600	32	18	35	75	56.5	20	45	14	16.5	11	58	16	5	M8 x 1.25	7	M18 x 1.5	31.5	3/8	94	9	156
80	up to 800	37	22	40	95	72	25	45	20	19	13	72	16	5	M10 x 1.5	10	M22 x 1.5	38	3/8	114	11.5	190
100	up to 800	37	26	40	114	89	30	55	20	19	16	72	16	5	M10 x 1.5	10	M26 x 1.5	38	1/2	114	17	190

With Mounting Bracket

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

Foot: (L)

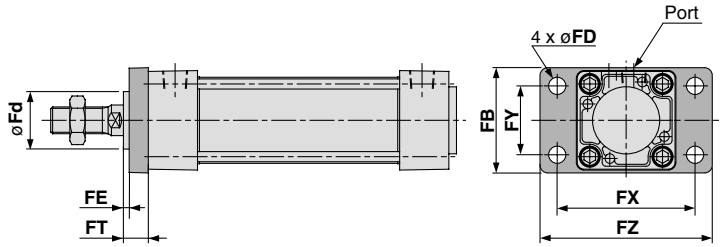


Foot (mm)

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

With Mounting Bracket

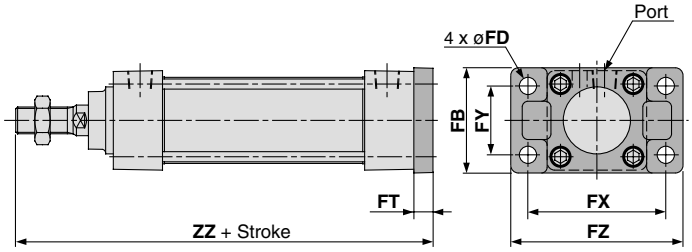
Front flange: (F)



Front Flange (mm)

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

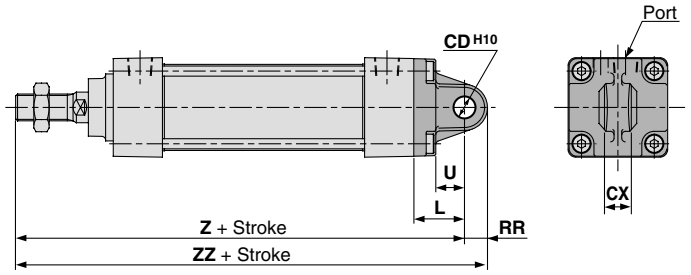
Rear flange: (G)



Rear Flange (mm)

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

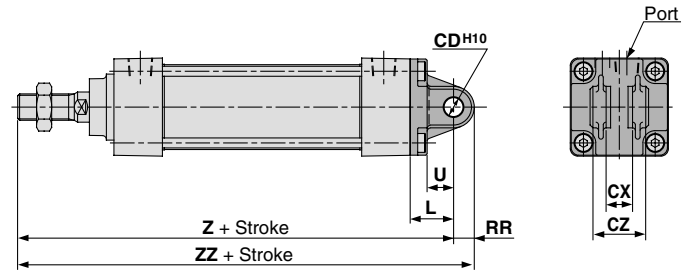
Single clevis: (C)



Single Clevis (mm)

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

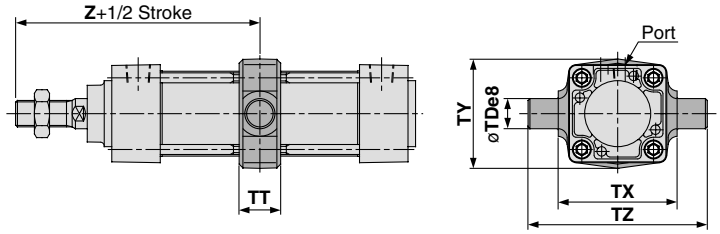
Double clevis: (D)



Double Clevis (mm)

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

Center trunnion: (T)



Center Trunnion (mm)

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

Air Cylinder: With End Lock

Series MBB

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

MBB **L** **32** **□** – **50** **□** – **H** **N** – **□**

With auto switch **MDBB** **L** **32** **□** – **50** **□** – **H** **N** – **M9BW** **□** – **□**

With auto switch
(Built-in magnet)

Mounting

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

Bore size

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

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 316.

Rod boot

Rod boot	Nil	None
	J	Nylon tarpaulin
	K	Heat resistant tarpaulin

Manual release

N	Non-locking
L	Locking

Locking position

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

Auto switch

Nil	Without auto switch

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

Number of auto switches

Nil	2
S	1
3	3
n	n

Made to Order
For details, refer to page 316.

Built-in Magnet Cylinder Model

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

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

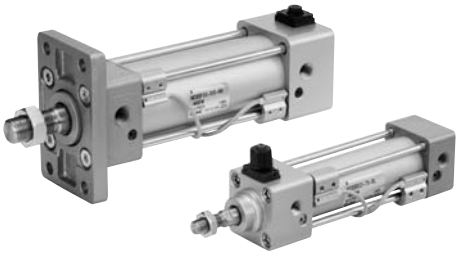
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Tie-rod mounting	Auto switch model: Band mounting	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet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

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

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

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

∗ Besides the above models, there are some other auto switches that are applicable. For detailed information, please refer to page 327.
∗ Solid state auto switches are also available with a pre-wired connector. Refer to pages 1328 and 1329 for details. Refer to pages 1317-1 and 1317-2 for D-P3DW□.
∗ D-A9□/M9□□□/P3DW□ auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled for D-A9□/M9□□□ when being shipped.)



Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting, Single rod					
Fluid	Air					
Proof pressure	1.5 MPa					
Max. operating pressure	1.0 MPa					
Min. operating pressure	0.15 MPa *					
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)					
Lubrication	Not required (Non-lube)					
Operating piston speed	50 to 1000 mm/s					
Allowable stroke tolerance	up to 250: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$, 1001 to 1500: $^{+1.8}_{0}$					
Cushion	Both ends (Air cushion)					
Port size (Rc, NPT, G)	1/8	1/4		3/8		1/2
Mounting	Basic, Foot, Rod side flange, Head side flange, Single clevis, Double clevis, Center trunnion					

* 0.05 MPa except locking parts.

Made to Order

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

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

Refer to pages 322 and 327 for cylinders with an auto switch.

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

Locking Specifications

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

Accessory

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

Standard Stroke

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

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

Mass/Aluminum Tube

(kg)

Bore size (mm)		32	40	50	63	80	100
Basic mass	Basic	0.50	0.69	1.19	1.47	2.73	3.7
	Foot	0.68	0.93	1.56	1.93	3.61	4.8
	Flange	0.79	1.06	1.64	2.26	4.18	7.01
	Single clevis	0.75	0.92	1.53	2.1	3.84	6.87
	Double clevis	0.76	0.96	1.62	2.26	4.13	7.39
	Trunnion	0.79	1.05	1.67	2.27	4.28	7.37
Additional mass per each 50 mm stroke	All mounting bracket	0.11	0.16	0.26	0.27	0.42	0.56
Accessory	Single knuckle	0.15	0.23	0.26	0.26	0.60	0.83
	Double knuckle (with pin)	0.22	0.37	0.43	0.43	0.87	1.27

Additional Mass of Locking Part

(kg)

Bore size (mm)		32	40	50	63	80	100
Manual release non-locking (N)	Locking at head end (H)	0.08	0.13	0.21	0.30	0.75	1.1
	Locking at rod end (R)	0.08	0.13	0.20	0.29	0.71	1.03
	Locking at both ends (W)	0.16	0.26	0.41	0.59	1.46	2.13
Manual release locking (L)	Locking at head end (H)	0.09	0.15	0.23	0.32	0.78	1.13
	Locking at rod end (R)	0.09	0.15	0.22	0.31	0.74	1.06
	Locking at both ends (W)	0.18	0.30	0.45	0.63	1.52	2.19

Calculation example: **MBBL32-100-HN**
- Basic mass ····· 0.68
- Additional mass ····· 0.11/50 stroke
- Cylinder stroke ····· 100 stroke
- Locking mass ····· 0.08 (Locking at head end, manual release non-locking type)

0.68 + 0.11 x 100/50 + 0.08 = 0.98 kg

Mounting Bracket Part No.

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

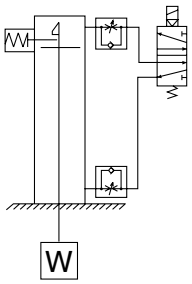
Note 1) Two foot brackets required for one cylinder.
Note 2) Accessories for each mounting bracket are as follows:
Foot, flange, single clevis/body mounting bolt, double clevis/body mounting bolt, clevis pins, flat washer and cotter pins. → Refer to page 298 for details.

Cautions for Using

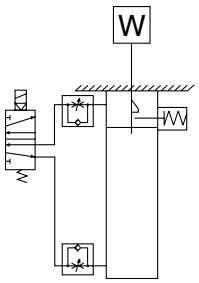
1. Use recommended pneumatic circuit

⚠Caution

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



With locking at head side



With locking at rod side

① Do not use a 3 position solenoid valve.

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

② Back pressure is required to release end lock.

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

③ Release lock when mounting or adjusting the cylinder.

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

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

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

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

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

⑥ Use a speed controller as meter-out.

Meter-in control may not allow lock to release.

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

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

2. Operating pressure

⚠Caution

Use pressures over 0.15 MPa at port with locking mechanism.

3. Exhaust speed

⚠Caution

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

4. Relationship with cushion

⚠Caution

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

5. Release of lock

⚠Warning

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

6. Manual release

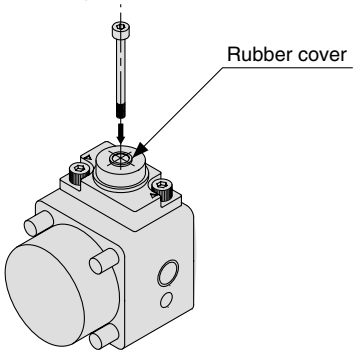
⚠Caution

Non-locking type

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

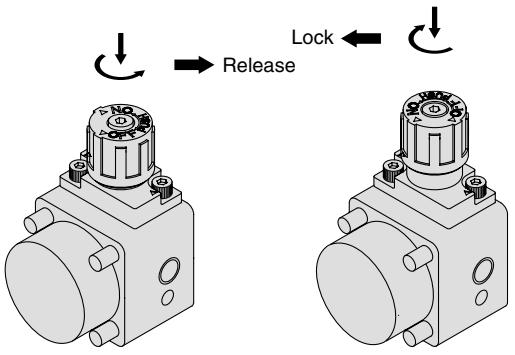
Bore size (mm)	Thread size	Pulling force	Stroke (mm)
32	≥ M2.5 x 0.45 x 25 ℓ	4.9 N	2
40, 50, 63	≥ M3 x 0.5 x 30 ℓ	10 N	3
80, 100	≥ M5 x 0.8 x 40 ℓ	24.5 N	3

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



Locking style

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

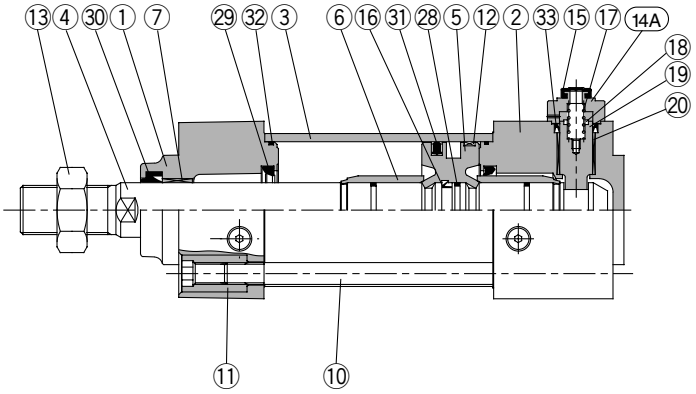


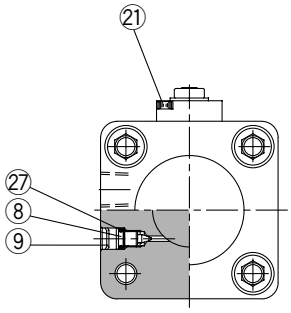
Locked **Released**

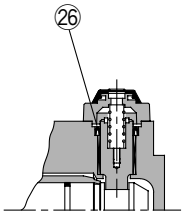
Construction

Locking at head end

Manual release non-locking type: N

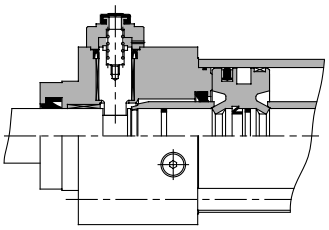


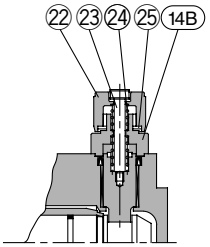




ø80, ø100

Locking at rod end





Manual release non-locking type: L

CJ1
CJP
CJ2
CM2
CG1
MB
MB1
CA2
CS1
CS2

Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Metallic painted
②	Head cover	Aluminum alloy	Metallic painted
③	Cylinder tube	Aluminum alloy	Hard anodized
④	Piston rod	Carbon steel	Hard chrome plated
⑤	Piston	Aluminum alloy	Chromated
⑥	Cushion ring	Aluminum alloy	Anodized
⑦	Bushing	Lead bronze casted	
⑧	Cushion valve	Steel wire	Nickel plated
⑨	Retaining ring	Steel for spring	ø40 to ø100
⑩	Tie rod	Carbon steel	Chromated
⑪	Tie rod nut	Carbon steel	Nickel plated
⑫	Wear ring	Resin	
⑬	Rod end nut	Carbon steel	Nickel plated
14A	Cover A	Aluminum alloy	Painted black
14B	Cover B	Carbon steel	Tufftride
⑮	Rubber cover	Synthetic rubber	
⑯	Piston holder	Urethane	

Component Parts

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

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

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

Replacement Parts/Seal Kit (Locking at both ends)

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

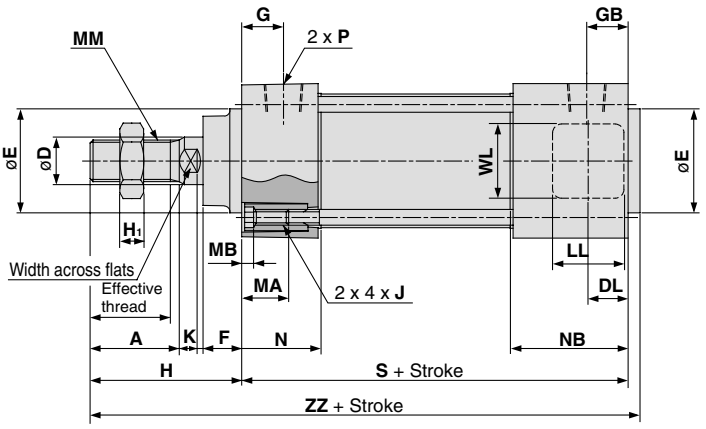
* Seal kits consist of items ㉙ to ㉝, and can be ordered by using the seal kit number corresponding to each bore size.
* Trunnion type should not be disassembled. (Refer to page 328.)
* Seal kit includes a grease pack (ø32 to 50: 10 g, ø63, 80: 20 g, ø100: 30 g).
  Order with the following part number when only the grease pack is needed.
  Grease pack part number: GR-S-010 (10 g), **GR-S-020** (20 g)

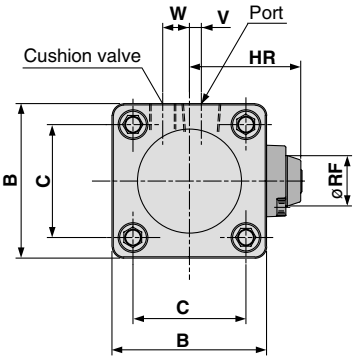
D-□
-X□
Individual -X□
Technical data

Basic: (B)

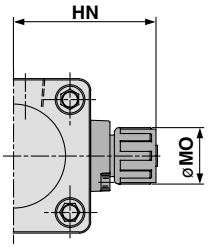
Locking at head end: MBBB Bore size Port thread type — Stroke — H□

Manual release non-locking type: N

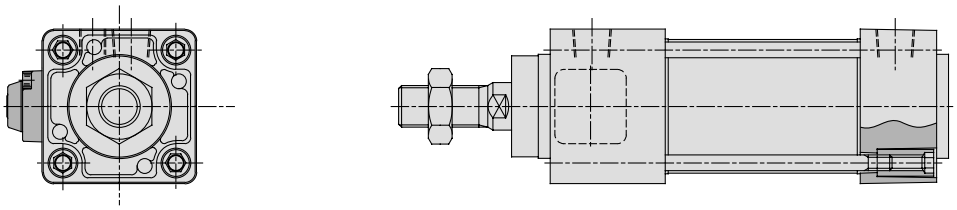




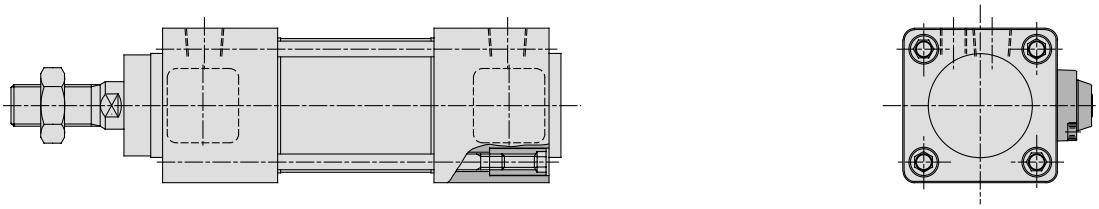
Manual release locking type: L



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



Locking at both ends: MBBB Bore size Port thread type — Stroke — W□



-H□/-R□ (mm)

Bore size (mm)	Stroke range (mm)	Effective thread length	Width across flats	A	B	C	D	DL	E	F	G	GB	H_1	H	HR	HN	J	K	LL	MA	MB
32	to 500	19.5	10	22	46	32.5	12	9	30	13	13	21	6	47	33.5	45	M6 x 1	6	15	16	4
40	to 500	27	14	30	52	38	16	12	35	13	14	27	8	51	38.5	52.5	M6 x 1	6	21	16	4
50	to 600	32	18	35	65	46.5	20	13	40	14	15.5	27.5	11	58	45	59	M8 x 1.25	7	21	16	5
63	to 600	32	18	35	75	56.5	20	13	45	14	16.5	28.5	11	58	50	64	M8 x 1.25	7	21	16	5
80	to 800	37	22	40	95	72	25	16	45	20	19	37	13	72	62	76.5	M10 x 1.5	10	30	16	5
100	to 800	37	26	40	114	89	30	16	55	20	19	37	16	72	71.5	86	M10 x 1.5	10	30	16	5

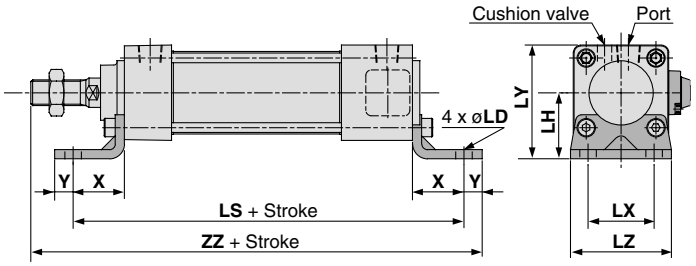
Bore size (mm)	Stroke range (mm)	MM	MO	N	NB	P	RF	S	V	W	WL	ZZ
32	to 500	M10 x 1.25	15	27	35	1/8	11	92	4	6.5	24	143
40	to 500	M14 x 1.5	19	27	40	1/4	11	97	4	9	24	152
50	to 600	M18 x 1.5	19	31.5	43.5	1/4	11	106	5	10.5	24	168
63	to 600	M18 x 1.5	19	31.5	43.5	3/8	11	106	9	12	24	168
80	to 800	M22 x 1.5	23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

-W□

S	ZZ
100	151
110	165
118	180
118	180
150	226
150	226

With Mounting Bracket

Foot(L)/Locking at head end (-H□)



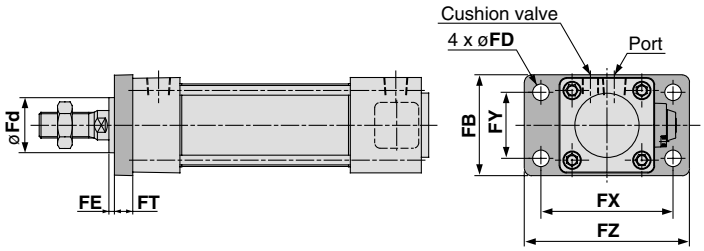
-H□/ -R□ (mm)

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

-W□ (mm)

Bore size (mm)	LS	ZZ
32	144	178
40	158	196
50	172	214
63	172	217
80	210	266
100	214	270

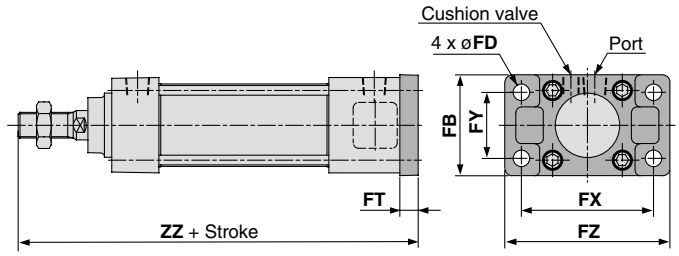
Front flange(F)/Locking at head end (-H□)



-H□/ -R□/ -W□ (mm)

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

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



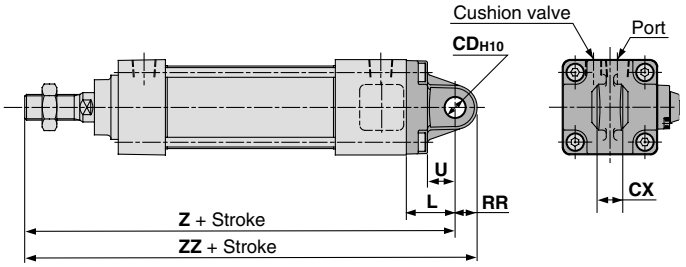
-H□/ -R□ (mm)

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

-W□

Bore size (mm)	ZZ
32	157
40	171
50	188
63	188
80	238
100	238

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



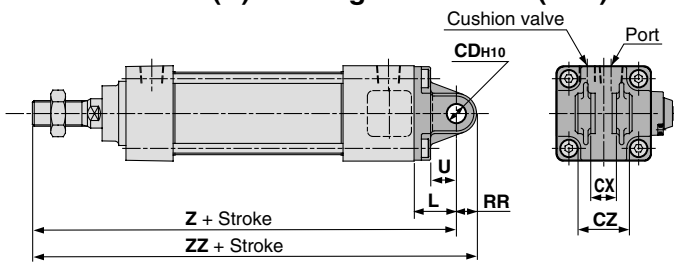
-H□/ -R□ (mm)

Bore size (mm)	Stroke range	L	RR	U	CD_{H10}	$CX^{-0.1}_{-0.3}$	Z	ZZ
32	to 500	23	10.5	13	10	14	162	172.5
40	to 500	23	11	13	10	14	171	182
50	to 600	30	15	17	14	20	194	209
63	to 600	30	15	17	14	20	194	209
80	to 800	42	23	26	22	30	246	269
100	to 800	42	23	26	22	30	246	269

-W□ (mm)

Bore size (mm)	Z	ZZ
32	170	180.5
40	184	195
50	206	221
63	206	221
80	264	287
100	264	287

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



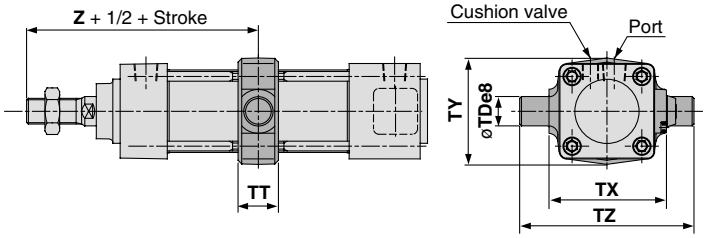
-H□/ -R□ (mm)

Bore size (mm)	Stroke range	L	RR	U	CD_{H10}	$CX^{+0.3}_{+0.1}$	CZ	Z	ZZ
32	to 500	23	10.5	13	10	14	28	162	172.5
40	to 500	23	11	13	10	14	28	171	182
50	to 600	30	15	17	14	20	40	194	209
63	to 600	30	15	17	14	20	40	194	209
80	to 800	42	23	26	22	30	60	246	269
100	to 800	42	23	26	22	30	60	246	269

-W□ (mm)

Bore size (mm)	Z	ZZ
32	170	180.5
40	184	195
50	206	221
63	206	221
80	264	287
100	264	287

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



-H□ (mm)

Bore size (mm)	Stroke range	TD_{e8}	TT	TX	TY	TZ	Z
32	to 500	12	17	50	49	74	89
40	to 500	16	22	63	58	95	93
50	to 600	16	22	75	71	107	105
63	to 600	20	28	90	87	130	105
80	to 800	20	34	110	110	150	129
100	to 800	25	40	132	136	182	129

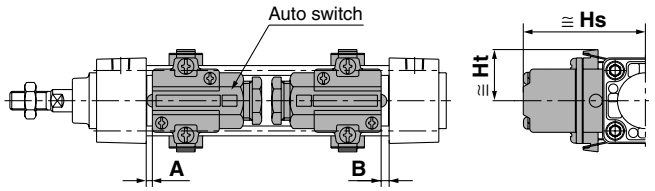
-R□/ -W□

Bore size (mm)	Z
32	97
40	106
50	117
63	117
80	147
100	147

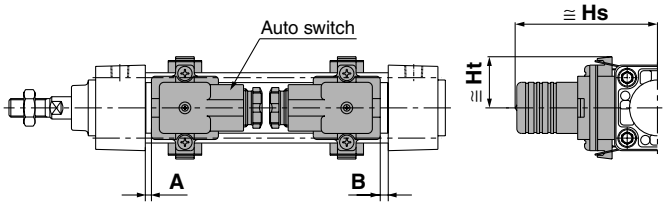
Proper Auto Switch Mounting Position (Detection at stroke end) and Mounting Height

Band mounting

D-A3□/G39/K39

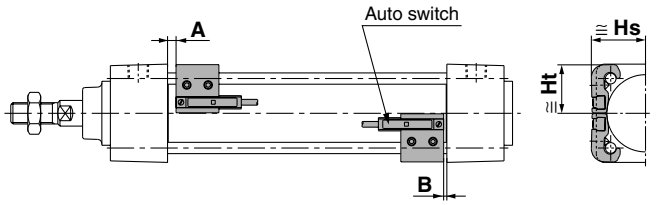


D-A44

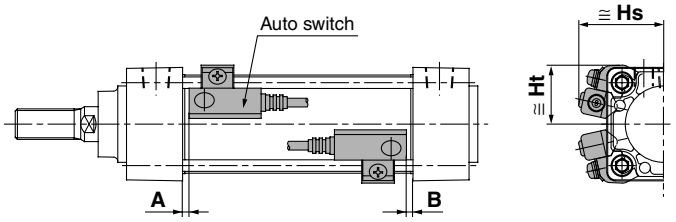


Tie-rod mounting

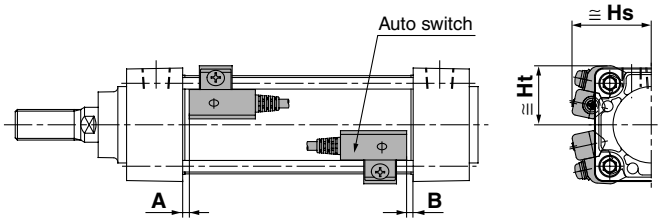
D-A9□/A9□V
D-M9□/M9□V
D-M9□W/M9□WV
D-M9□AL/M9□AVL
D-Z7□/Z80
D-Y59□/Y69□/Y7P/Y7PV
D-Y7□W/Y7□WV/Y7BAL



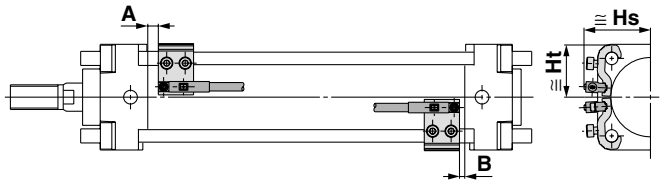
D-A5□/A6□
D-A59W



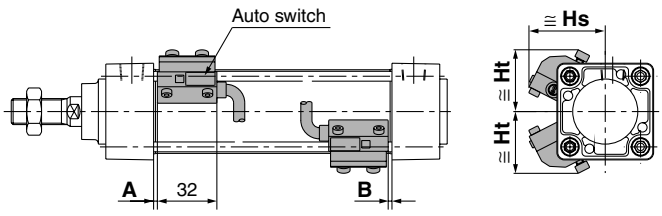
D-F5□/J5□
D-F5□W/J59W/F5BAL
D-F59F/F5NTL



D-P3DW□



D-P4DWL



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

Proper Auto Switch Mounting Position

(mm)

Auto switch model / Bore size	D-A9□ D-A9□V		D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□AL D-M9□AVL		D-A5□ D-A6□		D-A59W		D-F5□W D-J59W D-F5□ D-J5□ D-F5BAL D-F59F		D-F5NTL		D-A3□ D-A44 D-G39 D-K39		D-Z7□ D-Z80 D-Y59□ D-Y69□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV D-Y7BAL		D-P3DW□		D-P4DWL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
32	6.5	4	10.5	8	0.5	0	4.5	2	7	4.5	12	9.5	0.5	0	4	1.5	6	3	3.5	1
40	6.5	4	10.5	8	0.5	0	4.5	2	7	4.5	12	9.5	0.5	0	4	1.5	6	3	3.5	1
50	7	4.5	11	8.5	1	0	5	2.5	7.5	5	12.5	10	1	0	4.5	2	6	4	4	1.5
63	7	4.5	11	8.5	1	0	5	2.5	7.5	5	12.5	10	1	0	4.5	2	6	4	4	1.5
80	10	8.5	14	12.5	4	2.5	8	6.5	10.5	9	15.5	14	4	2.5	7.5	6	4	2.5	7	5.5
100	10	8.5	14	12.5	4	2.5	8	6.5	10.5	9	15.5	14	4	2.5	7.5	6	4	2.5	7	5.5
125	12	12	16	16	6	6	10	10	12.5	12.5	17.5	17.5	6	6	9.5	9.5	6.5	6.5	9	9

∗ Cylinders without an air cushion have different dimensions for proper auto switch mounting positions (A and B). Add the following values to both A and B: 3 mm (ø 32 and 40), 4 mm (ø50 and 63), 5 mm (ø80 and 100), 6 mm (ø125).
Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

Proper Auto Switch Mounting Height

(mm)

Auto switch model / Bore size	D-A9□ D-M9□ D-M9□W D-M9□AL		D-A9□V		D-M9□V D-M9□WV D-M9□AVL		D-A5□ D-A6□ D-A59W		D-F5□ D-J5□ D-F59F D-F5□W D-J59W D-F5BAL D-F5NTL		D-A3□ D-G39 D-K39		D-A44		D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W D-Y7BAL		D-Y69□ D-Y7PV D-Y7□WV		D-P3DW□		D-P4DWL	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
32	24.5	23	27.5	23	30.5	23	35	24.5	32.5	25	67	27.5	77	27.5	25.5	23	26.5	23	34	23	38	31
40	28.5	25.5	31.5	25.5	34	25.5	38.5	27.5	36.5	27.5	71.5	27.5	81.5	27.5	29.5	26	30	26	38	26	42	33
50	33.5	31	36	31	38.5	31	43.5	34.5	41	34	77	—	87	—	33.5	31	34.5	31	42	31	46.5	39
63	38.5	36	40.5	36	43	36	48.5	39.5	46	39	83.5	—	93.5	—	39	36	40	36	50	36	51.5	44
80	46.5	45	49	45	52	45	55	46.5	52.5	46.5	92.5	—	103	—	47.5	45	48.5	45	56	45	58	51.5
100	54	53.5	57	53.5	59.5	53.5	62	55	59.5	55	103	—	113.5	—	55.5	53.5	56.5	53.5	63.5	53.5	65.5	60.5
125	65.5	64.5	68.5	64.5	71	64.5	71.5	66.5	70.5	66.5	115	—	125	—	67.5	65	68.5	65	74.5	64.5	76.5	72

Operating Range

(mm)

Auto switch model	Bore size						
	32	**40**	**50**	**63**	**80**	**100**	**125**
D-A9□/A9□V	7	7.5	8.5	9.5	9.5	10.5	12
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	4	4.5	5	6	6	6	7
D-Z7□/Z80	7.5	8.5	7.5	9.5	9.5	10.5	13
D-A5□/A6□	9	9	10	11	11	11	10
D-A59W	13	13	13	14	14	15	17
D-A3□/A44	9	9	10	11	11	11	10
D-Y59□/Y69□ D-Y7P/Y7□V D-Y7□W/Y7□WV D-Y7BAL	5.5	5.5	7	7.5	6.5	5.5	7
D-F5□/J5□ D-F5□W/J59W D-F5BAL/F5NTL D-F59F	3.5	4	4	4.5	4.5	4.5	5
D-G39/K39	9	9	9	10	10	11	11
D-P3DW□	4.5	5	5	5.5	4	6.5	8.5
D-P4DWL	4	4	4	4.5	4	4.5	4.5

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

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

n: No. of auto switches (mm)

Auto switch model	No. of auto switches	Mounting brackets except center trunnion type		
		ø32, ø40, ø50, ø63	ø80, ø100	ø125
D-A9□	2 (Different surfaces, same surface) 1	15		
	n	$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)		
D-A9□V	2 (Different surfaces, same surface) 1	10		
	n	$10 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)		
D-M9□ D-M9□W	2 (Different surfaces, same surface) 1	15		
	n	$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)		
D-M9□V D-M9□WV	2 (Different surfaces, same surface) 1	10		
	n	$10 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)		
D-M9□AL	2 (Different surfaces, same surface) 1	15		
	n	$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)		
D-M9□AVL	2 (Different surfaces, same surface) 1	15		
	n	$15 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)		
D-A3□ D-G39 D-K39	2 (Different surfaces)	35		
	2 (Same surface)	100		
	n (Different surfaces)	35 + 30 (n – 2) (n = 2, 3, 4···)		
	n (Same surface)	100 + 100 (n – 2) (n = 2, 3, 4···)		
	1	10		
D-A44	2 (Different surfaces)	35		
	2 (Same surface)	55		
	n (Different surfaces)	35 + 30 (n – 2) (n = 2, 3, 4···)		
	n (Same surface)	55 + 50 (n – 2) (n = 2, 3, 4···)		
	1	10		
D-A5□ D-A6□	2 (Different surfaces, same surface) 1	15	20	20
	n (Same surface)	$15 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$20 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$20 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)
D-A59W	2 (Different surfaces, same surface)	20	25	25
	n (Same surface)	$20 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$25 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$25 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)
	1	15	25	25
D-F5□ D-J5□ D-F5□W D-J59W D-F5BAL D-F59F	2 (Different surfaces, same surface)	15	25	25
	n (Same surface)	$15 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$25 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$25 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)
	1	10	25	25
D-F5NTL	2 (Different surfaces, same surface)	15	25	30
	n (Same surface)	$15 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$25 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$30 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)
	1	10	25	30
D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W	2 (Different surfaces, same surface) 1	15		
	n	$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)		

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

n: No. of auto switches (mm)

Auto switch model	No. of auto switches	Mounting brackets except center trunnion type		
		ø32, ø40, ø50, ø63	**ø80, ø100**	**ø125**
D-Y69□ **D-Y7PV** **D-Y7□WV**	2 (Different surfaces, same surface) 1	10		
	n	$10 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)		
D-Y7BAL	2 (Different surfaces, same surface) 1	20		
	n	$20 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)		
D-P3DW□	2 (Different surfaces, same surface) 1	15		
	n	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)		
D-P4DWL	2 (Different surfaces, same surface) 1	15		20
	n	$15 + 65\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)		$20 + 65\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)

Minimum Auto Switch Mounting Stroke: Center Trunnion Type

n: No. of auto switches (mm)

Auto switch model	No. of auto switches	Center trunnion						
		ø32	ø40	ø50	ø63	ø80	ø100	ø125
D-A9□	2 (Different surfaces, same surface) 1	70	75		80	85	95	100
	n	$70 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$75 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$85 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$95 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$100 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-A9□V	2 (Different surfaces, same surface) 1	45	50		55	60	70	75
	n	$45 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$50 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$55 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$60 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$70 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$75 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-M9□ D-M9□W	2 (Different surfaces, same surface) 1	75	80		85	90	95	105
	n	$75 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$85 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$90 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$95 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$105 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-M9□V D-M9□WV	2 (Different surfaces, same surface) 1	50	55		60	65	70	80
	n	$50 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$55 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$60 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$65 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$70 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$80 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-M9□AL	2 (Different surfaces, same surface) 1	80	85		90	95	100	110
	n	$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$85 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$90 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$95 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$100 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$110 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-M9□AVL	2 (Different surfaces, same surface) 1	55	60		65	70	75	85
	n	$55 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$60 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$65 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$70 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$75 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$85 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-A3□ D-G39 D-K39	2 (Different surfaces)	60	65		75	80	85	90
	2 (Same surface)	90	95		100	105	110	125
	n (Different surfaces)	60 + 30 (n – 2) (n = 2, 4, 6, 8···)	65 + 30 (n – 2) (n = 2, 4, 6, 8···)		75 + 30 (n – 2) (n = 2, 4, 6, 8···)	80 + 30 (n – 2) (n = 2, 4, 6, 8···)	85 + 30 (n – 2) (n = 2, 4, 6, 8···)	90 + 30 (n – 2) (n = 2, 4, 6, 8···)
	n (Same surface)	90 + 100 (n – 2) (n = 2, 4, 6, 8···)	95 + 100 (n – 2) (n = 2, 4, 6, 8···)		100 + 100 (n – 2) (n = 2, 4, 6, 8···)	105 + 100 (n – 2) (n = 2, 4, 6, 8···)	110 + 100 (n – 2) (n = 2, 4, 6, 8···)	125 + 100 (n – 2) (n = 2, 4, 6, 8···)
	1	60	65		75	80	85	90
D-A44	2 (Different surfaces) 2 (Same surface)	70	75		80		85	90
	n (Different surfaces)	70 + 30 (n – 2) (n = 2, 4, 6, 8···)	75 + 30 (n – 2) (n = 2, 4, 6, 8···)		80 + 30 (n – 2) (n = 2, 4, 6, 8···)		85 + 30 (n – 2) (n = 2, 4, 6, 8···)	90 + 30 (n – 2) (n = 2, 4, 6, 8···)
	n (Same surface)	70 + 50 (n – 2) (n = 2, 4, 6, 8···)	75 + 50 (n – 2) (n = 2, 4, 6, 8···)		80 + 50 (n – 2) (n = 2, 4, 6, 8···)		85 + 50 (n – 2) (n = 2, 4, 6, 8···)	90 + 50 (n – 2) (n = 2, 4, 6, 8···)
	1	70	75		80		85	90
D-A5□ D-A6□	2 (Different surfaces, same surface) 1	60		80	105	110	115	
	n (Same surface)	$60 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$80 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$105 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$110 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$115 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	
D-A59W	2 (Different surfaces, same surface)	60	70	85	110	115	120	
	n (Same surface)	$60 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$70 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$85 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$110 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$115 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$120 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	
	1	60	70	85	110	115	120	
D-F5□/J5□ D-F5□W D-J59W D-F5BAL D-F59F	2 (Different surfaces, same surface)	90	95		110	115	120	130
	n (Same surface)	$90 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$95 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$110 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$115 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$120 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$130 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
	1	90	95		110	115	120	130
D-F5NTL	2 (Different surfaces, same surface)	100	105		120	125	130	140
	n (Same surface)	$100 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$105 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$120 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$125 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$130 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$140 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
	1	100	105		120	125	130	140
D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W	2 (Different surfaces, same surface) 1	80	85	90		95	100	105
	n	$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$85 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$90 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$95 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$100 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$105 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-Y69□ D-Y7PV D-Y7□WV	2 (Different surfaces, same surface) 1	60	65		70	75	85	85
	n	$60 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$65 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$70 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$75 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$85 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$85 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)

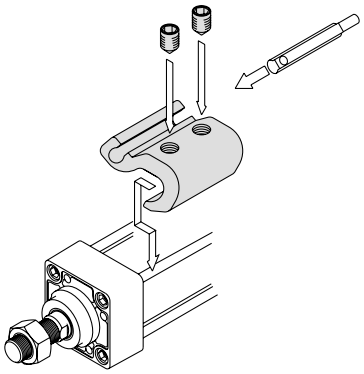
Minimum Auto Switch Mounting Stroke: Center Trunnion Type

n: No. of auto switches (mm)

Auto switch model	No. of auto switches	Center trunnion						
		ø32	ø40	ø50	ø63	ø80	ø100	ø125
D-Y7BAL	2 (Different surfaces, same surface) 1	85	90		100	105	110	115
	n	$85 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$90 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$100 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$105 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$110 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$115 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-P3DW□	2 (Different surfaces, same surface) 1	80	85		90		95	100
	n	$80 + 50\frac{(n-4)}{2}$ (n = 4,8,12,16···)	$85 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$90 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$95 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$100 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-P4DWL	2 (Different surfaces, same surface) 1	120		130		140		150
	n	$120 + 65\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···		$130 + 65\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$140 + 65\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$150 + 65\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)

Auto Switch Mounting Bracket: Part No.

Auto switch model	Bore size (mm)						
	ø32	ø40	ø50	ø63	ø80	ø100	ø125
D-A9□/A9□V D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	BMB5-032	BMB5-032	BA7-040	BA7-040	BA7-063	BA7-063	BA7-080
D-A3□/A44 D-G39/K39	BMB2-032	BMB2-040	BMB1-050	BMB1-063	BMB1-080	BMB1-100	BS1-125
D-A5□/A6□/A59W D-F5□/J5□ D-F5□W/J59W D-F59F/F5BAL D-F5NTL	BT-03	BT-03	BT-05	BT-05	BT-06	BT-06	BT-08
D-P3DW□	BMB9-032S	BMB9-032S	BMB9-050S	BMB9-050S	BA9T-063S	BA9T-063S	BA9T-080S
D-P4DWL	BMB3T-040	BMB3T-040	BMB3T-050	BMB3T-050	BMB3T-080	BMB3T-080	BAP2T-080
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BAL	BMB4-032	BMB4-032	BMB4-050	BMB4-050	BA4-063	BA4-063	BA4-080



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

[Stainless Steel Mounting Screw Kit]

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

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

Note 1) Refer to page 1365 for the details of BBA1.
The above stainless steel screws are used when a cylinder is shipped with D-F5BAL type auto switches.
When only a switch is shipped independently, BBA1 is attached.

Note 2) When using D-M9□A(V)L/Y7BAL, do not use the steel set screws which is included with the auto switch mounting brackets above (BMB5-032, BA7-□□□, BMB4-□□□, BA4-□□□). Order a stainless steel screw set (BBA1) separately, and select and use the M4 x 6L stainless steel set screws included in the BBA1.

In addition to the auto switches listed above, the following auto switches are also available. Refer to pages 1263 to 1371 for the detailed specifications.

Auto switch type	Part no.	Electrical entry (Entry direction)	Features
Reed auto switch	D-A93V, A96V	Grommet (perpendicular)	—
	D-A90V		Without indicator light
	D-A53, A56, Z73, Z76	Grommet (in-line)	—
	D-A67, Z80		Without indicator light
Solid state auto switch	D-M9NV, M9PV, M9BV	Grommet (perpendicular)	—
	D-Y69A, Y69B, Y7PV		
	D-M9NWV, M9PWV, M9BWV		Diagnostic indication (2-color)
	D-Y7NWV, Y7PWV, Y7BWV		
	D-M9NAVL, M9PAVL, M9BAVL		Water resistant (2-color indication)
	D-F59, F5P, J59	Grommet (in-line)	—
	D-Y59A, Y59B, Y7P		
	D-F59W, F5PW, J59W		Diagnostic indication (2-color)
	D-Y7NW, Y7PW, Y7BW		
	D-F5BAL, Y7BAL		Water resistant (2-color indication)
	D-F5NTL		With timer
	D-P5DWL		Magnetic field resistant (2-color indication)

∗ 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 page 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 air is supplied, the cushion valve may shoot out from the cover.

Bore (mm)	Cushion valve width across flats	Socket wrench
32, 40	2.5	JIS 4648 Hexagonal spanner wrench 2.5
50, 63	3	JIS 4648 Hexagonal spanner wrench 3
80, 100	4	JIS 4648 Hexagonal spanner wrench 4
125	4	JIS 4648 Hexagonal spanner wrench 4

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

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

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

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

Bore (mm)		Bolt	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
	Other	MB-80-48BC1251		
125	Foot	M12 x 1.75 x 25 (brazier head cap screw)	8	30.1
	Other	M12 x 1.75 x 28 (brazier head cap screw)		

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

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

5. There is no mounting interchangeability with serise CA1.

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

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

Non-rotating rod (Double acting, Single rod)

Handling

⚠ Caution

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

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

Mounting and Piping

⚠ Caution

1. Mounting a workpiece on the rod end

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