Air Cylinder

ø32, ø40, ø50, ø63, ø80, ø100, ø125

New

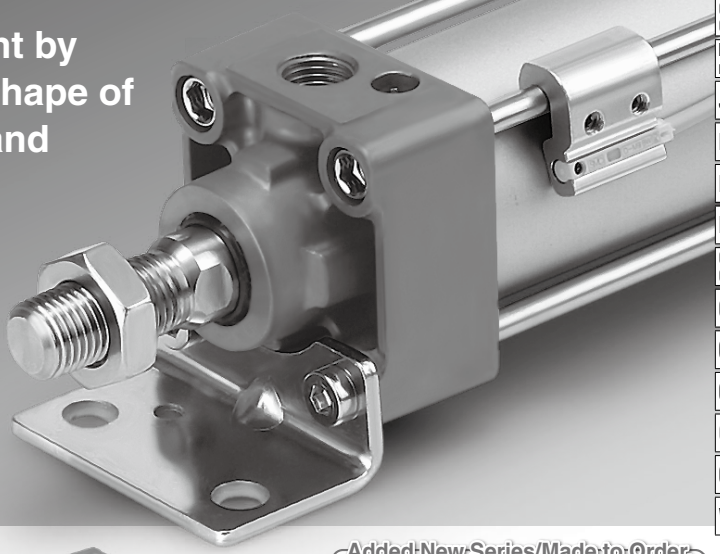
RoHS

Weight 16% lighter (ø63-100 stroke)

Added ø125 to standard type.

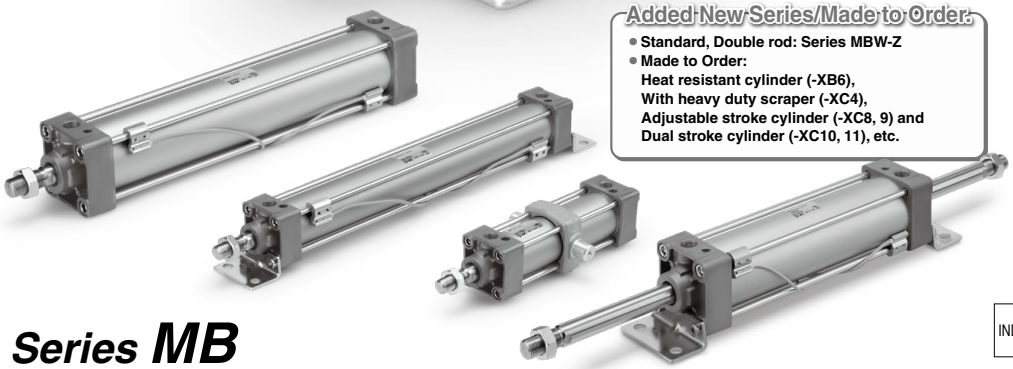
New Series MB: **1.69 kg** ◀◀◀ Existing model: **2.01 kg**

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



Added New Series/Made to Order.

- **Standard, Double rod: Series MBW-Z**
- **Made to Order:**
  Heat resistant cylinder (-XB6),
  With heavy duty scraper (-XC4),
  Adjustable stroke cylinder (-XC8, 9) and
  Dual stroke cylinder (-XC10, 11), etc.



Series MB

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

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

Example) **MDB[D]-40-100Z-[N][V]-M9BW**

•**Mounting style**

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

∗ Applicable to only D (Double clevis) and T (Center trunnion) mounting styles.

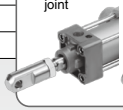
N: Kit of pivot bracket and double clevis

Kit of pivot bracket and trunnion

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

With rod end bracket

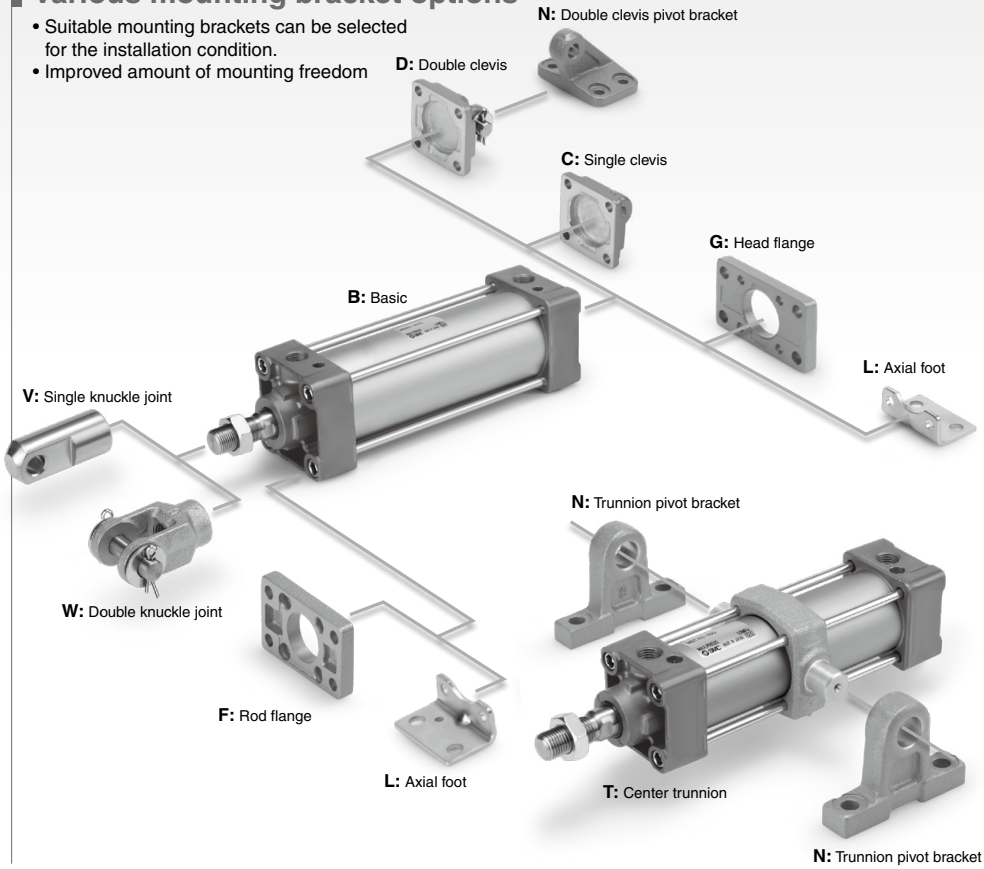
V: Single knuckle joint



W: Double knuckle joint

Various mounting bracket options

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



Lightweight

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

(kg)

Bore size (mm)	New MB	Reduction rate	Existing model
32	0.59	18	0.72
40	0.84	17	1.01
50	1.43	16	1.71
63	1.69	16	2.01
80	2.95	17	3.57
100	4.18	13	4.82
125	6.90	0	6.90

∗ At 100 stroke

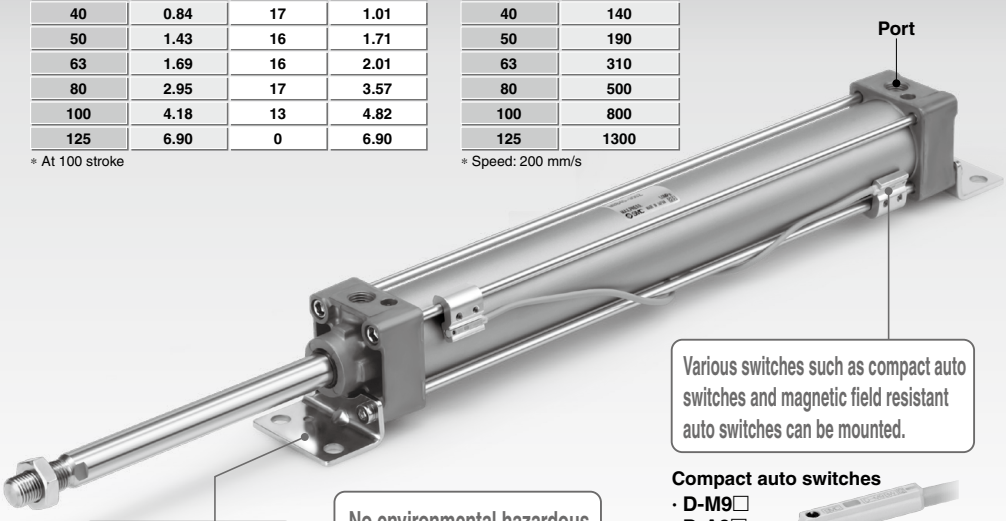
Applicable speed/load

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

(kg)

Bore size (mm)	Maximum load mass
32	80
40	140
50	190
63	310
80	500
100	800
125	1300

∗ Speed: 200 mm/s



Various switches such as compact auto switches and magnetic field resistant auto switches can be mounted.

Compact auto switches
- **D-M9□**
- **D-A9□**

Magnetic field resistant auto switches
- **D-P3DW**
- **D-P4DW**

Mounting dimensions are the same as the existing product.

No environmental hazardous substances used

Lead free bushing is used as sliding material. Compliant with EU RoHS directive.

Series Variations

Series	Type	Cushion	Bore size (mm) 32	40	50	63	80	100	125	Built-in magnet	With rod boot	Page
Standard Single rod **MB-Z**	Double acting, Single rod	Rubber / Air	●	●	●	●	●	●	●	●	●	Page 691
Standard Double rod **MBW-Z**	Double acting, Double rod	Rubber / Air	●	●	●	●	●	●	●	●	●	Page 701
Non-rotating rod Single rod **MBK**	Double acting, Single rod	Rubber / Air	●	●	●	●	●	●	●	●	●	Page 707
Non-rotating rod Double rod **MBKW**	Double acting, Double rod	Rubber / Air	●	●	●	●	●	●	●	●	●	Page 711
With end lock **MBB**	Double acting, Single rod	Rubber / Air	●	●	●	●	●	●	●	●	●	Page 715
Smooth Cylinder **MBY-Z**	Double acting, Single rod	Rubber	●	●	●	●	●	●	●	●	●	CAT.ES20-235
Low friction **MB□Q**	Use the new series **"Smooth Cylinder MBY Series"** to realize bi-directional low friction and low-speed operation. (Refer to the **WEB catalog** or "CAT.ES20-235" catalog.)											

Series MB

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

Series	MB (Standard type)							
Action/Type	Double acting							
	Single rod				Double rod			
Cushion	Air		Rubber		Air		Rubber	
Page	Page 691				Page 701			

Symbol	Specifications	Applicable bore size	ø32 to ø100	ø125	ø32 to ø100	ø125	ø32 to ø100	ø125	ø32 to ø100	ø125
Standard	Standard	ø32 to ø125	●	●	●	●	●	●	●	●
Long st	Long stroke		●	●	●	●	●	●	●	●
D	Built-in magnet		●	●	●	●	●	●	●	●
MB□-□$^{J}_{K}$	With rod boot		●	●	●	●	●	●	●	●
25A	Copper (Cu) and Zinc (Zn)-free Note 1)	ø32 to ø100	●	○	○	○	○	○	○	○
MB□$^{S}_{V}$	Water resistant	ø32 to ø125	●	○	●	○	○	○	○	○
10-	Clean series Note 6)		○	○	○	○	○	○	○	○
20-	Copper Note 5) and Fluorine-free Note 6)		●	○	●	○	●	○	●	○
XA□	Change of rod end shape	ø32 to ø125	◎	◎	◎	◎	◎	◎	◎	◎
XB5	Oversized rod cylinder Note 6)		◎	○	○	○	○	○	○	○
XB6	Heat resistant cylinder (–10 to 150°C)		◎	○	○	○	◎	○	○	○
XB13	Low speed cylinder (5 to 50 mm/s) Note 6)		◎	○	◎	○	○	○	○	○
XC3	Special port location Note 6)		◎	○	◎	○	◎	○	◎	○
XC4	With heavy duty scraper		◎	○	◎	○	◎	○	◎	○
XC5	Heat resistant cylinder (–10 to 110°C)		◎	○	○	○	◎	○	○	○
XC6	Piston rod and rod end nut made of stainless steel Note 6)	ø32 to ø125	—	◎	—	◎	—	○	—	○
XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel	ø32 to ø125	◎	○	◎	○	◎	○	◎	○
XC8	Adjustable stroke cylinder/Adjustable extension type		◎	○	◎	○	—	—	—	—
XC9	Adjustable stroke cylinder/Adjustable retraction type		◎	○	◎	○	—	—	—	—
XC10	Dual stroke cylinder/Double rod type		◎	○	◎	○	—	—	—	—
XC11	Dual stroke cylinder/Single rod type		◎	○	◎	○	—	—	—	—
XC12	Tandem cylinder		◎	○	◎	○	○	○	○	○
XC14	Change of trunnion bracket mounting position		◎	◎	◎	◎	◎	◎	◎	◎
XC22	Fluororubber seal		◎	◎	◎	◎	◎	○	◎	○
XC27	Double clevis and double knuckle joint pins made of stainless steel		◎	◎	◎	◎	—	—	—	—
XC29	Double knuckle joint with spring pin		◎	○	◎	○	○	○	○	○
XC30	Rod trunnion		◎	○	◎	○	◎	○	◎	○
XC35	With coil scraper		◎	○	◎	○	◎	○	◎	○
XC65	Made of stainless steel (Combination of XC7 and XC68)		◎	○	◎	○	○	○	○	○
XC68	Made of stainless steel (with hard chrome plated piston rod)		◎	○	◎	○	◎	○	◎	○
X1184	Cylinder with heat resistant reed auto switch (–10 to 120°C)		◎	○	○	○	○	○	○	○

Note 1) For details, refer to the **WEB catalog**.
Note 2) For details about the smooth cylinder, refer to the **WEB catalog** or "CAT.ES20-235" catalog.
Note 3) Simple specials except XC14A and XC14B.

Use the new series "**Smooth Cylinder MBY Series**" to realize bi-directional low friction and low-speed operation. (Refer to the **WEB catalog** or "CAT.ES20-235" catalog.)

MBK Note 6) (Non-rotating rod type)				MBB Note 6) (With end lock)	MBY Note 2) (Smooth Cylinder)	MB□Q Note 6) (Low friction type)	
Double acting							
Single rod		Double rod		Single rod	Single rod	Single rod	
Air	Rubber	Air	Rubber	Air	—	—	
Page 707		Page 711		Page 715	—	Page 723	
ø32 to ø100							Symbol
●	●	●	●	●	●	●	Standard
●	●	●	●	○	○	○	Long st
●	●	●	●	●	●	●	D
●	●	●	●	●	○	○	MB□-□$^{J}_{K}$
—	—	—	—	○	—	—	25A
—	—	—	—	○	—	○	MB□$^{R}_{V}$
○	○	○	○	○	—	○	10-
—	—	—	—	○	—	—	20-
◎	◎	○	○	◎	◎	◎	XA□
○	○	○	○	○	—	○	XB5
○	○	○	○	○	—	—	XB6
○	○	○	○	○	—	—	XB13
◎	◎	◎	◎	○	—	◎	XC3
—	—	—	—	○	—	—	XC4
○	○	○	○	○	—	—	XC5
◎	◎	◎	◎	○	—	◎	XC6
◎	◎	◎	◎	◎	◎	◎	XC7
◎	◎	—	—	○	○	○	XC8
◎	◎	—	—	○	○	○	XC9
◎Note 4)	◎Note 4)	—	—	◎	○	○	XC10
○	○	—	—	○	○	○	XC11
○	○	○	○	○	—	—	XC12
◎	◎	○	○	◎Note 3)	◎	◎	XC14
○	○	○	○	○	—	—	XC22
◎	◎	○	○	◎	◎	◎	XC27
○	○	○	○	◎	◎	◎	XC29
◎	◎	◎	◎	◎	◎	◎	XC30
—	—	—	—	○	—	○	XC35
○	○	○	○	○	◎	○	XC65
—	—	—	—	—	◎	—	XC68
—	—	—	—	○	—	—	X1184

Note 4) XC10 specification for the MBK series is the non-rotating type on both sides. For only one side, submit a special order request form.
Note 5) Copper-free for the externally exposed part.
Note 6) The cover shape is the same as the existing product.

Air Cylinder: Standard Type
Double Acting, Single Rod

Series MB

RoHS

ø32, ø40, ø50, ø63, ø80, ø100, ø125

How to Order

	MB	B	32		–	50			Z	–			–						
With auto switch	MDB	B	32		–	50			Z	–			–	M9BW		–			

With auto switch (Built-in magnet)

Mounting style

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

∗ Mounting brackets other than trunnion type are shipped together.

Bore size

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

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to "Standard Strokes" on page 692.

Suffix (Rod boot)

Nil	None
J	Nylon tarpaulin
K	Heat resistant tarpaulin

Suffix (Cushion)

Nil	Air cushion
N∗	Rubber bumper

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

Accessories 1

Nil	No bracket
N	Pivot bracket

∗ Only for D and T mounting styles.
∗ Pivot bracket is shipped together with the product.

Auto switch

Nil	Without auto switch

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

Number of auto switches

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

Made to Order
For details, refer to page 692.

Accessories 2

Nil	No bracket
V	Single knuckle joint
W	Double knuckle joint

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

∗ **Refer to "Ordering Example of Cylinder Assembly" on page 692.**

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

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage 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 auto switch	——	Grommet	Yes	3-wire (NPN)	5 V,12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)	24 V		M9P	—	●	●	●	○	○		
				2-wire	12 V		M9B	—	●	●	●	○	○		
		Terminal conduit		3-wire (NPN)	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	12 V		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∗∗	—	○	○	●	○	○	—	
	With diagnostic output (2-color indication)			4-wire (NPN)	5 V,12 V		F59F	—	●	—	●	○	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire (Non-polar)	—		P3DW	—	●	—	●	●	○	—	
							P4DW	—	—	—	●	●	○		
Reed auto switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	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	—	●	—	●	—	—			

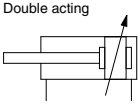
∗∗ Water-resistant type auto switch can be mounted on the above models, but in such case SMC cannot guarantee water resistance.
A water-resistant type cylinder is recommended for use in an environment which requires water resistance.

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

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

∗ Since there are other applicable auto switches than listed above, refer to page 731 for details.
∗ For details about auto switches with pre-wired connector, refer to the **WEB catalog** or the Best Pneumatics No. 2.
For the D-P3DW□, refer to the **WEB catalog** or the Best Pneumatics No. 2.
∗ The D-A9□/M9□□□/P3DW□ auto switches are shipped together, (but not assembled). (However, auto switch mounting brackets are assembled for the D-A9□/M9□□□ before shipment.)

Symbol
Double acting



Made to Order

Made to Order
(For details, refer to pages 733 to 747.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB5	Oversized rod cylinder*1 *2 *3
-XB6	Heat resistant cylinder (–10 to 150°C)
-XC3	Special port location*3
-XC4	With heavy duty scraper
-XC5	Heat resistant cylinder (–10 to 110°C)
-XC6	Piston rod and rod end nut made of stainless steel*3 *4
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel
-XC8	Adjustable stroke cylinder/Adjustable extension type
-XC9	Adjustable stroke cylinder/Adjustable retraction type
-XC10	Dual stroke cylinder/Double rod type
-XC11	Dual stroke cylinder/Single rod type
-XC12	Tandem cylinder
-XC14	Change of trunnion bracket mounting position
-XC22	Fluororubber seal
-XC27	Double clevis and double knuckle joint pins made of stainless steel
-XC29	Double knuckle joint with spring pin
-XC30	Rod trunnion
-XC35	With coil scraper
-XC65	Made of stainless steel (Combination of XC7 and XC68)
-XC68	Made of stainless steel (with hard chrome plated piston rod)
-X1184	Cylinder with heat resistant reed auto switch (–10 to 120°C)

*1 Air cushion only
*2 Except ø125
*3 The cover shape is the same as the existing product.
*4 ø125 only

For special port location (-XC3), the mounting bracket and port location can be determined using the standard product corresponding to the operating conditions.

For made of stainless steel (-XC6), use made of stainless steel (with hard chrome plated piston rod) (-XC68) that the surface treatment is performed on the piston rod with the same specifications.

Refer to pages 724 to 730 for cylinders with auto switches
- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Minimum stroke for auto switch mounting
- Auto switch mounting brackets/Part no.
- Operating range

Specifications

Bore size (mm)	32	40	50	63	80	100	125
Action	Double acting, Single rod						
Fluid	Air						
Proof pressure	1.5 MPa						
Maximum operating pressure	1.0 MPa						
Minimum operating pressure	0.05 MPa						
Ambient and fluid temperature	Without auto switch: –10 to 70°C With auto switch: –10 to 60°C (No freezing)						
Lubricant	Not required (Non-lube)						
Piston speed	50 to 1000 mm/s						
Stroke length tolerance	Up to 250: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$, 1001 to 1500: $^{+1.8}_{0}$, 1501 to 2000: $^{+2.2}_{0}$						
Cushion	Air cushion or Rubber bumper						
Port size (Rc)	1/8	1/4		3/8		1/2	
Mounting	Basic, Axial foot, Rod flange, Head flange Single clevis, Double clevis, Center trunnion						

Standard Strokes

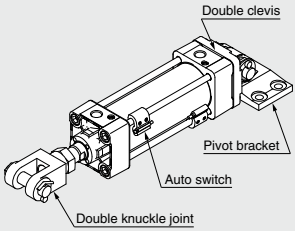
(mm)

Bore size	Standard stroke		Max. manufacturable stroke
	Stroke range ①	Stroke range ②	
32	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	Up to 1000	Up to 2700
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	Up to 1800	
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, 900, 1000	Up to 2000	

Note 1) Manufacture of intermediate strokes is possible. (Spacers are not used.)
Note 2) Applicable strokes should be confirmed according to the usage. For details, refer to "Air Cylinders Model Selection" on front matter pages of the Best Pneumatics No. 2 or the **WEB catalog**. In addition, the products that exceed the stroke range ① might not be able to fulfill the specifications due to the deflection etc.
Note 3) Please consult with SMC for manufacturability and the part numbers when exceeding the stroke range ②.
Note 4) The stroke range with rod boot is up to 1000 mm. Please consult with SMC when exceeding 1000 mm strokes.

Ordering Example of Cylinder Assembly

Cylinder model: MDBD32-50Z-NW-M9BW



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

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

Accessories

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

Rod Boot Material

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

* Max. ambient temperature for rod boot itself.

Mounting Brackets/Part No.

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

Note 1) Order two foots per cylinder.
Note 2) Accessories for each mounting bracket are as follows.
Axial foot, Rod/Head flange, Single clevis/Body mounting bolt; Double clevis/Body mounting bolt, Clevis pin, Flat washers and Split pins. → Refer to page 700 for details.

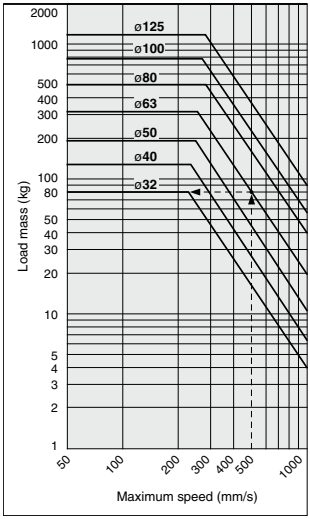
Theoretical Force

(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)

Allowable Kinetic Energy



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

Weights

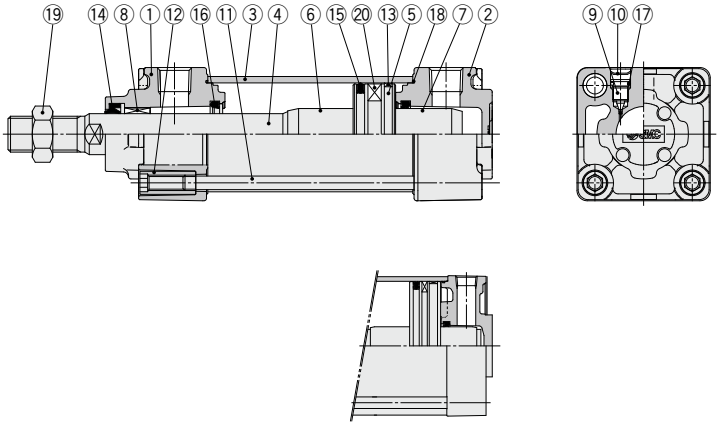
(kg)

Bore size (mm)		32	40	50	63	80	100	125
Basic weight	Basic	0.44	0.59	1.04	1.29	2.41	3.36	5.48
	Axial foot	0.56	0.73	1.26	1.57	2.91	4.02	7.56
	Rod/Head flange	0.73	0.96	1.49	2.08	3.86	6.67	9.64
	Single clevis	0.69	0.82	1.38	1.92	3.52	6.53	8.05
	Double clevis	0.7	0.86	1.47	2.08	3.81	7.05	8.25
	Center trunnion	0.73	0.95	1.52	2.09	3.96	7.03	8.46
Additional weight per 50 mm of stroke	All mounting brackets	0.11	0.16	0.26	0.27	0.42	0.56	0.71
Accessories	Single knuckle joint	0.15	0.23	0.26	0.26	0.60	0.83	1.08
	Double knuckle joint (with pin)	0.22	0.37	0.43	0.43	0.87	1.27	1.58

Calculation
Example) **MBB32-100Z** (Basic, ø32, 100 stroke)
- Basic weight ····· 0.44 (Basic, ø32)
- Additional weight ····· 0.11/50 stroke
- Cylinder stroke ····· 100 stroke

0.44 + 0.11 x 100/50 = **0.66 kg**

Construction



MB125

Component Parts

No.	Description	Material	Q'ty	Note
1	**Rod cover**	Aluminum die-cast	1	Trivalent chromated
2	**Head cover**	Aluminum die-cast	1	Trivalent chromated
3	**Cylinder tube**	Aluminum alloy	1	Hard anodized
4	**Piston rod**	Carbon steel	1	Hard chrome plating
5	**Piston**	Aluminum alloy	1	
6	**Cushion ring**	Aluminum alloy	1	Anodized
7	**Cushion ring B**	Aluminum alloy	1	Anodized
8	**Bushing**	Bearing alloy	1	
9	**Cushion valve**	Steel wire	2	Trivalent zinc chromated
10	**Retaining ring**	Steel for spring	2	ø40 to 125

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

Replacement Parts/Seal Kit

Bore size (mm)	Kit no.	Contents
32	MB32Z–PS	Set of the nos. ⑭, ⑮, ⑯, ⑱
40	CA2–40Z–PS	
50	CA2–50Z–PS	
63	CA2–63Z–PS	
80	CA2–80Z–PS	
100	CA2–100Z–PS	
125	MB125–PS	

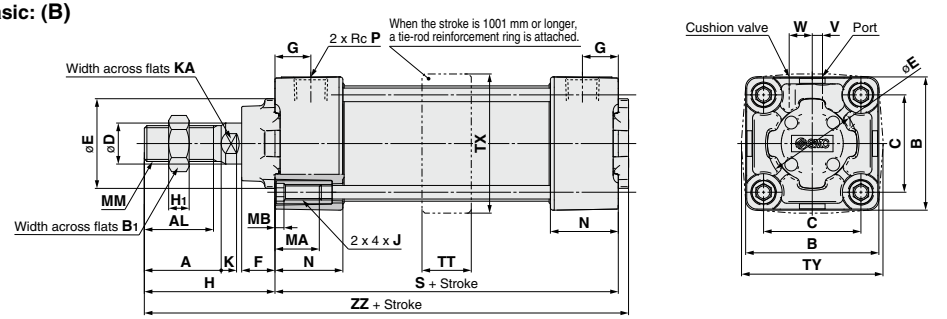
∗ Seal kits consist of items ⑭, ⑮, ⑯, ⑱, and can be ordered by using the seal kit number corresponding to each bore size.
∗ Center trunnion type should not be disassembled. (Refer to page 748.)
∗ The seal kit includes a grease pack (10 g for ø32 to ø50, 20 g for ø63 and ø80, 30 g for ø100 and ø125).
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

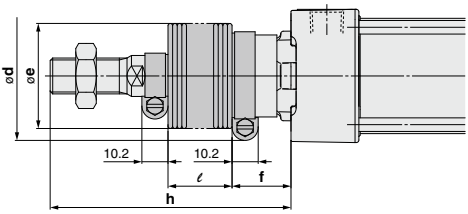
Water resistant air cylinders are also available in the MB series, which are suitable for use on machine tools, where exposure to coolant is possible and applicable for food machinery and automobile washing equipment in an environment where water splashes. Please refer to the **WEB catalog** or the Best Pneumatics No. 2 for more information.

Standard

Basic: (B)



With rod boot



(mm)

Bore size (mm)	A	AL	B	B_1	C	D	E	F	G	H	H_1	J	K	KA	MA	MB	MM	N	P	S	TT	TX	TY	V	W	ZZ
32	22	19.5	46	17	32.5	12	30	13	13	47	6	M6 x 1	6	10	16	4	M10 x 1.25	27	1/8	84	—	—	—	4	6.5	135
40	30	27	52	22	38	16	35	13	14	51	8	M6 x 1	6	14	16	4	M14 x 1.5	27	1/4	84	22	55	58	4	9	139
50	35	32	65	27	46.5	20	40	14	15.5	58	11	M8 x 1.25	7	18	16	5	M18 x 1.5	31.5	1/4	94	22	68	71	5	10.5	156
63	35	32	75	27	56.5	20	45	14	16.5	58	11	M8 x 1.25	7	18	16	5	M18 x 1.5	31.5	3/8	94	28	81	81	9	12	156
80	40	37	95	32	72	25	45	20	19	72	13	M10 x 1.5	10	22	16	5	M22 x 1.5	38	3/8	114	34	102	102	11.5	14	190
100	40	37	114	41	89	30	55	20	19	72	16	M10 x 1.5	10	26	16	5	M26 x 1.5	38	1/2	114	40	124	124	17	15	190
125	54	50	136	41	110	32	60	27	19	97	16	M12 x 1.75	13	27	20	6	M27 x 2	38	1/2	120	50	148	148	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

Rubber Bumper

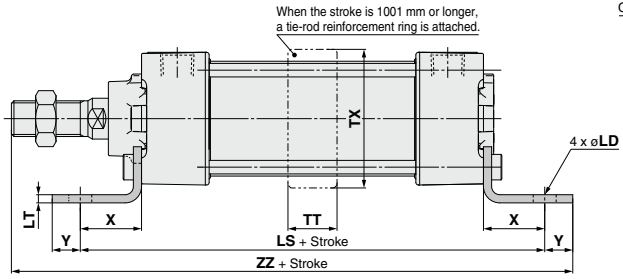
Bore size (mm)	S	ZZ
32	90	141
40	90	145
50	102	164
63	102	164
80	124	200
100	124	200
125	132	235

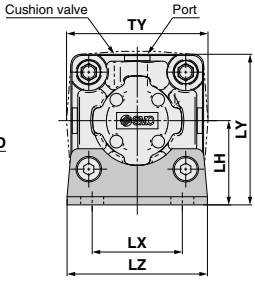
∗ Model without air cushion is designed to include rubber bumpers. Since the bumpers are attached to the both sides of the piston, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

Standard/With Mounting Bracket

* Refer to Basic (B) for other dimensions.

Axial foot: (L)





(mm)

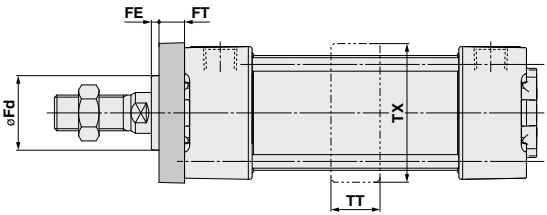
Bore size (mm)	LD	LH	LS	LT	LX	LY	LZ	TT	TX	TY	X	Y	ZZ
32	7	30	128	3.2	32	53	50	—	—	—	22	9	162
40	9	33	132	3.2	38	59	55	22	55	58	24	11	170
50	9	40	148	3.2	46	72.5	70	22	68	71	27	11	190
63	12	45	148	3.6	56	82.5	80	28	81	81	27	14	193
80	12	55	174	4.5	72	102.5	100	34	102	102	30	14	230
100	14	65	178	4.5	89	122	120	40	124	124	32	16	234
125	14	81	210	8	90	149	136	50	148	148	45	20	282

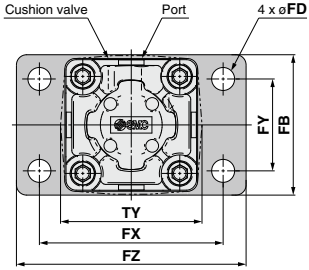
Rubber Bumper

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

Rod flange: (F)





(mm)

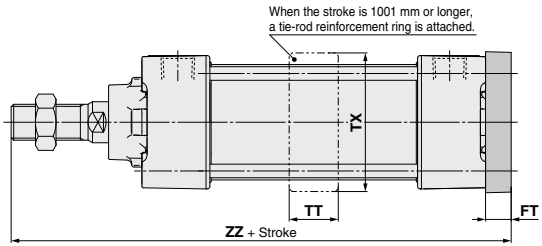
Bore size (mm)	FB	FD	FE	FT	FX	FY	FZ	Fd	TT	TX	TY
32	50	7	3	10	64	32	79	24.5	—	—	—
40	55	9	3	10	72	36	90	30.5	22	55	58
50	70	9	2	12	90	45	110	36.5	22	68	71
63	80	9	2	12	100	50	120	39.5	28	81	81
80	100	12	4	16	126	63	153	39.5	34	102	102
100	120	14	4	16	150	75	178	46.5	40	124	124
125	138	14	7	20	180	102	216	58	50	148	148

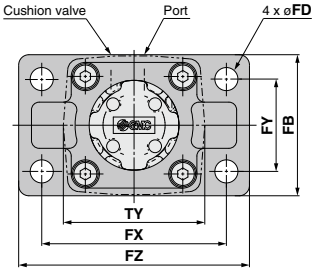
* Model without air cushion is designed to include rubber bumpers. Since the bumpers are attached to the both sides of the piston, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

Standard/With Mounting Bracket

∗ Refer to Basic (B) for other dimensions.

Head flange: (G)





(mm)

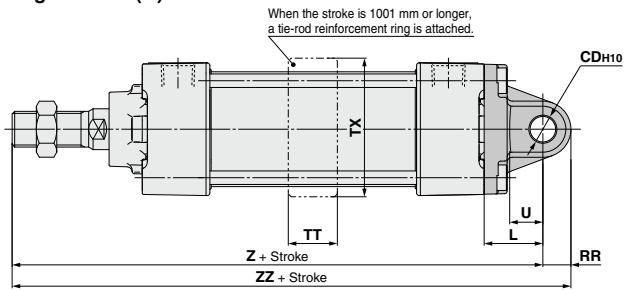
Bore size (mm)	FB	FD	FT	FX	FY	FZ	TT	TX	TY	ZZ
32	50	7	10	64	32	79	—	—	—	141
40	55	9	10	72	36	90	22	55	58	145
50	70	9	12	90	45	110	22	68	71	164
63	80	9	12	100	50	120	28	81	81	164
80	100	12	16	126	63	153	34	102	102	202
100	120	14	16	150	75	178	40	124	124	202
125	138	14	20	180	102	216	50	148	148	237

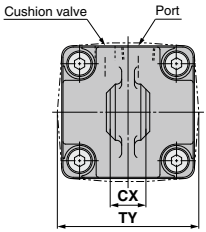
Rubber Bumper

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

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

Single clevis: (C)





(mm)

Bore size (mm)	CD_{H10}	CX	L	RR	TT	TX	TY	U	Z	ZZ
32	$10^{+0.058}_{0}$	$14^{-0.1}_{-0.3}$	23	10.5	—	—	—	13	154	164.5
40	$10^{+0.058}_{0}$	$14^{-0.1}_{-0.3}$	23	11	22	55	58	13	158	169
50	$14^{+0.070}_{0}$	$20^{-0.1}_{-0.3}$	30	15	22	68	71	17	182	197
63	$14^{+0.070}_{0}$	$20^{-0.1}_{-0.3}$	30	15	28	81	81	17	182	197
80	$22^{+0.084}_{0}$	$30^{-0.1}_{-0.3}$	42	23	34	102	102	26	228	251
100	$22^{+0.084}_{0}$	$30^{-0.1}_{-0.3}$	42	23	40	124	124	26	228	251
125	$25^{+0.084}_{0}$	$32^{-0}_{-0.3}$	50	28	50	148	148	30	267	295

Rubber Bumper

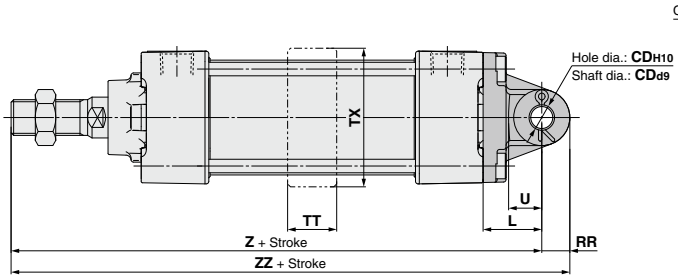
Bore size (mm)	Z	ZZ
32	160	170.5
40	164	175
50	190	205
63	190	205
80	238	261
100	238	261
125	279	307

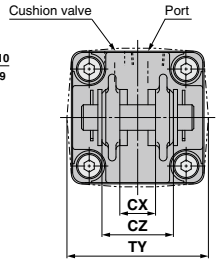
∗ Model without air cushion is designed to include rubber bumpers.
Since the bumpers are attached to the both sides of the piston, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

Standard/With Mounting Bracket

∗ Refer to Basic (B) for other dimensions.

Double clevis: (D)





(mm)

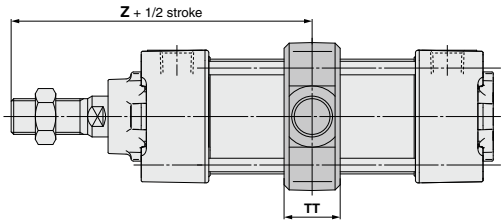
Bore size (mm)	CD_{H10}	CD_{d9}	CX	CZ	L	RR	TT	TX	TY	U	Z	ZZ
32	$10^{+0.058}_{0}$	$10^{-0.040}_{-0.076}$	$14^{+0.3}_{+0.1}$	28	23	10.5	—	—	—	13	154	164.5
40	$10^{+0.058}_{0}$	$10^{-0.04}_{-0.076}$	$14^{+0.3}_{+0.1}$	28	23	11	22	55	58	13	158	169
50	$14^{+0.070}_{0}$	$14^{-0.050}_{-0.093}$	$20^{+0.3}_{+0.1}$	40	30	15	22	68	71	17	182	197
63	$14^{+0.070}_{0}$	$14^{-0.050}_{-0.093}$	$20^{+0.3}_{+0.1}$	40	30	15	28	81	81	17	182	197
80	$22^{+0.084}_{0}$	$22^{-0.065}_{-0.117}$	$30^{+0.3}_{+0.1}$	60	42	23	34	102	102	26	228	251
100	$22^{+0.084}_{0}$	$22^{-0.065}_{-0.117}$	$30^{+0.3}_{+0.1}$	60	42	23	40	124	124	26	228	251
125	$25^{+0.084}_{0}$	$25^{-0.065}_{-0.117}$	$32^{+0.3}_{+0.1}$	64	50	28	50	148	148	30	267	295

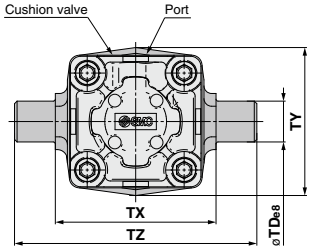
Rubber Bumper

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

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

Center trunnion: (T)





(mm)

Bore size (mm)	TD_{e8}	TT	TX	TY	TZ	Z
32	$12^{-0.032}_{-0.059}$	17	50	49	74	89
40	$16^{-0.032}_{-0.059}$	22	63	58	95	93
50	$16^{-0.032}_{-0.059}$	22	75	71	107	105
63	$20^{-0.040}_{-0.073}$	28	90	87	130	105
80	$20^{-0.040}_{-0.073}$	34	110	110	150	129
100	$25^{-0.040}_{-0.073}$	40	132	136	182	129
125	$25^{-0.040}_{-0.073}$	50	160	160	210	157

Rubber Bumper

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

∗ Model without air cushion is designed to include rubber bumpers.
Since the bumpers are attached to the both sides of the piston, the "Z" dimension is longer than the cylinder with air cushion as follows: ø32, ø40: +3 mm, ø50, ø63: +4 mm, ø80, ø100: +5 mm, ø125: +6 mm

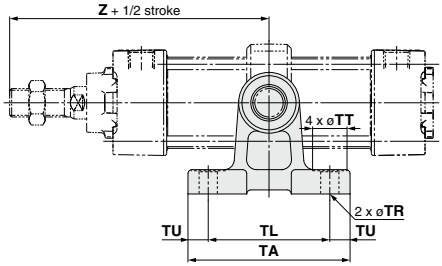
Pivot Bracket/Trunnion and Double Clevis Pivot Bracket

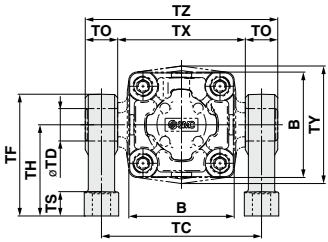
Part No.

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

Note) Order 2 trunnion pivot brackets per cylinder.

Trunnion pivot bracket





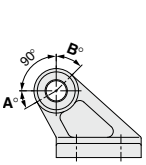
(mm)

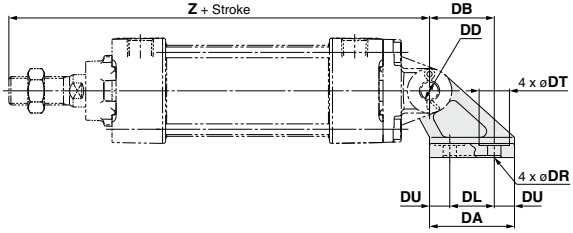
Part no.	Bore size (mm)	B	TA	TL	TU	TC	TX	TE	TO	TR	TT	TS	TH	TF	Z**	TD_{H10}
MB-S03	32	46	62	45	8.5	62	50	74	12	7	13	10	35	47	89	$12^{+0.070}_{0}$
MB-S04	40	52	80	60	10	80	63	97	17	9	17	12	45	60	93	$16^{+0.070}_{0}$
	50	65	80	60	10	92	75	109	17	9	17	12	45	60	105	$16^{+0.070}_{0}$
MB-S06	63	75	100	70	15	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	$25^{+0.084}_{0}$

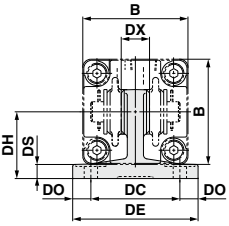
Rubber Bumper

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	$25^{+0.084}_{0}$

Rubber Bumper

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

Rotating Angle

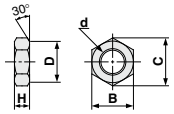
Bore size (mm)	A°	B°	A° + B° + 90°
32, 40	25°	45°	160°
50, 63	40°	60°	190°
80, 100	30°	55°	175°
125	30°	50°	170°

** Model without air cushion is designed to include rubber bumpers.
Since the bumpers are attached to the both sides of the piston, the "Z" dimension is longer than the cylinder with air cushion as follows: ø32, ø40: +3 mm, ø50, ø63: +4 mm, ø80, ø100: +5 mm, ø125: +6 mm

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

Dimensions of Accessories

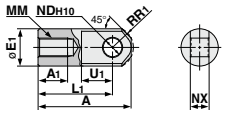
Rod end nut
(Standard)



(mm)

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

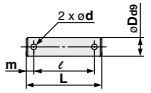
I type
Single knuckle joint



(mm)

Part no.	Bore size (mm)	A	A_1	E_1	L_1	MM	R_1	U_1	ND_{H10}	NX
I-03M	**32**	40	14	20	30	M10 x 1.25	12	16	$10^{+0.058}_{0}$	$14^{+0.10}_{-0.30}$
I-04M	**40**	50	19	22	40	M14 x 1.5	12.5	19	$10^{+0.058}_{0}$	$14^{+0.10}_{-0.30}$
I-05M	**50, 63**	64	24	28	50	M18 x 1.5	16.5	24	$14^{+0.070}_{0}$	$20^{-0.10}_{-0.30}$
I-08M	**80**	80	26	40	60	M22 x 1.5	23.5	34	$22^{+0.084}_{0}$	$30^{-0.10}_{-0.30}$
I-10M	**100**	80	26	40	60	M26 x 1.5	23.5	34	$22^{+0.084}_{0}$	$30^{-0.10}_{-0.30}$
I-12M	**125**	119	36	46	92	M27 x 2	28.5	34	$25^{+0.084}_{0}$	$32^{-0.10}_{-0.30}$

Knuckle joint pin
Clevis pin

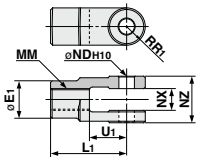


(mm)

Part no.	Bore size (mm) Clevis	Bore size (mm) Knuckle	D_{d9}	L	ℓ	m	d Drill through	Applicable split 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) Split pins and flat washers are included. Note 2) Only pins are included when shipped.

Y type
Double knuckle joint



(mm)

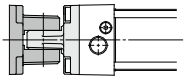
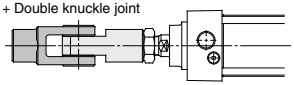
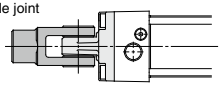
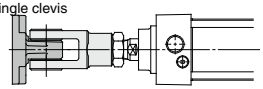
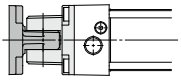
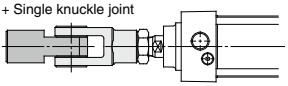
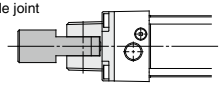
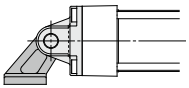
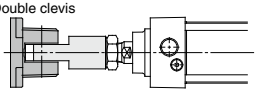
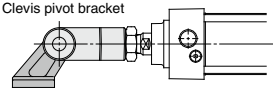
Part no.	Bore size (mm)	E_1	L_1	MM	R_1	U_1	ND_{H10}	NX	NZ
Y-03M Note 1)	**32**	20	30	M10 x 1.25	10	16	$10^{+0.058}_{0}$	$14^{+0.30}_{+0.10}$	$28^{-0.10}_{-0.30}$
Y-04M Note 1)	**40**	22	40	M14 x 1.5	11	19	$10^{+0.058}_{0}$	$14^{+0.30}_{+0.10}$	$28^{-0.10}_{-0.30}$
Y-05M Note 1)	**50, 63**	28	50	M18 x 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, split pins and flat washers are included. Note 2) A pin and split pins are included.

Bracket Combinations

Bracket combination available ▶Refer to the figure below.

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

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

Air Cylinder: Standard Type
Double Acting, Double Rod

Series MBW

ø32, ø40, ø50, ø63, ø80, ø100, ø125

How to Order

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

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

With auto switch
(Built-in magnet)

Mounting style

B	Basic
L	Axial foot
F	Rod flange
T	Center trunnion

∗ Mounting brackets other than trunnion type are shipped together.

Bore size

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

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to "Standard Strokes" on page 702.

Suffix (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)

Auto switch

Nil	Without auto switch

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

Number of auto switches

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

Made to Order
For details, refer to page 702.

Suffix (Cushion)

Nil	Air cushion
N∗	Rubber bumper

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

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

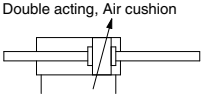
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Tie-rod mounting	Auto switch model: Band mounting	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	——	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	**M9N**	—	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)			**M9P**	—	●	●	●	○	○		
				2-wire		12 V	**M9B**	—	●	●	●	○	○		
		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 auto switch	——	Grommet	Yes	3-wire (Equiv. to NPN)	—	5 V	—	**A96**	—	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	100 V	—	**A93**	—	●	—	●	●	—	—	Relay, PLC
			Yes			100 V or less	—	**A90**	—	●	—	●	—	—	IC circuit	
			No			100 V, 200 V	—	**A54**	—	●	—	●	●	—	—	
			Yes			200 V or less	—	**A64**	—	●	—	●	—	—	—	
		Terminal conduit				—	—	**A33**	—	—	—	—	—	—	—	
						100 V, 200 V	—	**A34**	—	—	—	—	—	—		PLC
		DIN terminal					—	**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. Please contact SMC regarding water resistant types with the above model numbers.

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

∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ Since there are other applicable auto switches than listed above, refer to page 731 for details.
∗ For details about auto switches with pre-wired connector, refer to the **WEB catalog** or the Best Pneumatics No. 2.
For the D-P3DW□, refer to the **WEB catalog** or the Best Pneumatics No. 2.
∗ The D-A9□/M9□□□/P3DW□ auto switches are shipped together, (but not assembled). (However, auto switch mounting brackets are assembled for the D-A9□/M9□□□ before shipment.)

Symbol
Double acting, Air cushion



Specifications

Bore size (mm)	32	40	50	63	80	100	125
Action	Double acting, Double rod						
Fluid	Air						
Proof pressure	1.5 MPa						
Max. operating pressure	1.0 MPa						
Min. operating pressure	0.05 MPa						
Ambient and fluid temperature	Without auto switch: –10 to 70°C 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						
Cushion Note)	Air cushion or Rubber bumper						
Port size (Rc, NPT, G)	1/8	1/4		3/8		1/2	
Mounting	Basic, Axial foot, Rod flange, Center trunnion						

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

Standard Strokes

(mm)

Bore size	Standard stroke		Max. manufacturable stroke
	Stroke range ①	Stroke range ②	
32	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	Up to 1000	Up to 1800
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500		
50	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600	Up to 1200	
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	Up to 1500	
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, 900, 1000		

Note 1) Manufacture of intermediate strokes is possible. (Spacers are not used.)
Note 2) Applicable strokes should be confirmed according to the usage. For details, refer to "Air Cylinders Model Selection" on front matter pages of the Best Pneumatics No. 2 or the **WEB catalog**. In addition, the products that exceed the stroke range ① might not be able to fulfill the specifications due to the deflection etc.
Note 3) Please consult with SMC for manufacturability and the part numbers when exceeding the stroke range ②.
Note 4) The stroke range with rod boot is up to 1000 mm. Please consult with SMC when exceeding 1000 mm strokes.

Accessories

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

Rod Boot Material

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

* Max. ambient temperature for rod boot itself.

Mounting Brackets/Part No.

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

* Order two foots per cylinder.

Made to Order

Made to Order
(For details, refer to pages 733 to 747.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat resistant cylinder (–10 to 150°C)
-XC3	Special port location*1 *2
-XC4	With heavy duty scraper
-XC5	Heat resistant cylinder (–10 to 110°C)
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel
-XC14	Change of trunnion bracket mounting position
-XC22	Fluororubber seal
-XC30	Rod trunnion
-XC35	With coil scraper
-XC68	Made of stainless steel (with hard chrome plated piston rod)

*1 The cover shape is the same as the existing product.
*2 ø125 only

For special port location (-XC3), the mounting bracket and port location can be determined using the standard product corresponding to the operating conditions.

For made of stainless steel (-XC6), use made of stainless steel (with hard chrome plated piston rod) (-XC68) that the surface treatment is performed on the piston rod with the same specifications.

Refer to pages 724 and 730 for cylinders with auto switches.

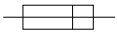
- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Minimum stroke for auto switch mounting
- Auto switch mounting brackets/Part no.
- Operating range

Water Resistant Air Cylinder

Water resistant air cylinders are also available in the MB series, 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 the **WEB catalog** or the Best Pneumatics No. 2 for more information.

Theoretical Force

(Unit: N) OUT ← IN →



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

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

Weights/Aluminum Tube

(kg)

Bore size (mm)		**32**	**40**	**50**	**63**	**80**	**100**	**125**
Basic weight	Basic	0.56	0.78	1.37	1.64	3.05	4.23	6.48
	Axial foot	0.68	0.92	1.59	1.92	3.55	4.89	8.56
	Rod flange	0.85	1.15	1.82	2.43	4.50	7.54	10.64
	Center trunnion	0.85	1.14	1.85	2.44	4.60	7.90	9.46
Additional weight per 50 mm of stroke	All mounting brackets	0.15	0.24	0.37	0.38	0.61	0.82	1.02
Accessories	Single knuckle joint	0.15	0.23	0.26	0.26	0.60	0.83	1.08
	Double knuckle joint (with pin)	0.22	0.37	0.43	0.43	0.87	1.27	1.58

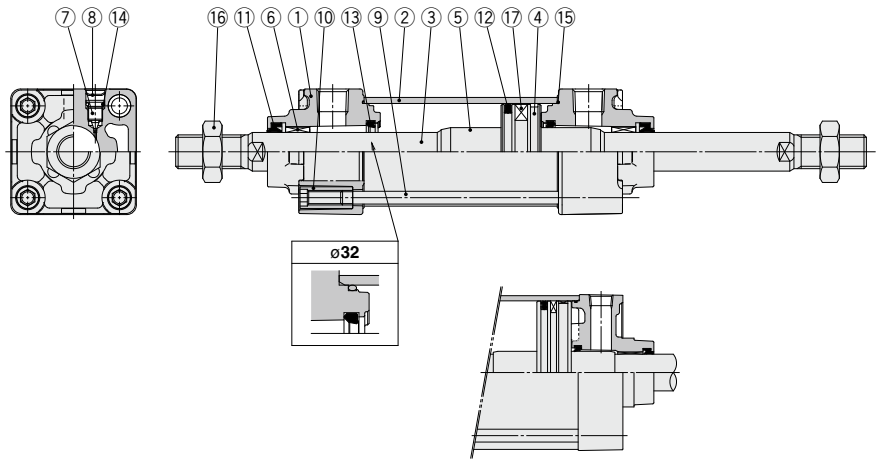
Calculation

Example) **MBWB32-100Z** (Basic, ø32, 100 stroke)

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

0.56 + 0.15 x 100/50 = **0.86 kg**

Construction



MBW125

Component Parts

No.	Description	Material	Q'ty	Note
1	**Rod cover**	Aluminum die-cast	2	Trivalent chromated
2	**Cylinder tube**	Aluminum alloy	1	Hard anodized
3	**Piston rod**	Carbon steel	1	Hard chrome plating
4	**Piston**	Aluminum alloy	1	
5	**Cushion ring**	Aluminum alloy	2	Anodized
6	**Bushing**	Bearing alloy	2	
7	**Cushion valve**	Steel wire	2	Trivalent zinc chromated
8	**Retaining ring**	Steel for spring	2	ø40 to 125
9	**Tie rod**	Carbon steel	4	Trivalent zinc chromated

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

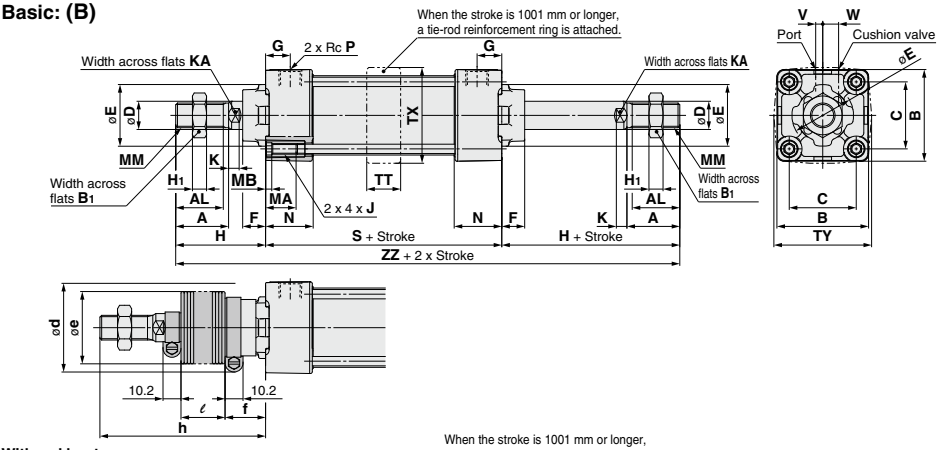
Replacement Parts/Seal Kit

Bore size (mm)	Kit no.	Contents
32	MBW32Z–PS	Set of the nos. ⑪, ⑫, ⑬, ⑮
40	CA2W40Z–PS	
50	CA2W50Z–PS	
63	CA2W63Z–PS	
80	CA2W80Z–PS	
100	CA2W100Z–PS	
125	MBW125–PS	

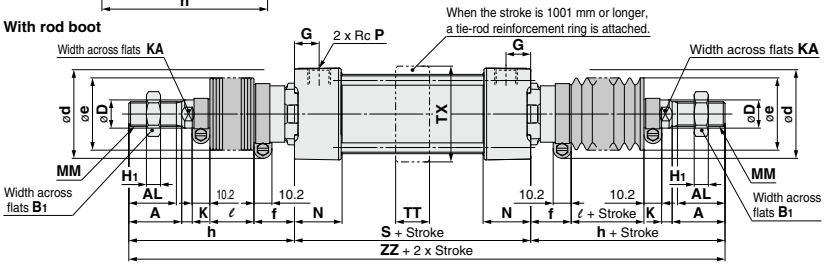
∗ Seal kits consist of items ⑪, ⑫, ⑬, ⑮, and can be ordered by using the seal kit number corresponding to each bore size.
∗ Trunnion type should not be disassembled. (Refer to page 748.)
∗ The seal kit includes a grease pack (10 g for ø32 to ø50, 20 g for ø63 and ø80, 30 g for ø100 and ø125).
Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g), **GR-S-020** (20 g)

Standard

Basic: (B)



With rod boot



Rubber Bumper

Bore size (mm)	S	ZZ
32	90	184
40	90	192
50	102	218
63	102	218
80	124	268
100	124	268
125	132	326

(mm)

Bore size (mm)	A	AL	B	B1	C	D	E	F	G	H	H1	J	K	KA	MA	MB	MM	N	P	S	TT	TX	TY	V	W	ZZ
32	22	19.5	46	17	32.5	12	30	13	13	47	6	M6 x 1	6	10	16	4	M10 x 1.25	27	1/8	84	—	—	—	4	6.5	178
40	30	27	52	22	38	16	35	13	14	51	8	M6 x 1	6	14	16	4	M14 x 1.5	27	1/4	84	22	55	58	4	9	186
50	35	32	65	27	46.5	20	40	14	15.5	58	11	M8 x 1.25	7	18	16	5	M18 x 1.5	31.5	1/4	94	22	68	71	5	10.5	210
63	35	32	75	27	56.5	20	45	14	16.5	58	11	M8 x 1.25	7	18	16	5	M18 x 1.5	31.5	3/8	94	28	81	81	9	12	210
80	40	37	95	32	72	25	45	20	19	72	13	M10 x 1.5	10	22	16	5	M22 x 1.5	38	3/8	114	34	102	102	11.5	14	258
100	40	37	114	41	89	30	55	20	19	72	16	M10 x 1.5	10	26	16	5	M26 x 1.5	38	1/2	114	40	124	124	17	15	258
125	54	50	136	41	110	32	60	27	19	97	16	M12 x 1.75	13	27	20	6	M27 x 2.0	38	1/2	120	50	148	148	17	15	314

With Rod Boot

(mm)

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

Note) ZZ indicates dimensions for double side rod boot. (mm)

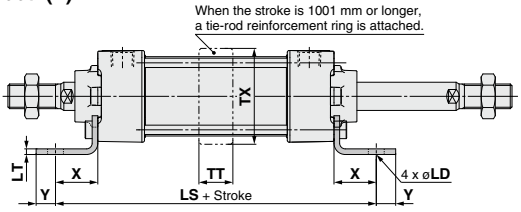
Bore size (mm)	ZZ Note)										
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000
32	230	256	280	306	356	406	456	—	—	—	—	—
40	246	272	296	322	372	422	472	—	—	—	—	—
50	272	298	322	348	398	448	498	548	—	—	—	—
63	272	298	322	348	398	448	498	548	—	—	—	—
80	316	342	366	392	442	492	542	592	642	692	—	—
100	316	342	366	392	442	492	542	592	642	692	—	—
125	360	380	400	420	460	500	540	580	620	660	700	740

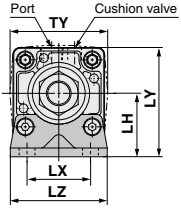
∗ Model without air cushion is designed to include rubber bumpers. Since the bumpers are attached to the both sides of the piston, the overall length is longer than the cylinder with air cushion as follows: ø32, ø40: +6 mm, ø50, ø63: +8 mm, ø80, ø100: +10 mm, ø125: +12 mm

Standard: With Mounting Bracket

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

Axial foot: (L)

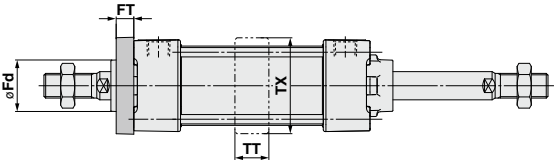


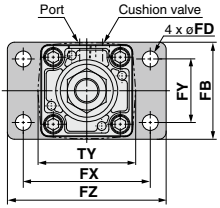


(mm)

Bore size (mm)	X	Y	LD	LH	LS∗	LT	LX	LY	LZ	TT	TX	TY
32	22	9	7	30	128	3.2	32	53	50	—	—	—
40	24	11	9	33	132	3.2	38	59	55	22	55	58
50	27	11	9	40	148	3.2	46	72.5	70	22	68	71
63	27	14	12	45	148	3.6	56	82.5	80	28	81	81
80	30	14	12	55	174	4.5	72	102.5	100	34	102	102
100	32	16	14	65	178	4.5	89	122	120	40	124	124
125	45	20	14	81	210	8	90	149	136	50	148	148

Rod flange: (F)

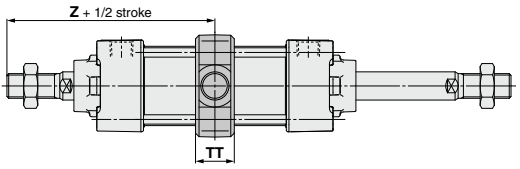


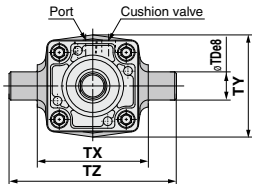


(mm)

Bore size (mm)	FB	FD	FT	FX	FY	FZ	Fd	TT	TX	TY
32	50	7	10	64	32	79	25	—	—	—
40	55	9	10	72	36	90	31	22	55	58
50	70	9	12	90	45	110	38.5	22	68	71
63	80	9	12	100	50	120	39.5	28	81	81
80	100	12	16	126	63	153	45	34	102	102
100	120	14	16	150	75	178	54	40	124	124
125	138	14	20	180	102	216	57.5	50	148	148

Center trunnion: (T)





(mm)

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

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

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

Air Cylinder: Non-rotating Rod Type
Double Acting, Single Rod
Series MBK
ø32, ø40, ø50, ø63, ø80, ø100

How to Order

MBK L 32 □ – 50 □ □ – □

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

With auto switch
(Built-in magnet)

Mounting style

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

Bore size

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

Auto switch

Nil	Without auto switch

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

Number of auto switches

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

Made to Order
For details, refer to page 708.

Suffix (Cushion)

Nil	Air cushion
N∗	Rubber bumper

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

Suffix (Rod boot)

Nil	None
J	Nylon tarpaulin
K	Heat resistant tarpaulin

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to "Standard Strokes" on page 708.

Built-in Magnet Cylinder Model

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

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

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage 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 auto switch	——	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)	24 V		M9P	—	●	●	●	○	○		
				2-wire	12 V		M9B	—	●	●	●	○	○		
		Terminal conduit		3-wire (NPN)	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 auto switch	——	Grommet	Yes	3-wire (Equiv. to NPN)	—	5 V	—	A96	—	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	A93	—	●	—	●	●	—	—	Relay, PLC
							100 V or less	A90	—	●	—	●	—	—	IC circuit	
			Yes				100 V, 200 V	A54	—	●	—	●	●	—	—	
			No				200 V or less	A64	—	●	—	●	—	—		
		Terminal conduit	Yes				—	A33	—	—	—	—	—	—	—	PLC
							100 V, 200 V	—	A34	—	—	—	—	—		
		DIN terminal					—	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. Please contact SMC regarding water resistant types with the above model numbers.

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

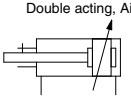
∗ Solid state auto switches marked with "○" are produced upon receipt of order.

∗ Since there are other applicable auto switches than listed above, refer to page 731 for details.

∗ For details about auto switches with pre-wired connector, refer to the **WEB catalog** or the Best Pneumatics No. 2.
For the D-P3DW□, refer to the **WEB catalog** or the Best Pneumatics No. 2.

∗ The D-A9□/M9□□□/P3DW□ auto switches are shipped together, (but not assembled). (However, auto switch mounting brackets are assembled for the D-A9□/M9□□□ before shipment.)

Symbol
Double acting, Air cushion



Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting, Single rod					
Fluid	Air					
Proof pressure	1.5 MPa					
Maximum operating pressure	1.0 MPa					
Minimum operating pressure	0.05 MPa					
Ambient and fluid temperature	Without auto switch: –10 to 70°C With auto switch: –10 to 60°C (No freezing)					
Lubricant	Non-lube					
Piston speed	50 to 1000 mm/s					
Stroke length tolerance	Up to 250: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$, 1001 to 1500: $^{+1.8}_{0}$					
Cushion Note)	Air cushion or Rubber bumper					
Port size (Rc, NPT, G)	1/8	1/4		3/8		1/2
Mounting	Basic, Axial foot, Rod flange, Head flange, Single clevis, Double clevis, Center trunnion					
Non-rotating accuracy	±0.5°		±0.5°		±0.3°	
Allowable rotating torque N·m or less	0.25	0.45	0.64		0.79	0.93

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

Made to Order

Made to Order
(For details, refer to pages 733 to 747.)

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

∗ All Made-to-Order products have the same cover shapes as the existing products.

Refer to pages 724 to 730 for cylinders with auto switches

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

Standard Strokes

(mm)

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

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

Accessories

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

Rod Boot Material

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

∗ Max. ambient temperature for rod boot itself.

Mounting Brackets/Part No.

Bore size (mm)	32	40	50	63	80	100
Axial foot Note 1)	MB-L03	MB-L04	MB-L05	MB-L06	MB-L08	MB-L10
Rod/Head 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) Order two foots per cylinder.
Note 2) Accessories for each mounting bracket are as follows. Axial foot, Rod/Head flange, Single clevis/Body mounting bolt; Double clevis/Body mounting bolt, Clevis pin, Flat washers and Split pins. → Refer to page 700 for details.

Theoretical Force

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

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

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

Weights

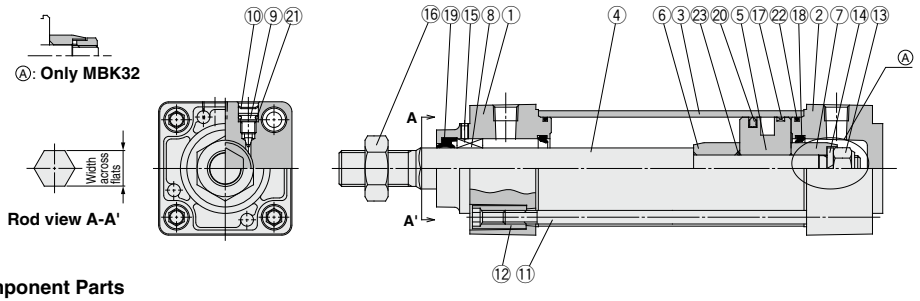
(kg)

Bore size (mm)		32	40	50	63	80	100
Basic weight	Basic	0.50	0.66	1.21	1.51	2.58	3.73
	Axial foot	0.62	0.83	1.41	1.75	3.23	4.36
	Rod/Head 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
	Center trunnion	0.79	1.02	1.69	2.31	4.13	7.40
Additional weight per 50 mm of stroke	All mounting brackets	0.11	0.15	0.26	0.27	0.40	0.52
Accessories	Single knuckle joint	0.15	0.23	0.26	0.26	0.60	0.83
	Double knuckle joint (with pin)	0.22	0.37	0.43	0.43	0.87	1.27

Calculation
Example) **MBKB32-100** (Basic, ø32, 100 stroke)
- Basic weight····· 0.50 (Basic, ø32)
- Additional weight····· 0.11/50 stroke
- Cylinder stroke····· 100 stroke

0.50 + 0.11 x 100/50 = **0.72 kg**

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	Trivalent zinc chromated
10	**Retaining ring**	Steel for spring	ø40 to ø100
11	**Tie rod**	Carbon steel	Trivalent zinc chromated
12	**Tie rod nut**	Carbon steel	Trivalent zinc chromated

No.	Description	Material	Note
13	**Piston nut**	Rolled steel	
14	**Washer**	Steel wire	
15	**Lock nut**	Steel wire	
16	**Rod end nut**	Carbon steel	Trivalent zinc chromated
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

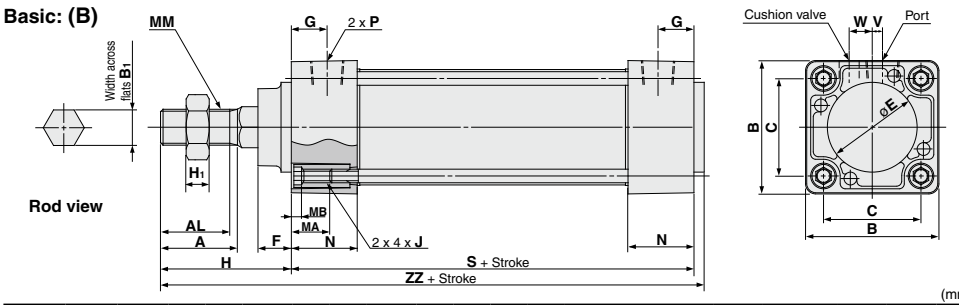
Bore size (mm)	Kit no.	Contents
32	MBK32-PS	Set of the nos. ⑱, ⑲, ⑳, ㉒
40	MBK40-PS	
50	MBK50-PS	
63	MBK63-PS	
80	MBK80-PS	
100	MBK100-PS	

* Seal kits consist of items ⑱, ⑲, ⑳, 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: 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 size (mm)	AL	B_1	A	B	C	E	F	G	H_1	H	MA	MB	J	MM	N	P	S*	V	W	ZZ*
32	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	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	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	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	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	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 type (double acting, single rod). Also dimensions with boot is same as the basic type (double acting, single rod).

Air Cylinder: Non-rotating Rod Type
Double Acting, Double Rod
Series MBKW
ø32, ø40, ø50, ø63, ø80, ø100

How to Order

	MBKW	L	32		–	50			–						
With auto switch	MDBKW	L	32		–	50			–	M9BW		–			

With auto switch (Built-in magnet)

Non-rotating rod type

Double rod

Mounting style

B	Basic/Without bracket
L	Axial foot
F	Rod flange
G	Head flange
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 Strokes" on page 712.

Suffix (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)

Suffix (Cushion)

Nil	Air cushion
N*	Rubber bumper

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

Number of auto switches

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

Auto switch

Nil	Without auto switch

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

Made to Order
For details, refer to page 712.

Built-in Magnet Cylinder Model

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

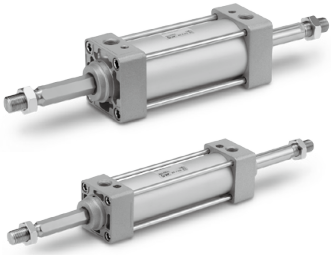
Applicable Auto Switches/Refer to the **WEB catalog** or the Best Pneumatics No. 2 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage 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 auto 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	—	●	●	●	○	○		
		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)	24 V, 5 V, 12 V	—	M9NW	—	●	●	●	○	○	IC circuit	
				3-wire (PNP)			M9PW	—	●	●	●	○	○		
				2-wire	12 V		M9BW	—	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)	24 V, 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 auto 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					—	—	A33	—	—	—	—	—	—	
			Yes				100 V, 200 V	—	A34	—	—	—	—	—	PLC	
		DIN terminal						—	A44	—	—	—	—	—	Relay, PLC	
	Diagnostic indication (2-color indication)	Grommet				—	—	A59W	—	●	—	●	—	—		

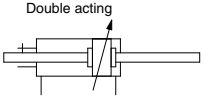
** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Please contact SMC regarding water resistant types with the above model numbers.

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

* Solid state auto switches marked with "○" are produced upon receipt of order.
* Since there are other applicable auto switches than listed above, refer to page 731 for details.
* For details about auto switches with pre-wired connector, refer to the **WEB catalog** or the Best Pneumatics No. 2. For the D-P3DW□, refer to the **WEB catalog** or the Best Pneumatics No. 2.
* The D-A9□/M9□□□/P3DW□ auto switches are shipped together, (but not assembled). (However, auto switch mounting brackets are assembled for the D-A9□/M9□□□ before shipment.)



Symbol
Double acting



Specifications

Bore size (mm)	32	40	50	63	80	100
Action	Double acting, Double rod					
Fluid	Air					
Proof pressure	1.5 MPa					
Max. operating pressure	1.0 MPa					
Min. operating pressure	0.05 MPa					
Ambient and fluid temperature	Without auto switch: –10 to 70°C With auto switch: –10 to 60°C (No freezing)					
Lubrication	Non-lube					
Operating piston speed	50 to 1000 mm/s					
Allowable stroke tolerance	Up to 250: $^{+1.0}_{0}$, 251 to 800: $^{+1.4}_{0}$					
Cushion Note)	Air cushion or Rubber bumper					
Port size (Rc, NPT, G)	1/8	1/4		3/8		1/2
Mounting	Basic, Axial foot, Rod flange, Head flange, Center trunnion					
Non-rotating accuracy	±0.5°		±0.5°		±0.3°	
Allowable rotating torque N·m or less	0.25	0.45	0.64		0.79	0.93

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

Made to Order

Made to Order
(For details, refer to pages 733 to 747.)

Symbol	Specifications
-XC3	Special port location
-XC6	Piston rod and rod end nut made of stainless steel
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel
-XC30	Rod trunnion

∗ All Made-to-Order products have the same cover shapes as the existing products.

Standard Strokes

(mm)

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

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

Accessories

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

Refer to pages 724 to 730 for cylinders with auto switches.

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

Rod Boot Material

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

∗ Max. ambient temperature for rod boot itself.

Mounting Brackets/Part No.

Bore size (mm)	32	40	50	63	80	100
Axial foot	MB-L03	MB-L04	MB-L05	MB-L06	MB-L08	MB-L10
Rod/Head flange	MB-F03	MB-F04	MB-F05	MB-F06	MB-F08	MB-F10

Note) Order two foots per cylinder.

Theoretical Force

(Unit: N) OUT ← IN →

Bore size (mm)	Rod dia. (mm) Width across flats (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa)								
				0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
32	12	OUT	691	138	207	276	346	415	484	553	622	691
	12.2	IN	675	135	203	270	338	405	473	540	608	675
40	16	OUT	1056	211	317	422	528	634	739	845	950	1056
	14.2	IN	1082	216	325	433	541	649	757	866	974	1082
50	20	OUT	1649	330	495	660	825	989	1154	1319	1484	1649
	19	IN	1651	330	495	660	826	991	1156	1321	1486	1651
63	20	OUT	2803	561	841	1121	1402	1682	1962	2242	2523	2803
	19	IN	2804	561	841	1122	1402	1682	1963	2243	2524	2804
80	25	OUT	4536	907	1361	1814	2268	2722	3175	3629	4082	4536
	23	IN	4568	914	1370	1827	2284	2741	3198	3654	4111	4568
100	30	OUT	7147	1429	2144	2859	3574	4288	5003	5718	6432	7147
	27	IN	7223	1445	2167	2889	3612	4334	5056	5778	6501	7223

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

Weights/Aluminum Tube

(kg)

Bore size (mm)		**32**	**40**	**50**	**63**	**80**	**100**
Basic weight	Basic	0.54	0.77	1.37	1.67	3.06	4.00
	Axial foot	0.58	0.91	1.59	1.95	3.56	4.66
	Rod/Head flange	0.83	1.14	1.82	2.46	4.51	7.31
	Center trunnion	0.83	1.13	1.85	2.47	4.61	7.67
Additional weight per 50 mm of stroke	All mounting brackets	0.12	0.19	0.30	0.32	0.48	0.68
Accessories	Single knuckle joint	0.15	0.23	0.26	0.26	0.6	0.83
	Double knuckle joint (with pin)	0.22	0.37	0.43	0.43	0.87	1.27

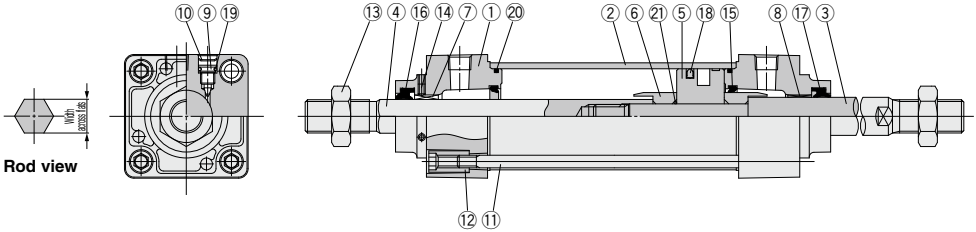
Calculation

Example) **MBKWB32-100** (Basic, ø32, 100 st)

- Basic weight ···0.54 (Basic, ø32)
- Additional weight ···0.12/50 stroke

0.54 + 0.12 x 100/50 = **0.78 kg**

Construction



Rod view

Component Parts

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

No.	Description	Material	Note
20*	**Cylinder tube gasket**	NBR	
21	**Piston gasket**	NBR	

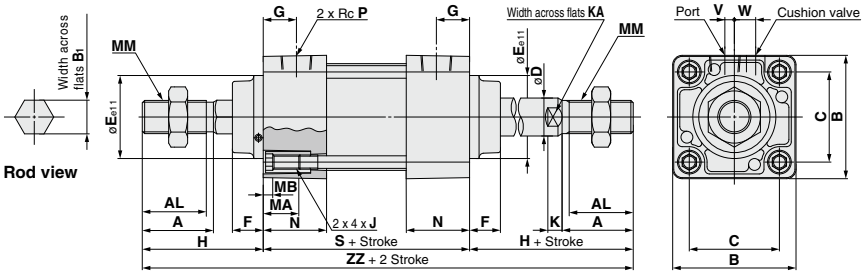
Replacement Parts/Seal Kit

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

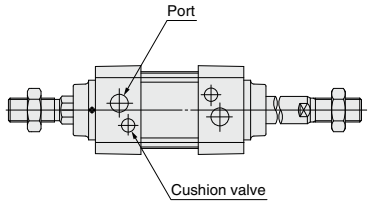
* Seal kits consist of items ⑮, ⑯, ⑰, ⑱, ⑳, and can be ordered by using the seal kit number corresponding to each bore size.
* Trunnion type should not be disassembled. (Refer to page 748.)
* Seal kit includes a grease pack (ø32 to 50: 10 g, ø63, 80: 20 g, ø100, 125: 30 g). Order with the following part number when only the grease pack is needed. **Grease pack part number: GR-S-010** (10 g), **GR-S-020** (20 g)

Without Mounting Bracket

Basic: (B)



Positional relationship between port and cushion valve



(mm)

Bore size (mm)	AL	B1	KA	A	B	C	D	E	F	G	H1	H	MA	MB	J
32	19.5	12.2	10	22	46	32.5	12	30	13	13	6	47	16	4	M6 x 1
40	27	14.2	14	30	52	38	16	35	13	14	8	51	16	4	M6 x 1
50	32	19	18	35	65	46.5	20	40	14	15.5	11	58	16	5	M8 x 1.25
63	32	19	18	35	75	56.5	20	45	14	16.5	11	58	16	5	M8 x 1.25
80	37	23	22	40	95	72	25	45	20	19	13	72	16	5	M10 x 1.5
100	37	27	26	40	114	89	30	55	20	19	16	72	16	5	M10 x 1.5

(mm)

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

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

The dimensions for each mounting type are the same as those for the standard double acting double rod model. Refer to pages 705 and 706.

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 style

B	Basic/Without bracket
L	Axial foot
F	Rod flange
G	Head 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 Strokes" on page 716.

Suffix (Rod boot)

Nil	None
J	Nylon tarpaulin
K	Heat resistant tarpaulin

Locking position

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

Manual release

N	Non-locking
L	Locking

Auto switch

Nil	Without auto switch

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

Number of auto switches

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

Made to Order
For details, refer to page 716.

Built-in Magnet Cylinder Model

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

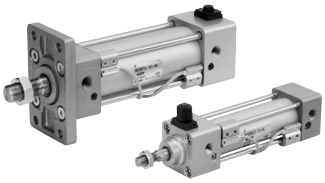
Applicable Auto Switches/Refer to the **WEB catalog** or the Best Pneumatics No. 2 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage 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 auto 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	—	●	●	●	○	○		
		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 auto 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
							100 V, 200 V	A34	—	—	—	—	—	—		
		DIN terminal					—	A44	—	—	—	—	—	—		Relay, PLC
	Diagnostic indication (2-color indication)	Grommet				—	—	A59W	—	●	—	●	—	—		

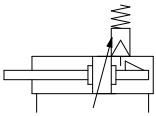
** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Please contact SMC regarding water resistant types with the above model numbers.

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

∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ Since there are other applicable auto switches than listed above, refer to page 731 for details.
∗ For details about auto switches with pre-wired connector, refer to the **WEB catalog** or the Best Pneumatics No. 2.
For the D-P3DW□, refer to the **WEB catalog** or the Best Pneumatics No. 2.
∗ The D-A9□/M9□□□/P3DW□AL auto switches are shipped together, (but not assembled). (However, auto switch mounting brackets are assembled for the D-A9□/M9□□□ before shipment.)



Symbol
Air cushion



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 With auto switch: –10 to 60°C (No freezing)					
Lubrication	Non-lube					
Operating piston speed	50 to 1000 mm/s					
Allowable stroke tolerance	Up to 250: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$, 1001 to 1500: $^{+1.8}_{0}$					
Cushion	Air cushion					
Port size (Rc, NPT, G)	1/8	1/4		3/8		1/2
Mounting	Basic, Axial foot, Rod flange, Head flange, Single clevis, Double clevis, Center trunnion					

* 0.05 MPa except locking parts

Made to Order

Made to Order
(For details, refer to pages 733 to 747.)

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 type
-XC14	Change of trunnion bracket mounting position
-XC27	Double clevis and double knuckle joint pins made of stainless steel
-XC29	Double knuckle joint with spring pin
-XC30	Rod trunnion

* All Made-to-Order products have the same cover shapes as the existing products.

Refer to pages 724 to 730 for cylinders with auto switches.

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

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					

Standard Strokes

(mm)

Bore size	Standard stroke
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.)

Accessories

Mounting		Basic	Axial foot	Rod flange	Head 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	●	●	●	●	●	●	●

Weights/Aluminum Tube

(kg)

Bore size (mm)		32	40	50	63	80	100
Basic weight	Basic	0.50	0.69	1.19	1.47	2.73	3.7
	Axial foot	0.68	0.93	1.56	1.93	3.61	4.8
	Rod/Head 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
	Center trunnion	0.79	1.05	1.67	2.27	4.28	7.37
Additional weight per 50 mm of stroke	All mounting brackets	0.11	0.16	0.26	0.27	0.42	0.56
Accessories	Single knuckle joint	0.15	0.23	0.26	0.26	0.60	0.83
	Double knuckle joint (with pin)	0.22	0.37	0.43	0.43	0.87	1.27

Additional Weight of Locking Part

(kg)

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

Calculation

Example) **MBBL32-100-HN**

- Basic weight 0.68
- Additional weight ..... 0.11/50 stroke
- Cylinder stroke ..... 100 stroke
- Locking weight ..... 0.08 (Locking at head end, manual release non-locking type)

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

Mounting Brackets/Part No.

Bore size (mm)	32	40	50	63	80	100
Axial foot Note 1)	MB-L03	MB-L04	MB-L05	MB-L06	MB-L08	MB-L10
Rod/Head 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) Order two foots per cylinder.

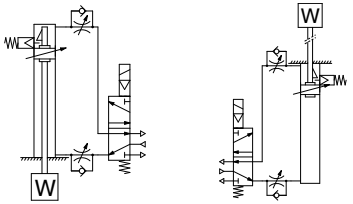
Note 2) Accessories for each mounting bracket are as follows.
Axial foot, Rod/Head flange, Single clevis/Body mounting bolt; Double clevis/Body mounting bolt, Clevis pins, Flat washer and Split pins. → Refer to page 700 for details.

Cautions for Using

1. Use recommended pneumatic circuit.

⚠Caution

For correct operation of locking or releasing mechanism, use the following pneumatic circuit.



With locking at head end　　With locking at rod end

① Do not use a 3-position solenoid valve.

Avoid using circuit with 3-position solenoid valve (especially closed center, metal seal type).
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 lock.

Before starting operation, supply air to side without locking mechanism as figure above, (or side without locking the piston rod for models with locking at both ends.) Otherwise, 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 may be damaged.

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

If cylinder is used over 50% load capacity, lock may be damaged.

⑤ Do not use multiple cylinders synchronously.

Avoid using 2 or more end lock cylinders synchronously to perform a single task because one of the cylinders may not allow lock to 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 lock.

If cylinder piston does not reach end of stroke, lock may not be engaged or released.

2. Operating pressure

⚠Caution

Use pressures 0.15 MPa or more at port with locking mechanism. Otherwise, lock will not be released.

3. Exhaust speed

⚠Caution

When pressures at port with locking mechanism is decreased 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 distanced 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 the same result.

4. Relationship with cushion

⚠Caution

When cushion valve at side with locking mechanism is fully closed or nearly fully closed, piston rod may not reach the stroke end. Thus lock is not established. And when locking is done with the cushion valve nearly fully closed, adjust the 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.
(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. Also, piston rod will operate immediately.

6. Manual release

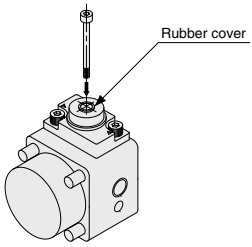
⚠Caution

Non-locking type

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

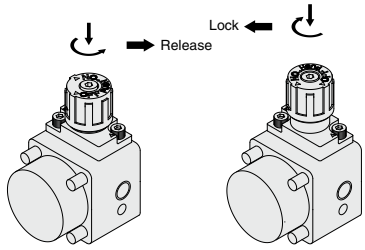
Bore size (mm)	Thread size	Pulling force	Stroke (mm)
32	≥ M2.5 x 0.45 x 25 L	4.9 N	2
40, 50, 63	≥ M3 x 0.5 x 30 L	10 N	3
80, 100	≥ M5 x 0.8 x 40 L	24.5 N	3

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



Locking type

Turn 90° counterclockwise while pushing the M/O knob. Lock is released when ▲ on the cap and ▼ OFF mark on the M/O knob correspond. (Lock remains released.)
When locking is desired, turn 90° clockwise while fully pushing the M/O knob and correspond ▲ on the cap and ▼ ON mark on the M/O knob. Confirm the correct position by click sound "click". Otherwise, lock may not be engaged.

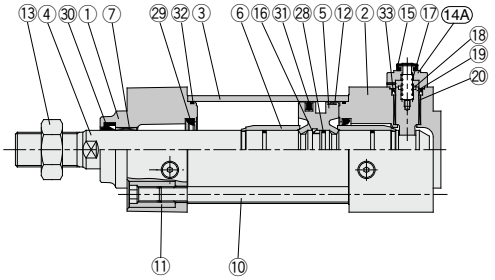


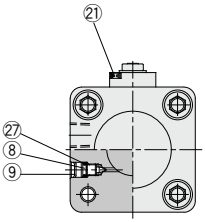
Locked　　**Released**

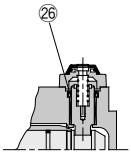
Construction

Locking at head end

Manual release non-locking type: N

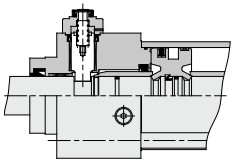


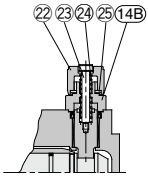




ø80, ø100

Locking at rod end





Manual release locking type: L

Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Metallic painted
2	**Head cover**	Aluminum alloy	Metallic painted
3	**Cylinder tube**	Aluminum alloy	Hard anodized
4	**Piston rod**	Carbon steel	Hard chrome plating
5	**Piston**	Aluminum alloy	Chromated
6	**Cushion ring**	Aluminum alloy	Anodized
7	**Bushing**	Bearing alloy	
8	**Cushion valve**	Steel wire	Trivalent zinc chromated
9	**Retaining ring**	Steel for spring	ø40 to ø100
10	**Tie rod**	Carbon steel	Trivalent zinc chromated
11	**Tie rod nut**	Carbon steel	Trivalent zinc chromated
12	**Wear ring**	Resin	
13	**Rod end nut**	Carbon steel	Trivalent zinc chromated
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 plating
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 nos. 29, 30, 31, 32, 33
40	MBB40-PS	
50	MBB50-PS	
63	MBB63-PS	
80	MBB80-PS	
100	MBB100-PS	

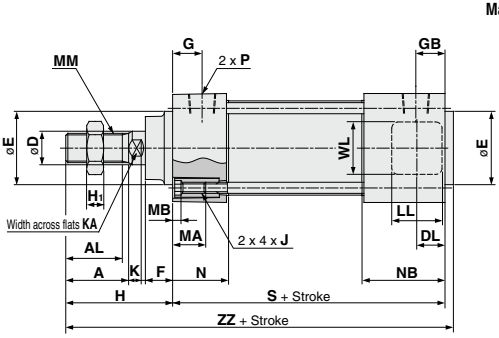
Replacement Parts/Seal Kit (Locking at both ends)

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

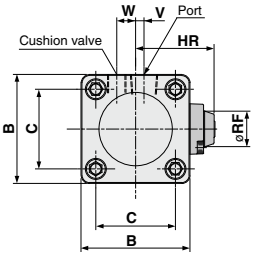
* Seal kits consist of items 29 to 33, and can be ordered by using the seal kit number corresponding to each bore size.
* Trunnion type should not be disassembled. (Refer to page 748.)
* Seal kit includes a grease pack (ø32 to 50: 10 g, ø63, 80: 20 g, ø100: 30 g). Order with the following part number when only the grease pack is needed.
  Grease pack part number: GR-S-010 (10 g), **GR-S-020** (20 g)

Basic: (B)

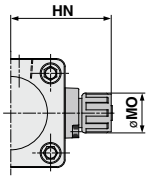
Locking at head end: MBBB Bore size | Port thread type — Stroke — H□



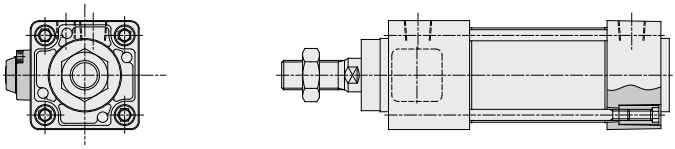
Manual release non-locking type: N



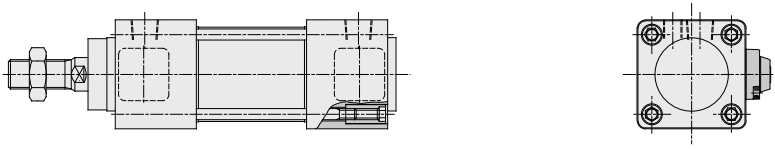
Manual release locking type: L



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)	AL	KA	A	B	C	D	DL	E	F	G	GB	H_1	H	HR	HN	J	K	LL	MA	MB
32	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	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	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	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	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	37	26	40	114	89	30	16	55	20	19	37	16	72	71.5	86	M10 x 1.5	10	30	16	5

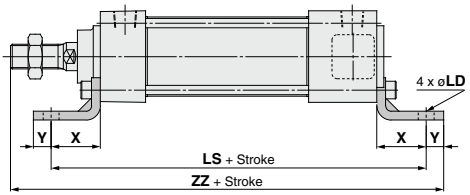
Bore size (mm)	MM	MO	N	NB	P	RF	S	V	W	WL	ZZ
32	M10 x 1.25	15	27	35	1/8	11	92	4	6.5	24	143
40	M14 x 1.5	19	27	40	1/4	11	97	4	9	24	152
50	M18 x 1.5	19	31.5	43.5	1/4	11	106	5	10.5	24	168
63	M18 x 1.5	19	31.5	43.5	3/8	11	106	9	12	24	168
80	M22 x 1.5	23	38	56	3/8	21	132	11.5	14	40	208
100	M26 x 1.5	23	38	56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

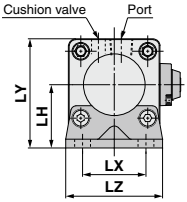
-W□

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

With Mounting Bracket

Axial foot: (L) / Locking at head end: (-H□)

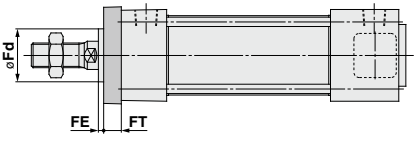


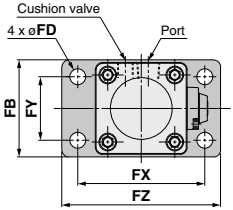


-H□/-R□ (mm) **-W□**

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

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

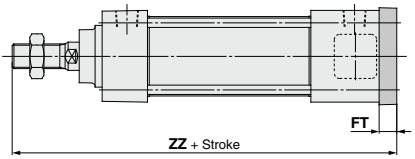


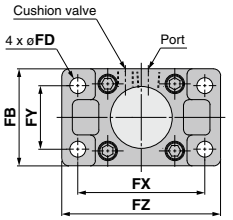


-H□/-R□/-W□ (mm)

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

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



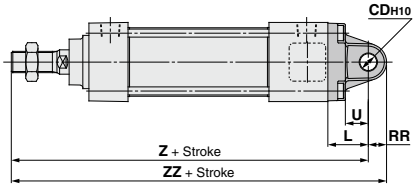


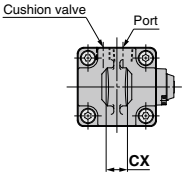
-H□/-R□ (mm) **-W□**

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

With Mounting Bracket

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

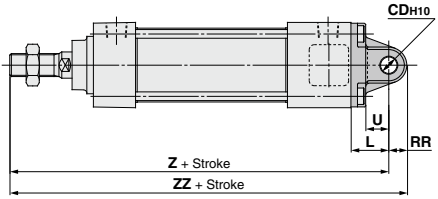


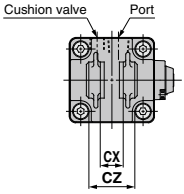


(mm)

Bore size (mm)	-H□/-R□ L	RR	U	CD_{H10}	$CX^{-0.1}_{-0.3}$	Z	ZZ	-W□ Z	ZZ
32	23	10.5	13	10	14	162	172.5	170	180.5
40	23	11	13	10	14	171	182	184	195
50	30	15	17	14	20	194	209	206	221
63	30	15	17	14	20	194	209	206	221
80	42	23	26	22	30	246	269	264	287
100	42	23	26	22	30	246	269	264	287

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

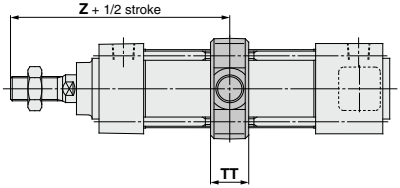


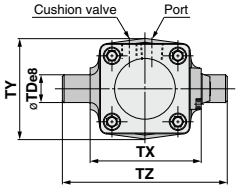


(mm)

Bore size (mm)	-H□/-R□ L	RR	U	CD_{H10}	$CX^{+0.3}_{+0.1}$	CZ	Z	ZZ	-W□ Z	ZZ
32	23	10.5	13	10	14	28	162	172.5	170	180.5
40	23	11	13	10	14	28	171	182	184	195
50	30	15	17	14	20	40	194	209	206	221
63	30	15	17	14	20	40	194	209	206	221
80	42	23	26	22	30	60	246	269	264	287
100	42	23	26	22	30	60	246	269	264	287

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





(mm)

Bore size (mm)	-H□ TD_{e8}	TT	TX	TY	TZ	Z	-R□/-W□ Z
32	12	17	50	49	74	89	97
40	16	22	63	58	95	93	106
50	16	22	75	71	107	105	117
63	20	28	90	87	130	105	117
80	20	34	110	110	150	129	147
100	25	40	132	136	182	129	147

Air Cylinder: Low Friction Type

Series MB□Q

ø32, ø40, ø50, ø63, ø80, ø100

Use the new series "**Smooth Cylinder MBY Series**" to realize bi-directional low friction and low-speed operation. (Refer to the **WEB catalog** or "CAT. ES20-235" catalog.)

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)

Made to Order

Mounting style

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

Number of auto switches

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

Auto switch

Nil	Without auto switch

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

Bore size

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

Direction of low friction

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

Port thread type

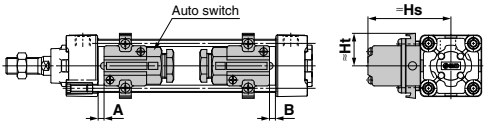
Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)

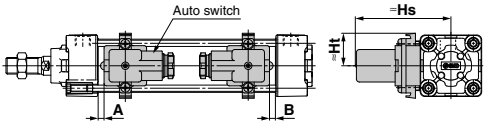
Auto Switch Mounting

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

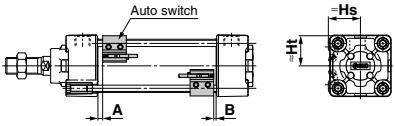
<Band mounting>
D-G39/K39/A3□



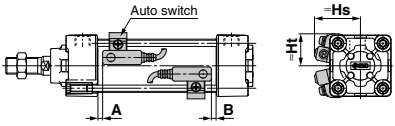
D-A44



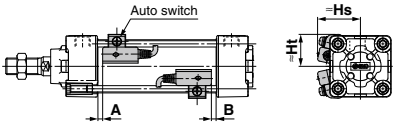
<Tie-rod mounting>
D-M9□/M9□V
D-M9□W/M9□WV
D-M9□A/M9□AV
D-A9□/A9□V
D-Y59□/Y69□/Y7P/Y7PV
D-Y7□W/Y7□WV/Y7BA
D-Z7□/Z80



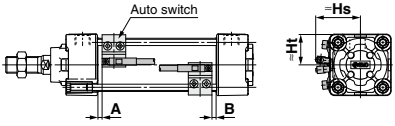
D-A5□/A6□
D-A59W



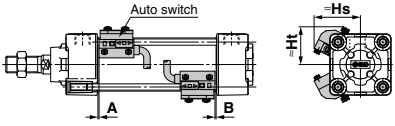
D-F5□/J59
D-F5□W/J59W/F5BA
D-F59F/F5NT



D-P3DW



D-P4DW



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

Auto Switch Proper Mounting Position (Standard type)

(mm)

Auto switch model / Bore size	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV		D-A9□ D-A9□V		D-F5□ D-J59 D-F59F		D-F5NT		D-A5□ D-A6□		D-A59W		D-G39 D-K39 D-A3□ D-A44		D-Y59□ D-Y69□ D-Y7P D-Y7PV D-Y7H D-Y7□W D-Y7□WV D-Z7□ D-Z8□		D-P3DW		D-P4DW	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
32	10	8	6	4	6.5	4.5	11.5	9.5	0	0	4	2	0	0	3.5	1.5	5.5	3.5	3	1
40	9	9	5	5	5.5	5.5	10.5	10.5	0	0	3	3	0	0	2.5	2.5	4.5	4.5	2	2
50	10	9	6	5	6.5	5.5	11.5	10.5	0	0	4	3	0	0	3.5	2.5	5.5	4.5	3	2
63	10	9	6	5	6.5	5.5	11.5	10.5	0	0	4	3	0	0	3.5	2.5	5.5	4.5	3	2
80	14.5	11.5	10.5	7.5	11	8	16	13	4.5	1.5	8.5	5.5	4.5	1.5	8	5	5.5	2	7.5	4.5
100	14	12	10	8	10.5	8.5	15.5	13.5	4	2	8	6	4	2	7.5	5.5	5	2.5	7	5
125	16	16	12	12	12.5	12.5	17.5	17.5	6	6	10	10	6	6	9.5	9.5	6.5	6.5	9	9

∗ Models with rubber bumper have different dimensions for auto switch proper mounting positions (A and B). Add the following values to both A and B: 3 mm (ø32 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.

Auto Switch Proper Mounting Height (Standard type)

(mm)

Auto switch model / Bore size	D-M9□ D-M9□W D-M9□A D-A9□		D-A9□V		D-M9□V D-M9□WV D-M9□AV		D-F5□ D-J59 D-F59F D-F5□W D-J59W D-F5BA D-F5NT		D-A5□ D-A6□ D-A59W		D-G39 D-K39 D-A3□		D-A44		D-Y59□ D-Y7P D-Y7□W D-Y7BA D-Z7□ D-Z80		D-Y69□ D-Y7PV D-Y7□WV		D-P3DW		D-P4DW	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
32	24.5	23	27.5	23	30.5	23	32.5	25	35	24.5	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	36.5	27.5	38.5	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	41	34	43.5	34.5	77	—	87	—	33.5	31	34.5	31	42	31	46.5	39
63	38.5	36	40.5	36	43	36	46	39	48.5	39.5	83.5	—	93.5	—	39	36	40	36	50	36	51.5	44
80	46.5	45	49	45	52	45	52.5	46.5	55	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	59.5	55	62	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	70.5	66.5	71.5	66.5	115	—	125	—	67.5	65	68.5	65	74.5	64.5	76.5	72

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

Auto Switch Proper Mounting Position (Non-rotating rod type, With end lock)

(mm)

Auto switch model / Bore size	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV		D-A9□ D-A9□V		D-F5□ D-J59 D-F59F		D-F5NT		D-A5□ D-A6□		D-A59W		D-G39 D-K39 D-A3□ D-A44		D-Y59□ D-Y69□ D-Y7P D-Y7PV D-Y7H D-Y7□W D-Y7□WV D-Z7□ D-Z8□		D-P3DW		D-P4DW	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
32	10.5	8	6.5	4	7	4.5	12	9.5	0.5	0	4.5	2	0.5	0	4	1.5	6	3	3.5	1
40	10.5	8	6.5	4	7	4.5	12	9.5	0.5	0	4.5	2	0.5	0	4	1.5	6	3	3.5	1
50	11	8.5	7	4.5	7.5	5	12.5	10	1	0	5	2.5	1	0	4.5	2	6	4	4	1.5
63	11	8.5	7	4.5	7.5	5	12.5	10	1	0	5	2.5	1	0	4.5	2	6	4	4	1.5
80	14	12.5	10	8.5	10.5	9	15.5	14	4	2.5	8	6.5	4	2.5	7.5	6	4	2.5	7	5.5
100	14	12.5	10	8.5	10.5	9	15.5	14	4	2.5	8	6.5	4	2.5	7.5	6	4	2.5	7	5.5
125	16	16	12	12	12.5	12.5	17.5	17.5	6	6	10	10	6	6	9.5	9.5	6.5	6.5	9	9

∗ Models with rubber bumper have different dimensions for auto switch proper mounting positions (A and B). Add the following values to both A and B: 3 mm (ø32 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.

Auto Switch Proper Mounting Height (Non-rotating rod type, With end lock)

(mm)

Auto switch model / Bore size	D-M9□ D-M9□W D-M9□A D-A9□		D-A9□V		D-M9□V D-M9□WV D-M9□AV		D-F5□ D-J59 D-F59F D-F5□W D-J59W D-F5BA D-F5NT		D-A5□ D-A6□ D-A59W		D-G39 D-K39 D-A3□		D-A44		D-Y59□ D-Y7P D-Y7□W D-Y7BA D-Z7□ D-Z80		D-Y69□ D-Y7PV D-Y7□WV		D-P3DW		D-P4DW	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
32	24.5	23	27.5	23	30.5	23	32.5	25	35	24.5	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	36.5	27.5	38.5	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	41	34	43.5	34.5	77	—	87	—	33.5	31	34.5	31	42	31	46.5	39
63	38.5	36	40.5	36	43	36	46	39	48.5	39.5	83.5	—	93.5	—	39	36	40	36	50	36	51.5	44
80	46.5	45	49	45	52	45	52.5	46.5	55	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	59.5	55	62	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	70.5	66.5	71.5	66.5	115	—	125	—	67.5	65	68.5	65	74.5	64.5	76.5	72

Minimum Stroke for Auto Switch Mounting

Mounting Brackets Except Center Trunnion

n: Number of auto switches (mm)

Auto switch model	Number of auto switches	Mounting brackets except center trunnion		
		ø32, ø40, ø50, ø63	ø80, ø100	ø125
D-M9□ D-M9□W	2 (Different surfaces, same surface) 1	15		
	n	$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)		
D-M9□V D-M9□WV	2 (Different surfaces, same surface) 1	10		
	n	$10 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)		
D-M9□A	2 (Different surfaces, same surface) 1	15		
	n	$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)		
D-M9□AV	2 (Different surfaces, same surface) 1	15		
	n	$15 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)		
D-A9□	2 (Different surfaces, same surface) 1	15		
	n	$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)		
D-A9□V	2 (Different surfaces, same surface) 1	10		
	n	$10 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)		
D-G39 D-K39 D-A3□	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-F5□ D-J59 D-F5□W D-J59W D-F5BA D-F59F	2 (Different surfaces, same surface)	15	25	25
	n (Same surface)	$15 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)	$25 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)	$25 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)
	1	10	25	25
D-A5□ D-A6□	2 (Different surfaces, same surface) 1	15	20	20
	n (Different surfaces)	$15 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)	$20 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)	$20 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)
D-A59W	2 (Different surfaces, same surface)	20	25	25
	n (Same surface)	$20 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)	$25 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)	$25 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)
	1	15	25	25
D-F5NT	2 (Different surfaces, same surface)	15	25	30
	n (Same surface)	$15 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)	$25 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)	$30 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)
	1	10	25	30
D-Y59□ D-Y7P D-Y7□W D-Z7□ D-Z80	2 (Different surfaces, same surface) 1	15		
	n	$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)		

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

Minimum Stroke for Auto Switch Mounting

Mounting Brackets Except Center Trunnion

n: Number of auto switches (mm)

Auto switch model	Number of auto switches	Mounting brackets except center trunnion			
		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…) Note 1)			
D-Y7BA	2 (Different surfaces, same surface) 1	20			
	n	$20 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)			
D-P3DW	2 (Different surfaces), 1	25			
	2 (Same surface)	45	25		
	n (Different surfaces)	$25 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)			
	n (Same surface)	$45 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)	$25 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)		
D-P4DW	2 (Different surfaces, same surface) 1	15			20
	n	$15 + 65\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)			$20 + 65\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)

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

Mounting Brackets Except Center Trunnion (Non-rotating rod type, With end lock)

n: Number of auto switches (mm)

Auto switch model	Number of auto switches	Mounting brackets except center trunnion			
		ø32, ø40	ø50, ø63	ø80, ø100	ø125
D-P3DW	2 (Different surfaces), 1	15	15		
	2 (Same surface)	40	15		
	n (Different surfaces)	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)		
	n (Same surface)	$40 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…) Note 1)		

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

Center Trunnion

n: Number of auto switches (mm)

Auto switch model	Number of auto switches	Center trunnion					
		ø32	ø40	ø50	ø63	ø80	ø100	ø125
D-M9□ D-M9□W	2 (Different surfaces, same surface) 1	75	80		85	90	95	105
	n	$75 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)		$85 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$90 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$95 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$105 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)
D-M9□V D-M9□WV	2 (Different surfaces, same surface) 1	50	55		60	65	70	80
	n	$50 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$55 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)		$60 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$65 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$70 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$80 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)
D-M9□A	2 (Different surfaces, same surface) 1	80	85		90	95	100	110
	n	$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$85 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)		$90 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$95 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$100 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$110 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)
D-M9□AV	2 (Different surfaces, same surface) 1	55	60		65	70	75	85
	n	$55 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$60 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)		$65 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$70 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$75 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$85 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)
D-A9□	2 (Different surfaces, same surface) 1	70	75		80	85	95	100
	n	$70 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$75 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)		$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$85 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$95 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$100 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)
D-A9□V	2 (Different surfaces, same surface) 1	45	50		55	60	70	75
	n	$45 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$50 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)		$55 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$60 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$70 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)	$75 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…) Note 2)

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

Minimum Stroke for Auto Switch Mounting

Center Trunnion

n: Number of auto switches (mm)

Auto switch model	Number of auto switches	Center trunnion						
		ø32	ø40	ø50	ø63	ø80	ø100	ø125
D-G39 D-K39 D-A3□	2 (Different surfaces)	60	65		75	80	85	90
	2 (Same surface)	90	95		100	105	110	125
	n (Different surfaces)	60 + 30 (n – 2) (n = 2, 4, 6, 8...) Note 1)	65 + 30 (n – 2) (n = 2, 4, 6, 8...) Note 1)		75 + 30 (n – 2) (n = 2, 4, 6, 8...) Note 1)	80 + 30 (n – 2) (n = 2, 4, 6, 8...) Note 1)	85 + 30 (n – 2) (n = 2, 4, 6, 8...) Note 1)	90 + 30 (n – 2) (n = 2, 4, 6, 8...) Note 1)
	n (Same surface)	90 + 100 (n – 2) (n = 2, 4, 6, 8...) Note 1)	95 + 100 (n – 2) (n = 2, 4, 6, 8...) Note 1)		100 + 100 (n – 2) (n = 2, 4, 6, 8...) Note 1)	105 + 100 (n – 2) (n = 2, 4, 6, 8...) Note 1)	110 + 100 (n – 2) (n = 2, 4, 6, 8...) Note 1)	125 + 100 (n – 2) (n = 2, 4, 6, 8...) Note 1)
	1	60	65		75	80	85	90
D-A44	2 (Different surfaces)	70	75		80		85	90
	2 (Same surface)							
	n (Different surfaces)	70 + 30 (n – 2) (n = 2, 4, 6, 8...) Note 1)	75 + 30 (n – 2) (n = 2, 4, 6, 8...) Note 1)		80 + 30 (n – 2) (n = 2, 4, 6, 8...) Note 1)		85 + 30 (n – 2) (n = 2, 4, 6, 8...) Note 1)	90 + 30 (n – 2) (n = 2, 4, 6, 8...) Note 1)
	n (Same surface)	70 + 50 (n – 2) (n = 2, 4, 6, 8...) Note 1)	75 + 50 (n – 2) (n = 2, 4, 6, 8...) Note 1)		80 + 50 (n – 2) (n = 2, 4, 6, 8...) Note 1)		85 + 50 (n – 2) (n = 2, 4, 6, 8...) Note 1)	90 + 50 (n – 2) (n = 2, 4, 6, 8...) Note 1)
	1	70	75		80		85	90
D-F5□/J59 D-F5□W D-J59W D-F5BA 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...) Note 2)	$95 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$110 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$115 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$120 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$130 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
	1	90	95		110	115	120	130
D-F5NT	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...) Note 2)	$105 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$120 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$125 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$130 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$140 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
	1	100	105		120	125	130	140
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...) Note 2)		$80 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$105 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$115 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	
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...) Note 2)	$70 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$85 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$115 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$120 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	
	1	60	70	85	110	115	120	
D-Y59□ D-Y7P D-Y7□W D-Z7□ D-Z80	2 (Different surfaces, same surface) 1	80	85	90		95	100	105
	n	$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$85 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$90 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$95 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$100 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$105 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-Y69□ D-Y7PV D-Y7□WV	2 (Different surfaces, same surface) 1	60	65		70	75	85	85
	n	$60 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$65 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$70 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$75 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$85 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$85 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-Y7BA	2 (Different surfaces, same surface) 1	85	90		100	105	110	115
	n	$85 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$90 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$100 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$105 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$115 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
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...) Note 2)	$85 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$90 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$95 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$100 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-P4DW	2 (Different surfaces, same surface) 1	120		130		140		150
	n	$120 + 65\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$130 + 65\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$140 + 65\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$150 + 65\frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)

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

Auto Switch Mounting Brackets/Part No.

Auto switch model	Bore size (mm)						
	ø32	ø40	ø50	ø63	ø80	ø100	ø125
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV D-A9□/A9□V	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-F5□/J59 D-F5□W/J59W D-F59F/F5BA D-F5NT D-A5□/A6□/A59W	BT-03	BT-03	BT-05	BT-05	BT-06	BT-06	BT-08
D-P3DW	BMB9-032S	BMB9-032S	BMB9-050S	BMB9-050S	BA9T-063S	BA9T-063S	BA9T-080S
D-P4DW	BMB3T-040	BMB3T-040	BMB3T-050	BMB3T-050	BMB3T-080	BMB3T-080	BAP2T-080
D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BA D-Z7□/Z80	BMB4-032	BMB4-032	BMB4-050	BMB4-050	BA4-063	BA4-063	BA4-080

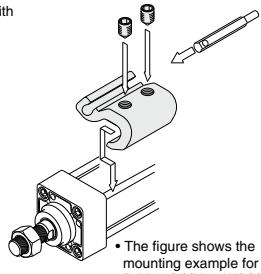
[Stainless Steel Mounting Screw]

The following stainless steel mounting screw kit (including set screws) is available. Use it in accordance with the operating environment. (Since the auto switch mounting bracket is not included, order it separately.)

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

Note 1) Refer to the **WEB catalog** or the Best Pneumatics No. 2 for details on the BBA1. The above stainless steel screws are used when a cylinder is shipped with the D-F5BA auto switch. When only one auto switch is shipped independently, the BBA1 is attached.

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



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

Operating Range

(mm)

Auto switch model	Bore size (mm)						
	32	40	50	63	80	100	125
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	4	4.5	4.5	4.5	5	6	7
D-Y59□/Y69□ D-Y7P/Y7□V D-Y7□W/Y7□WV D-Y7BA	5.5	5.5	7	7.5	6.5	5.5	7
D-F5□/J59 D-F5□W/J59W D-F5BA/F5NT D-F59F	3.5	4	4	4.5	4.5	4.5	5
D-G39/K39	9	9	9	10	10	11	11
D-P3DW	4.5	5	5	5.5	4	6.5	8.5
D-P4DW	4	4	4	4.5	4	4.5	4.5
D-A9□/A9□V	7	7.5	8.5	9.5	9.5	10.5	12
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

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

Other than the applicable auto switches listed in "How to Order", the following auto switches are mountable.
Refer to the **WEB catalog** or the Best Pneumatics No. 2 for the detailed specifications.

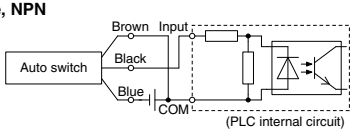
Type	Model	Electrical entry	Features
Solid state	D-M9NV/M9PV/M9BV	Grommet (Perpendicular)	—
	D-Y69A/Y69B/Y7PV		
	D-M9NWV/M9PWV/M9BWV		Diagnostic indication (2-color indication)
	D-Y7NWV/Y7PWV/Y7BWV		
	D-M9NAV/M9PAV/M9BAV		Water resistant (2-color indication)
	D-P4DW		Magnetic field resistant (2-color indication)
	D-F59/F5P/J59	Grommet (In-line)	—
	D-Y59A/Y59B/Y7P		
	D-Y7H		
	D-F59W/F5PW/J59W		Diagnostic indication (2-color indication)
	D-Y7NW/Y7PW/Y7BW		
	D-F5BA/Y7BA		Water resistant (2-color indication)
	D-F5NT		With timer
	D-P5DW		Magnetic field resistant (2-color indication)
Reed	D-A93V/A96V	Grommet (Perpendicular)	—
	D-A90V		Without indicator light
	D-A53/A56/Z73/Z76	Grommet (In-line)	—
	D-A67/Z80		Without indicator light

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

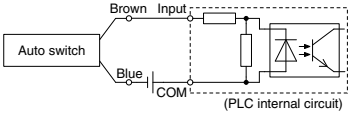
Prior to Use
Auto Switch Connection and Example

Sink Input Specifications

3-wire, NPN

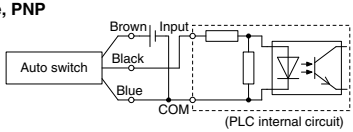


2-wire

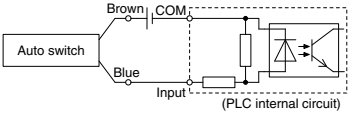


Source Input Specifications

3-wire, PNP



2-wire



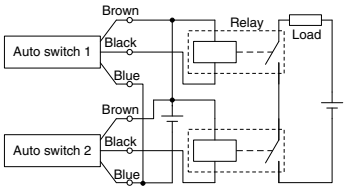
Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

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

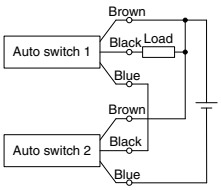
∗ When using solid state auto switches, ensure the application is set up so the signals for the first 50 ms are invalid.

3-wire AND connection for NPN output

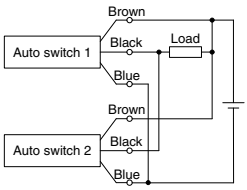
(Using relays)



(Performed with auto switches only)

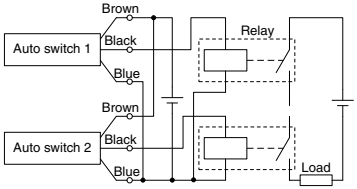


3-wire OR connection for NPN output

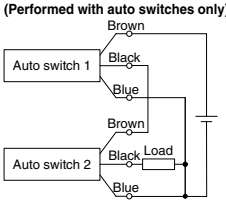


3-wire AND connection for PNP output

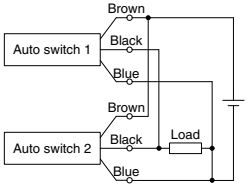
(Using relays)



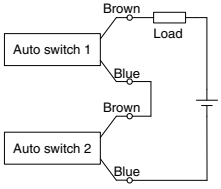
(Performed with auto switches only)



3-wire OR connection for PNP output



2-wire AND connection

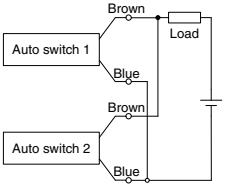


When two auto switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state.
The indicator lights will light up when both of the auto switches are in the ON state.
Auto switches with load voltage less than 20 V cannot be used.

Load voltage at ON = Power supply voltage – Residual voltage x 2 pcs.
= 24 V – 4 V x 2 pcs.
= 16 V

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

2-wire OR connection



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

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

Load voltage at OFF = Leakage current x 2 pcs. x Load impedance
= 1 mA x 2 pcs. x 3 kΩ
= 6 V

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

Simple Specials/Made to Order

Made to Order

Please contact SMC for detailed specifications, delivery and prices.

■Simple Specials

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

Symbol	Specifications	MB (Standard type) Double acting					
		Single rod				Double rod	
		Air		Rubber		Air	
		ø32 to ø100	ø125	ø32 to ø100	ø125	ø32 to ø100	ø125
-XA0 to 30	Change of rod end shape	●	●	●	●	●	●
-XC14	Change of trunnion bracket mounting position	●	●	●	●	●	●

■Made to Order

Symbol	Specifications	MB (Standard type) Double acting					
		Single rod				Double rod	
		Air		Rubber		Air	
		ø32 to ø100	ø125	ø32 to ø100	ø125	ø32 to ø100	ø125
-XB5	Oversized rod cylinder Note 1)	●					
-XB6	Heat resistant cylinder (–10 to 150°C)	●				●	
-XB13	Low Speed Cylinder (5 to 50 m/s) Note 1)	●		●			
-XC3	Special port location Note 1)	●		●		●	
-XC4	With heavy duty scraper	●		●		●	
-XC5	Heat resistant cylinder (–10 to 110°C)	●				●	
-XC6	Piston rod and rod end nut made of stainless steel Note 1)		●		●		●
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel	●		●		●	
-XC8	Adjustable stroke cylinder/Adjustable extension type	●		●			
-XC9	Adjustable stroke cylinder/Adjustable retraction type	●		●			
-XC10	Dual stroke cylinder/Double rod type	●		●			
-XC11	Dual stroke cylinder/Single rod type	●		●			
-XC12	Tandem cylinder	●		●			
-XC22	Fluororubber seal	●	●	●	●	●	
-XC27	Double clevis and double knuckle joint pins made of stainless steel	●	●	●	●		
-XC29	Double knuckle joint with spring pin	●		●			
-XC30	Rod trunnion	●		●		●	
-XC35	With coil scraper	●		●		●	
-XC65	Made of stainless steel (Combination of XC7 and XC68)	●		●		●	
-XC68	Made of stainless steel (with hard chrome plated piston rod)	●		●		●	
-X1184	Cylinder with heat resistant reed auto switch (–10 to 120°C)	●					

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

	MB (Standard type)		MBK Note 1) (Non-rotating rod type)				MBB Note 1) (With end lock)
	Double acting						
	Double rod		Single rod		Double rod		Single rod
	Rubber		Air	Rubber	Air	Rubber	Air
	ø32 to ø100	ø125					
-XA0 to 30	●	●	●	●			●
-XC14	●	●	●	●			●

Symbol	Page
-XA0 to 30	Page 735, 736
-XC14	Page 736

	MB (Standard type)		MBK (Non-rotating rod type)				MBB (With end lock)
	Double acting						
	Double rod		Single rod		Double rod		Single rod
	Air	Rubber	Air	Rubber	Air	Rubber	Air
	ø32 to ø100	ø125					
-XB5	●				●	●	
-XB6	●				●	●	
-XB13		●	●	●	●	●	
-XC3	●		●	●	●	●	
-XC4	●						
-XC5		●	●	●	●	●	
-XC6		●	●	●	●	●	
-XC7	●		●	●	●	●	●
-XC8			●	●			
-XC9			●	●			
-XC10			●	●			
-XC11							
-XC12							
-XC22	●						
-XC27			●	●			●
-XC29							●
-XC30	●		●	●	●	●	●
-XC35	●						
-XC65							
-XC68	●						
-X1184							

Symbol	Page
-XB5	Page 737
-XB6	Page 737
-XB13	Page 738
-XC3	Page 738
-XC4	Page 739
-XC5	Page 739
-XC6	Page 739
-XC7	Page 740
-XC8	Page 740
-XC9	Page 741
-XC10	Page 742
-XC11	Page 743
-XC12	Page 744
-XC22	Page 744
-XC27	Page 745
-XC29	Page 745
-XC30	Page 745
-XC35	Page 746
-XC65	Page 746
-XC68	Page 746
-X1184	Page 747

Series MB
Simple Specials

These changes are dealt with Simple Specials System.

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

1 Change of Rod End Shape

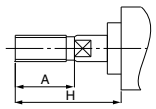
Symbol
-XA0 to XA30

Series		Action	Symbol for change of rod end shape	Note
Standard type	MB	Double acting, Single rod	XA0 to 30	Except pivot bracket and rod end bracket
	MBW	Double acting, Double rod	XA0 to 30	Except pivot bracket and rod end bracket
Non-rotating rod type	MBK	Double acting, Single rod	XA0, 1, 6, 10, 11, 13, 14, 17, 19, 21	
With end lock	MBB	Double acting, Single rod	XA0 to 30	

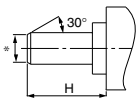
Precautions

1. SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
2. Standard dimensions marked with "*" will be as follows to the rod diameter (D). Enter any special dimension you desire.
   $D \leq 6 \rightarrow D - 1$ mm $6 < D \leq 25 \rightarrow D - 2$ mm $D > 25 \rightarrow D - 4$ mm
3. In the case of double rod type and single acting retraction type, enter the dimensions when the rod is retracted.

Symbol: A0



Symbol: A1



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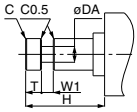
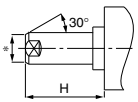
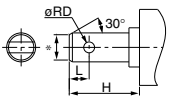


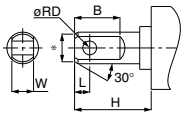
Symbol: A3



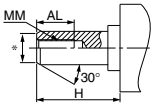
Symbol: A4



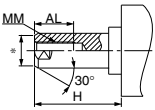
Symbol: A5



Symbol: A6



Symbol: A7



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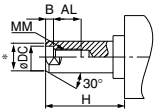

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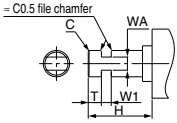

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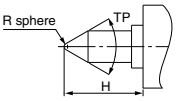

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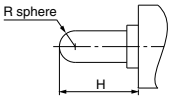

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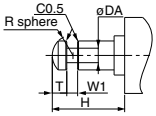

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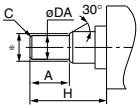

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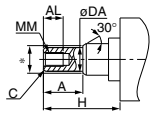

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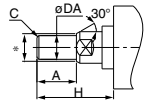

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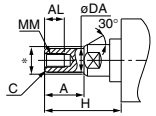

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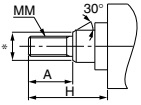

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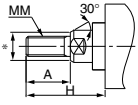

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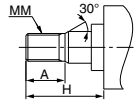

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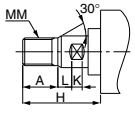

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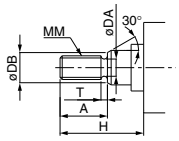

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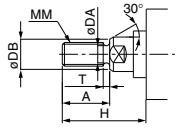

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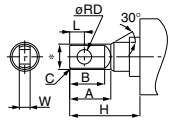

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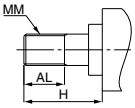

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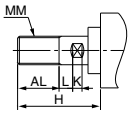

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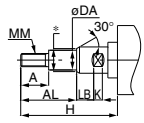

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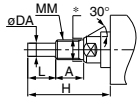

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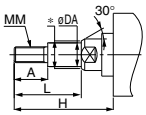

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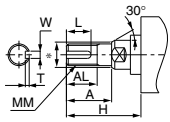

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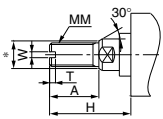
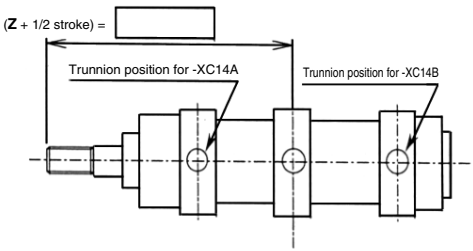


2 Change of Trunnion Bracket Mounting Position

Symbol -XC14

The position for mounting the trunnion pivot bracket on the cylinder can be moved from the standard mounting position to any desired position.

Description	Model	Action	Note
Standard type	MB	Double acting, Single rod	
	MBW	Double acting, Double rod	
Non-rotating rod type	MBK	Double acting, Single rod	
With end lock	MBB	Double acting, Single rod	



Precautions

1. Specify "Z + 1/2 stroke" in the case the trunnion bracket position is not -XC14A, B or trunnion is not a center trunnion.
2. SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
3. The possible range of trunnion bracket mounting position is indicated in the table below.
4. Some trunnion mounting positions do not allow auto switch mounting. Please consult with SMC for more information.

(mm)

Symbol / Bore size	**Z** + 1/2 stroke					
	For **-XC14A**	For **-XC14B**	For **-XC14**		Reference Standard (Center trunnion)	Minimum stroke
			Minimum	Maximum		
32	82.5	95.5 + Stroke	84	94 + Stroke	89 + 1/2 stroke	1
40	89	97 + Stroke	90	96 + Stroke	93 + 1/2 stroke	1
50	100.5	109.5 + Stroke	102	108 + Stroke	105 + 1/2 stroke	1
63	103.5	106.5 + Stroke	105	105 + Stroke	105 + 1/2 stroke	1
80	127	131 + Stroke	128	130 + Stroke	129 + 1/2 stroke	1
100	130	128 + Stroke	131	127 + Stroke	129 + 1/2 stroke	1
125	160	154 + Stroke	160.5	153.5 + Stroke	157 + 1/2 stroke	1

Series MB
Made to Order

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

Made to Order

Symbol

1 Oversized Rod Cylinder — -XB5

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

Applicable Series

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

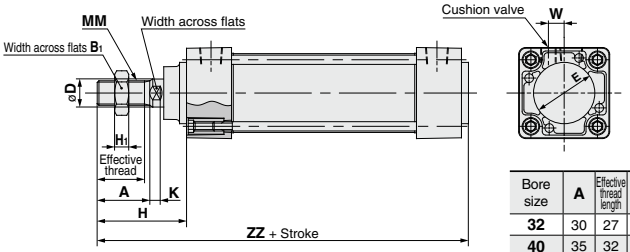
Note) The cover shape is the same as the existing product.

How to Order

MB | **Mounting style** | **Bore size** | **–** | **Stroke** | **– XB5**

Oversized rod cylinder

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



(mm)

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

Symbol

2 Heat Resistant Cylinder (–10 to 150°C) — -XB6

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

Applicable Series

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

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

How to Order

Standard model no. **– XB6**

Heat resistant cylinder

Specifications

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

⚠Warning

Precautions

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

SMC

Symbol
-XB13

3 Low Speed Cylinder (5 to 50 mm/s)

Even if driving at lower speeds 5 to 50 mm/s, there would be no stick-slip phenomenon and it can run smoothly.

Applicable Series

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

How to Order

Standard model no. – **XB13**

Low speed cylinder

Specifications

Piston speed	5 to 50 mm/s
Dimensions	Same as standard type
Specifications other than above	Same as standard type

Note 1) Operate without lubrication from a pneumatic system lubricator.
Note 2) For the speed adjustment, use speed controllers for controlling at lower speeds. (Series AS-FM/AS-M)

⚠Warning

Precautions

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

Symbol
-XC3

4 Special Port Location

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

Applicable Series

Description	Model	Action	Note
Standard type	MB	Double acting, Single rod	Except ø125
	MBW	Double acting, Double rod	Except ø125
Non-rotating rod type	MBK	Double acting, Single rod	
	MBKW	Double acting, Double rod	
Low friction type	MB□Q	Double acting, Single rod	

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

How to Order

MB
MBW
MBK
MBKW

Mounting style | **Bore size** – **Stroke** | **Suffix** – **XC3** | **A** | **C**

Special port location

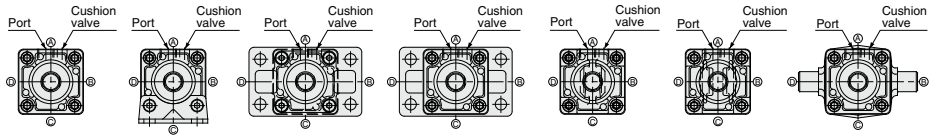
Cushion valve location seen from the rod side
Rod port location seen from the rod side

* For port location, refer to the following diagrams and show the symbols of A, B, C and D.

Specifications: Same as standard type

Relationship between Port Location and Cushion Valve Location

Corresponding symbol of mounting bracket (Positional relationships)



Basic | **Axial foot** | **Rod flange** | **Head flange** | **Single clevis** | **Double clevis** | **Center trunnion**

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

Symbol
-XC4

5 With Heavy Duty Scraper

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

Applicable Series

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

How to Order

Standard model no. – **XC4**

With heavy duty scraper

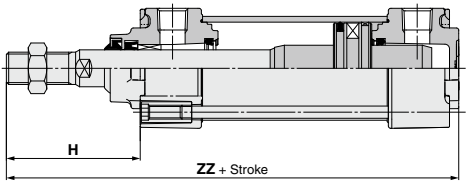
Specifications: Same as standard type

⚠Caution

Do not replace heavy duty scrapers.

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

Construction (Dimensions are the same as standard.)



(mm)

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

Symbol
-XC5

6 Heat Resistant Cylinder (–10 to 110°C)

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

Applicable Series

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

How to Order

Standard model no. – **XC5**

Heat resistant cylinder

Specifications

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

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

Symbol
-XC6

7 Piston Rod and Rod End Nut Made of Stainless Steel

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

Applicable Series

Description	Model	Action	Note
Standard type	MB	Double acting, Single rod	ø125 only
	MBW	Double acting, Double rod	ø125 only
Non-rotating rod type	MBK	Double acting, Single rod	
	MBKW	Double acting, Double rod	

How to Order

Standard model no. – **XC6**

Piston rod and rod end nut made of stainless steel

Specifications

Parts changed to stainless steel	Piston rod, Rod end nut
Max. manufacturable stroke (mm)	Double acting, Single rod: 1500 Double acting single rod with rod boot: 1000
Specifications other than above and external dimensions	Same as standard type

Symbol
-XC7

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

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

Applicable Series

Description	Model	Action	Note
Standard type	MB	Double acting, Single rod	Except ø125
	MBW	Double acting, Double rod	Except ø125
Non-rotating rod type	MBK	Double acting, Single rod	
	MBKW	Double acting, Double rod	
With end lock	MBB	Double acting, Single rod	

Specifications

Component parts changed to stainless steel	Tie-rod, Tie-rod nut, Bracket mounting bolt, Cushion valve, Lock nut
Specifications other than above	Same as standard type
Dimensions	Same as standard type

How to Order

Standard model no. – **XC7**

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

Symbol
-XC8

9 Adjustable Stroke Cylinder/Adjustable Extension Type

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

Applicable Series

Description	Model	Action	Note
Standard type	MB	Double acting, Single rod	Except ø125, head flange and clevis types
Non-rotating rod type	MBK	Double acting, Single rod	Except ø125, head flange and clevis types

Specifications

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

How to Order

MB | Mounting style | Bore size | – | Stroke | Suffix | Stroke adjustment symbol | **Z** | – | Pivot bracket | Rod end bracket | – **XC8**

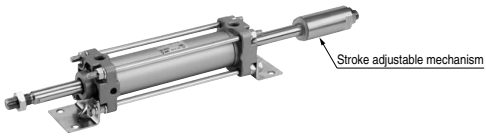
∗ Except head flange and clevis types

Adjustable stroke cylinder/Adjustable extension type

MBK | Mounting style | Bore size | – | Stroke | Suffix | Stroke adjustment symbol | – **XC8**

∗ Except head flange and clevis types

Adjustable stroke cylinder/Adjustable extension type

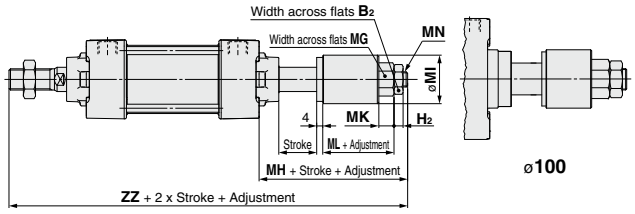


⚠Warning

Precautions

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

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



(mm)

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

Symbol
-XC9

10 Adjustable Stroke Cylinder/Adjustable Retraction Type

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

Applicable Series

Description	Model	Action	Note
Standard type	MB	Double acting, Single rod	Except ø125, head flange and clevis types
Non-rotating rod type	MBK	Double acting, Single rod	Except ø125, head flange and clevis types

Specifications

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

How to Order

MB | Mounting style | Bore size | – | Stroke | Suffix | Stroke adjustment symbol | **Z** – | Pivot bracket | Rod end bracket | – **XC9**

∗ Except head flange and clevis types

XC9: Adjustable stroke cylinder/Adjustable retraction type

MBK | Mounting style | Bore size | – | Stroke | Suffix | Stroke adjustment symbol | – **XC9**

∗ Except head flange and clevis types

XC9: Adjustable stroke cylinder/Adjustable retraction type

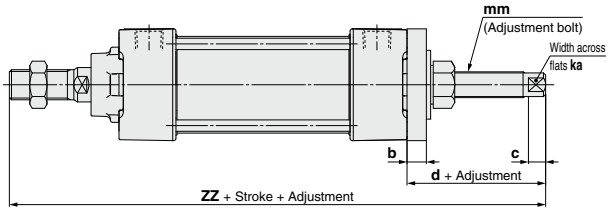
(After the stroke is adjusted, with cushion on both sides is altered to single-sided, with cushion.)

⚠Caution

Precautions

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

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



(mm)

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

Symbol
-XC10

11 Dual Stroke Cylinder/Double Rod Type

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

Applicable Series

Description	Model	Action	Note
Standard type	MB	Double acting, Single rod	Except ø125, clevis and trunnion types, pivot bracket and rod end bracket
Non-rotating rod type	MBK	Double acting, Single rod	Except clevis and trunnion types
With end lock	MBB	Double acting, Single rod	Except clevis and trunnion types

Specifications

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

How to Order

MB | **Mounting style** | **Bore size** | – | **Stroke A** | **Suffix** | + | **Stroke B** | **Suffix** | **Z – XC10**

∗ Except clevis and trunnion types

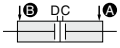
Dual stroke cylinder

MBK
MBB | **Mounting style** | **Bore size** | – | **Stroke A** | **Suffix** | + | **Stroke B** | **Suffix** | **– XC10**

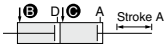
∗ Except clevis and trunnion types

Dual stroke cylinder

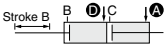
Function



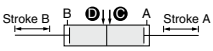
When air pressure is supplied to ports A and B, both strokes A and B retract.



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

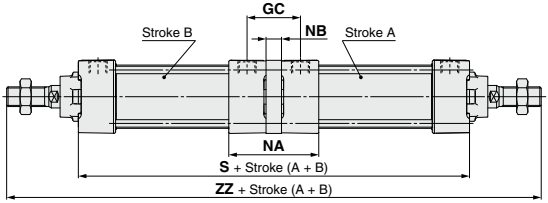


When air pressure is supplied to ports A and D, B out strokes.



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

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



(mm)

Bore size	GC	NA	NB	S	ZZ
32	36	64	10.6	178	272
40	38	64	10.6	178	280
50	41	73	10.6	198	314
63	43	73	10.6	198	314
80	52	90	14.6	242	386
100	52	90	14.6	242	386

Symbol
-XC11

12 Dual Stroke Cylinder/Single Rod Type

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

Applicable Series

Description	Model	Action	Note
Standard type	MB	Double acting, Single rod	Except ø125 and trunnion type

Specifications

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

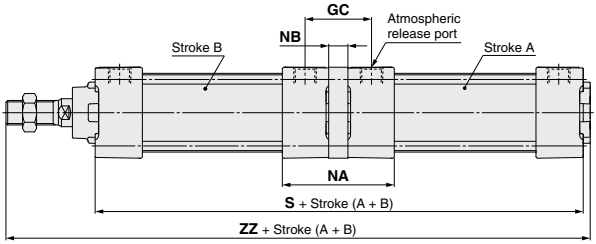
How to Order

MB | Mounting style | Bore size | – | Stroke A | Suffix | + | Stroke B-A | Suffix | **Z** – | Pivot bracket | Rod end bracket | – **XC11**

∗ Except trunnion type

Dual stroke cylinder/Single rod

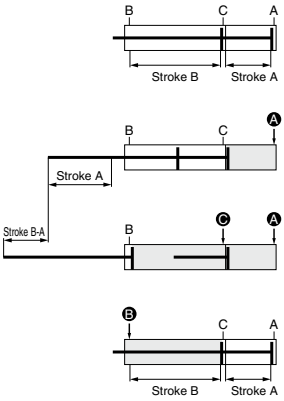
Dimensions (Dimensions other than below are the same as standard type.)



(mm)

Bore size	GC	NA	NB	S	ZZ
32	36	64	10.6	179	230
40	38	64	10.6	179	234
50	41	73	10.6	199	261
63	43	73	10.6	199	261
80	52	90	14.6	243	319
100	52	90	14.6	243	319

Functional description of dual stroke cylinder



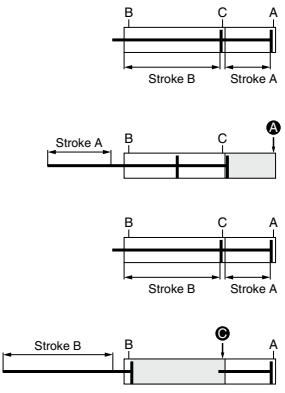
1) Initial state
(0 stroke position)

2) 1st stage
(Stroke A operation)
When the air pressure is supplied from the Ⓐ port, the rod operates the stroke A.

3) 2nd stage
(Stroke B-A operation)
Following the 1st stage, when the air pressure is supplied from the Ⓒ port, the rod operates the stroke B-A.

4) Cylinder retraction
When the air pressure is supplied from the Ⓑ port, the rod retracts completely.

Stroke A or Stroke B operation can be made individually.



Stroke A operation

1) Initial state
(0 stroke position)

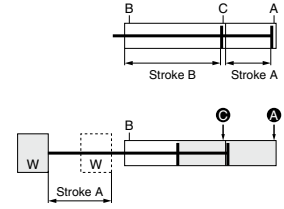
2) Operation
When the air pressure is supplied from the Ⓐ port, the rod operates the stroke A.

Stroke B operation

1) Initial state
(0 stroke position)

2) Operation
When the air pressure is supplied from the Ⓒ port, the rod operates the stroke B.

Double output is possible.



1) Initial state
(0 stroke position)

2) Double output
When the air pressure is supplied to the Ⓐ and Ⓒ ports at the same time, the double output can be obtained in the stroke A range.

⚠Caution

Precautions

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

Symbol
13 Tandem Cylinder -XC12

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

Applicable Series

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

How to Order

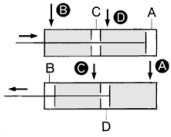
Standard model no. – **XC12**

Tandem cylinder

Specifications

Max. manufacturable stroke (mm)	500
Specifications other than above	Same as standard type

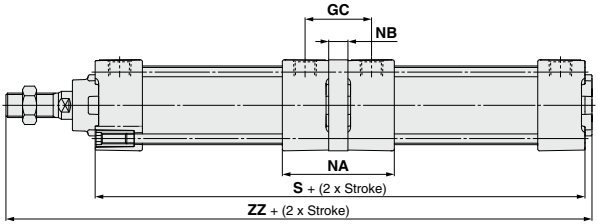
Function



When air pressure is supplied to ports ⓑ and ⓓ, the output force is doubled in the retract stroke.

When air pressure is supplied to ports ⓐ and ⓒ, the output force is doubled in the out stroke.

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



(mm)

Bore size	GC	NA	NB	S	ZZ
32	36	64	10.6	180	231
40	38	64	10.6	180	235
50	41	73	10.6	200	262
63	43	73	10.6	200	262
80	52	90	14.6	244	320
100	52	90	14.6	244	320

Symbol
14 Fluororubber Seal -XC22

Applicable Series

Description	Model	Action	Note
Standard type	MB	Double acting, Single rod	
	MBW	Double acting, Double rod	

How to Order

Standard model no. – **XC22**

Fluororubber seal

Specifications

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

Note 1) Please contact SMC, as the type of chemical and the operating temperature may not allow the use of this product.
Note 2) Cylinders with auto switches can also be produced; however, auto switch related parts (auto switch units, mounting brackets, built-in magnets) are the same as standard products. Before using these, please contact SMC regarding their suitability for the operating environment.
Note 3) No cushion is equipped for N type.

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

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

Applicable Series

Description	Model	Action	Note
Standard type	MB	Double acting, Single rod	
Non-rotating rod type	MBK	Double acting, Single rod	
With end lock	MBB	Double acting, Single rod	

Specifications

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

How to Order

MB□D – Standard model no. – XC27
- MB□D: Double clevis type
- XC27: Double clevis pin made of stainless steel

Y – 03M, 04M, 05M, 08M, 10M – XC27
- Y: Double knuckle joint
- XC27: Double knuckle joint pin made of stainless steel

CD – M03, M05, M08 – XC27
- CD: Clevis pin, Knuckle pin
- Clevis pin, Knuckle pin made of stainless steel

Symbol
16 Double Knuckle Joint with Spring Pin -XC29

To prevent loosening of the double knuckle joint of standard air cylinder (Series CM2/CA2)

Applicable Series

Description	Model	Action	Note
Standard type	MB	Double acting, Single rod	Except ø125 and rod end bracket
With end lock	MBB	Double acting, Single rod	

How to Order

Standard model no. – XC29
- XC29: Double knuckle joint with spring pin

Specifications: Same as standard type

Symbol
17 Rod Trunnion -XC30

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

Applicable Series

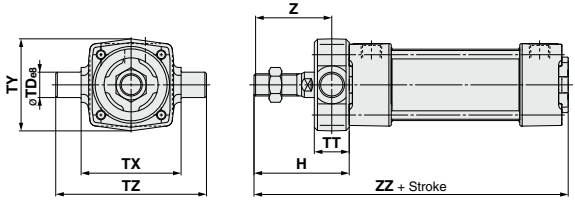
Description	Model	Action	Note
Standard type	MB	Double acting, Single rod	Except ø125
	MBW	Double acting, Double rod	Except ø125
Non-rotating rod type	MBK	Double acting, Single rod	
	MBKW	Double acting, Double rod	
With end lock	MBB	Double acting, Single rod	

How to Order

MB□T – Standard model no. – XC30
- MB□T: Trunnion bracket
- XC30: Rod trunnion

Specifications: Same as standard type

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



(mm)

Bore size	H	øTDe8	TT	TX	TY	TZ	Z	ZZ
32	47	$12^{-0.032}_{-0.059}$	17	50	49	74	38.5	135
40	60	$16^{-0.032}_{-0.059}$	22	63	58	95	49	148
50	66	$16^{-0.032}_{-0.059}$	22	75	71	107	55	164
63	72	$20^{-0.040}_{-0.073}$	28	90	87	130	58	170
80	86	$20^{-0.040}_{-0.073}$	34	110	110	150	69	204
100	92	$25^{-0.040}_{-0.073}$	40	132	136	182	72	210

Symbol
-XC35

18 With Coil Scraper

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

Applicable Series

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

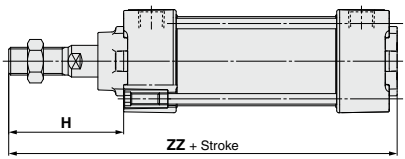
How to Order

Standard model no. – **XC35**

With coil scraper

Specifications: Same as standard type

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



(mm)

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

Symbol
-XC65

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

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

Applicable Series

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

How to Order

Standard model no. – **XC65**

Made of stainless steel
(Combination of XC7 and XC68)

Specifications

Parts changed to stainless steel	Tie-rod, Tie-rod nut, Cushion valve, Piston rod (with hard chrome plated), Rod end nut
Max. manufacturable stroke (mm)	Double acting, Single rod: 1600 Double acting single rod with rod boot: 1000
Specifications other than above and external dimensions	Same as standard type

Symbol
-XC68

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

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

Applicable Series

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

How to Order

Standard model no. – **XC68**

Made of stainless steel
(With hard chrome plated piston rod)

Specifications

Parts changed to stainless steel	Piston rod, Rod end nut
Max. manufacturable stroke (mm)	Double acting, Single rod: 1600 Double acting single rod with rod boot: 1000
Specifications other than above and external dimensions	Same as standard type

Symbol
-X1184

21 Cylinder with Heat Resistant Reed Auto Switch (–10 to 120°C)

Applicable Series

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

How to Order

MDB | **Standard model no.** | **Z –** | **Pivot bracket** | **Rod end bracket** | **–** | **Heat resistant reed auto switch** | | **– X1184**

Switch model

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

Number of switches

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

Cylinder with heat resistant reed auto switch

∗ Refer to the **WEB catalog** or the Best Pneumatics No. 2 for details on auto switches.

Specifications

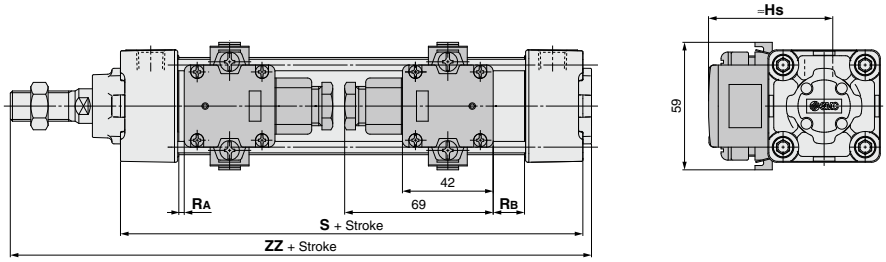
Ambient temperature range	–10°C to 120°C
Bore size	40, 50, 63, 80, 100
Seal material	Fluororubber
Grease	Heat resistant grease

⚠Warning

Precautions

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

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



(mm)

Bore size	S	ZZ	Hs	RA	RB	Minimum mounting stroke		Auto switch mounting bracket part number
						Other than center trunnion	Center trunnion	
40	99	154	57.5	2.5	14.5	1 pc.: 50 st or more 2 pcs.: Different surfaces 50 st or more 2 pcs.: Same surface 220 st or more	200 st or more	BMB2-040
50	109	171	62.5	3.5	14.5		200 st or more	BMB1-050
63	109	171	69	0.5	14.5		200 st or more	BMB1-063
80	129	205	78	2.5	22.5		210 st or more	BMB1-080
100	129	205	88.5	1	22		210 st or more	BMB1-100

Specific Product Precautions

Be sure to read this before handling. Refer to page 1574 for Safety Instructions. For Actuator and Auto Switch Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com

Adjustment

⚠Warning

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

Crimping (ø32) or a retaining 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 size (mm)	Cushion valve width across flats (mm)	Hexagon wrench
32, 40	2.5	JIS 4648 Hexagonal wrench key 2.5
50, 63	3	JIS 4648 Hexagonal wrench key 3
80, 100, 125	4	JIS 4648 Hexagonal wrench key 4

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

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

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

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

4. When replacing mounting brackets, tie-rod nuts on the cylinder body become loosened.

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

5. Do not disassemble the trunnion type cylinder because the mounting precision is required.

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.

With Rod Boot

Handling

⚠Caution

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

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

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