Cylinder with Lock

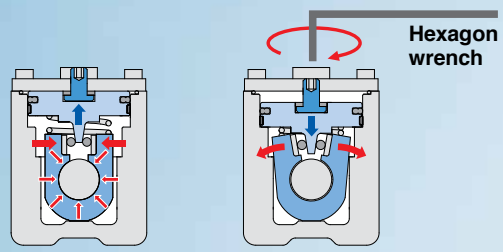
ø32, ø40, ø50, ø63

New

RoHS

Lock can be manually operated with a hexagon wrench.

Easily mounted onto equipment



◎Separate construction for improved ease of maintenance

Maintenance made easy due to separate construction of lock unit and cylinder

◎Holding force improved by 14%

(MNB, ø50: 308 lbf [1370 N] ➡ **MWB: 353 lbf [1570 N]**)

◎High stopping accuracy within ±1mm

(With ø50 and 30 kg of load)

◎Overall length reduced by 13mm max.

(Compared with MNB, ø63, 100 mm stroke)

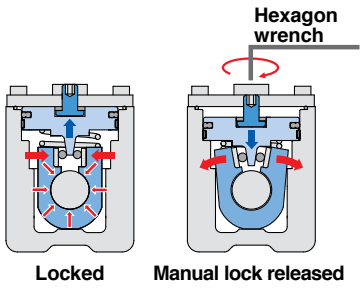
MWB Series

SMC

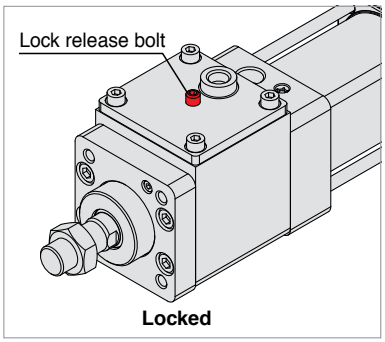
CAT.NAS20-246A

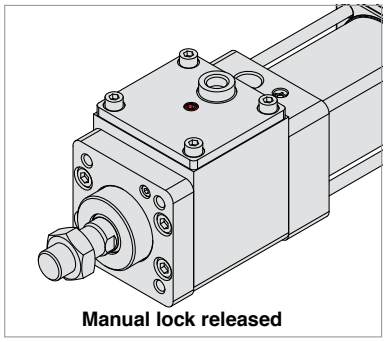
A locking cylinder ideal for intermediate stops, emergency stops and drop prevention

- **Built-in manual lock release holding mechanism**
- **It is possible to release the locked state with a hexagon wrench and hold the released state without pressurizing the unlock port.**
- **Simple construction**



- **Locked and manual lock released state can be checked visually by the condition of the lock release bolt.**





Refer to page 33 for the manual lock release.

Overall length reduced by 13 mm max.

Up to 13 mm shorter compared with the MNB series

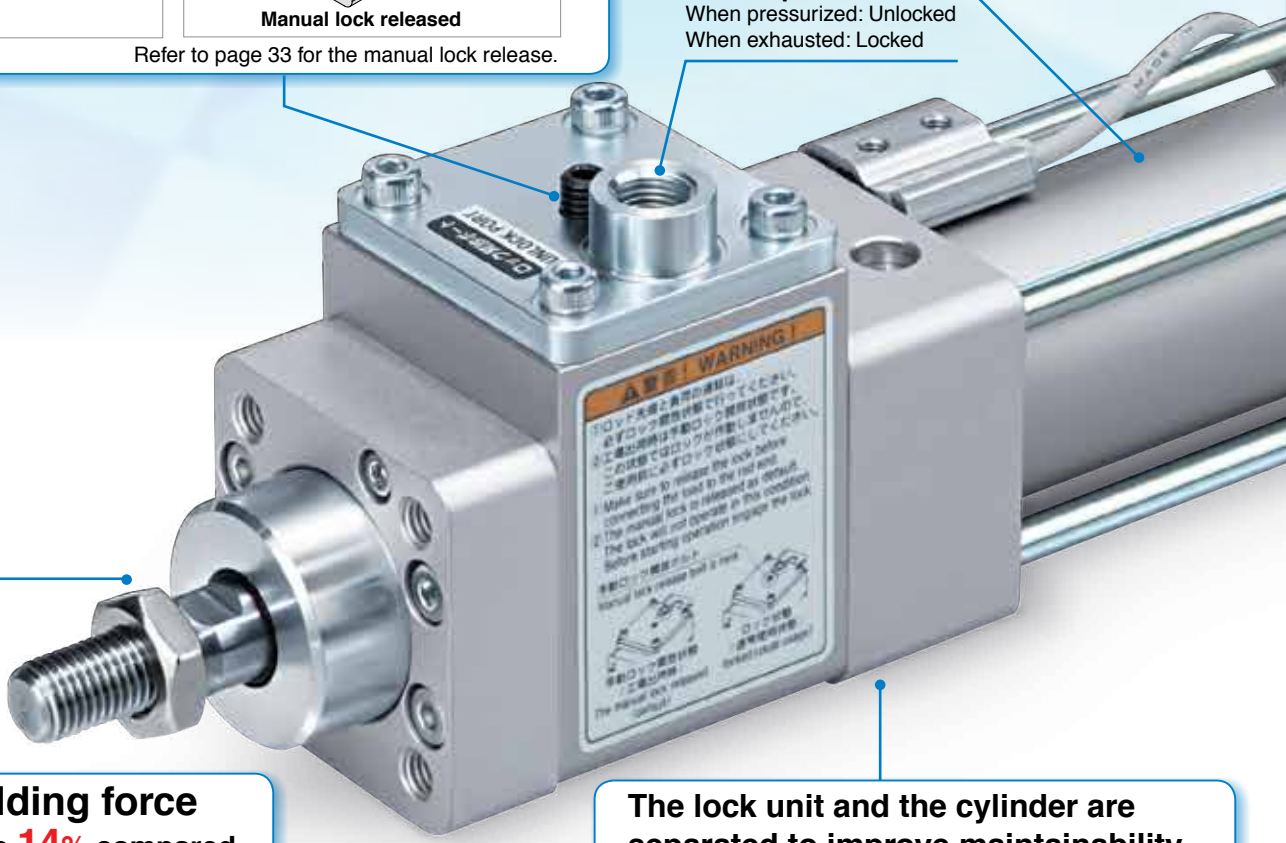
Overall length

Overall length reduced [mm]

Bore size [mm]	MWB	MNB	Reduction
32	194	205	11
40	212	216	4
50	234	245	11
63	246	259	13

∗ For basic type dimensions

Unlock port
When pressurized: Unlocked
When exhausted: Locked



Improved holding force

Improved by up to 14% compared with the MNB series

Improved holding force lbf [N]

Bore size [mm]	MWB	MNB	Increase rate [%]
32	142 [630]	124 [552]	14
40	220 [980]	198 [882]	11
50	353 [1570]	308 [1370]	14
63	551 [2450]	486 [2160]	13

The lock unit and the cylinder are separated to improve maintainability.

Refer to page 34 for the replacement procedure.

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

Not necessary to order a bracket for the applicable cylinder separately

* Rod end bracket and pivot bracket are shipped together with the product, but not assembled.

Example) **MDWB D 40-100- N V -M9BW**

Mounting

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 types.

Double clevis

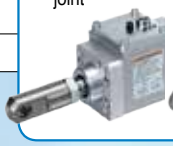
Center trunnion

Rod end bracket

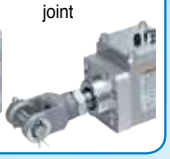
Nil	No bracket
V	Single knuckle joint
W	Double knuckle joint

With rod end bracket

V: Single knuckle joint



W: Double knuckle joint



Compact auto switches are mountable.

- **Solid state auto switch: D-M9□**

- **Reed auto switch: D-A9□**

- **Magnetic field resistant auto switch: D-P3DWA D-P4DW**

Series Variations

Cylinder with Lock

Type	Action	Bore size [mm]				Lock holding force lbf [N]	Cushion		With rod boot	Made to order
		32	40	50	63		Air	Rubber		
 Standard	Double acting, Single rod	●	●	●	●	142 to 551 [630 to 2450]	●	●	●	Change of rod end shape
 Double rod	Double acting, Double rod	●	●	●	●	142 to 551 [630 to 2450]	●	●	●	–

CONTENTS

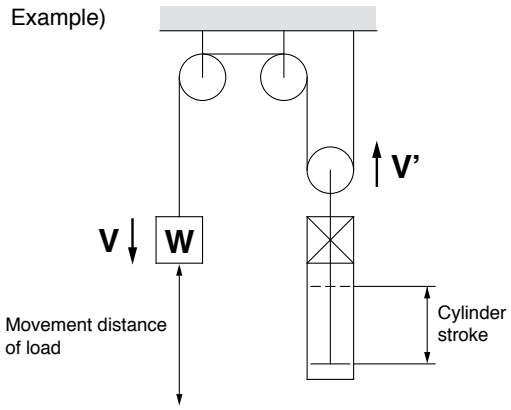
MWB Series
Model Selection

Precautions on Model Selection

⚠ Caution

1. In order that the originally selected maximum speed shall not be exceeded, be certain to use a speed controller to adjust the total movement distance of the load so that movement takes place in no less than the applicable movement time.
The movement time is the time that is necessary for the load to travel the total movement distance from the start without any intermediate stops.

2. In cases where the cylinder stroke and the movement distance of the load are different (double speed mechanism etc.), use the movement distance of the load for selection purposes.



3. The following selection example and procedures are based on use at the intermediate stop (including emergency stops during operation). However, when the cylinder is in a locked state, kinetic energy does not act upon it. Under these conditions, use the load mass at the maximum speed (V) of 100 mm/s shown in graphs 5 to 7 on page 4 depending on the operating pressure and select models.

Selection Example

- Load mass : **m** = 50 kg
- Movement distance : **st** = 500 mm
- Movement time : **t** = 2 s
- Load condition : Vertical downward = Load in direction of rod extension
- Operating pressure : **P** = 0.4 MPa

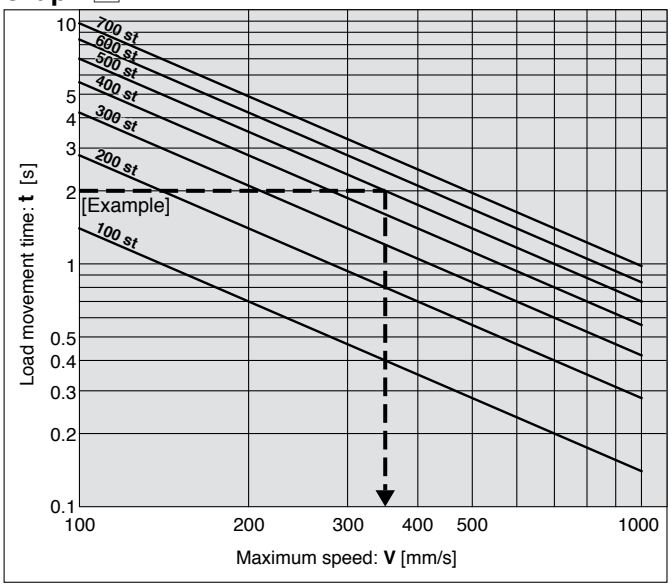
Step 1: From graph 1, find the maximum movement speed of the load
∴ Maximum speed **V**: ≈ 350 mm/s.

Step 2: Select graph 6 based upon the load conditions and operating pressure, and then from the intersection of the maximum speed **V** = 350 mm/s found in Step 1, and the load mass **m** = 50 kg.
∴ ø63 → Select an MWB63 or larger bore size.

Step 1 Find the maximum load speed V.

Find the maximum load speed: **V** [mm/s] from the load movement time: **t** [s] and the movement distance: **st** [mm].

Graph 1

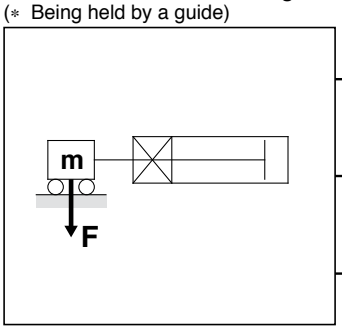


Step 2 Find the bore size.

Select a graph based upon the load condition and operating pressure, and then find the point of intersection for the maximum speed found in Step 1 and the load mass. Select the bore size on the above the point of intersection.

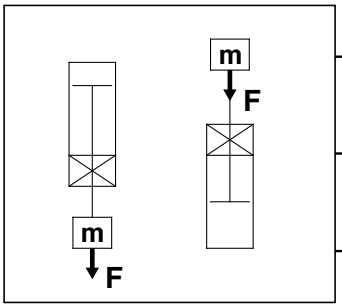
Load Condition	Operating Pressure

Load in the direction at the right angle to rod
(∗ Being held by a guide)



- 44 psi [0.3 MPa] ≤ → Graph 2
- 58 psi [0.4MPa] ≤ → Graph 3
- 73 psi [0.5 MPa] ≤ → Graph 4

Load in the direction of rod extension
Load in the direction of rod retraction

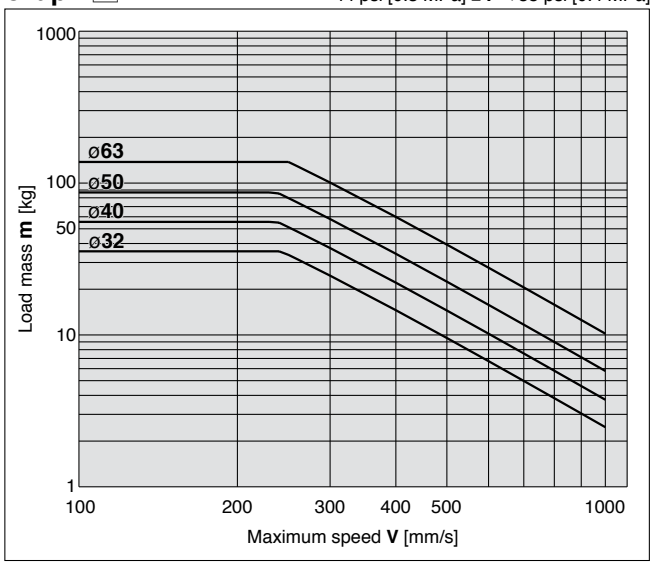


- 44 psi [0.3 MPa] ≤ → Graph 5
- 58 psi [0.4MPa] ≤ → Graph 6
- 73 psi [0.5 MPa] ≤ → Graph 7

Selection Graph

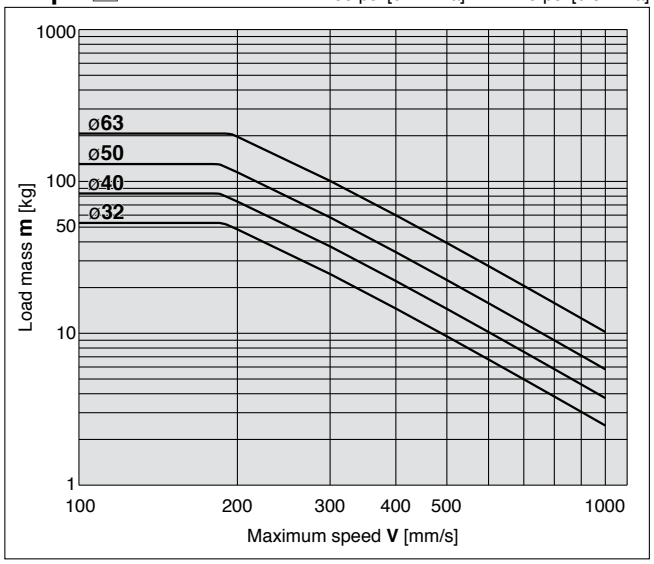
Graph 2

44 psi [0.3 MPa] ≤ **P** < 58 psi [0.4 MPa]



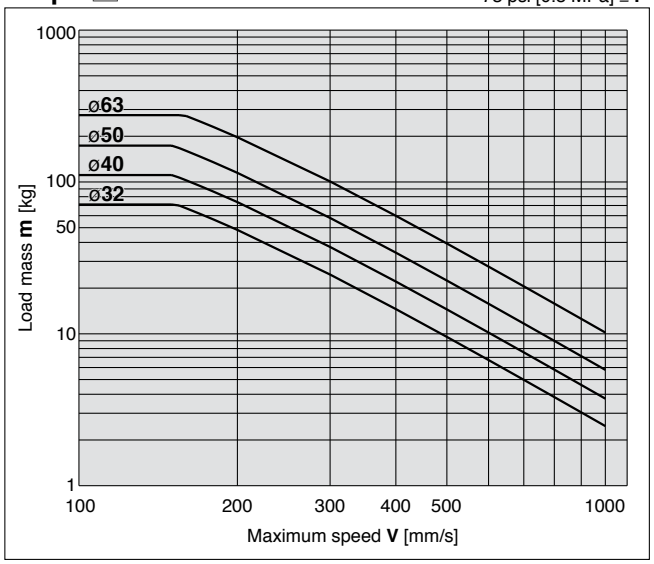
Graph 3

58 psi [0.4 MPa] ≤ **P** < 73 psi [0.5 MPa]



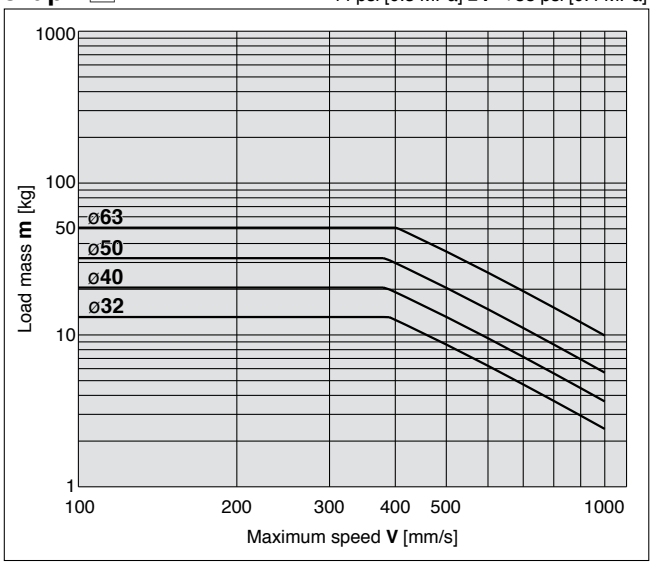
Graph 4

73 psi [0.5 MPa] ≤ **P**



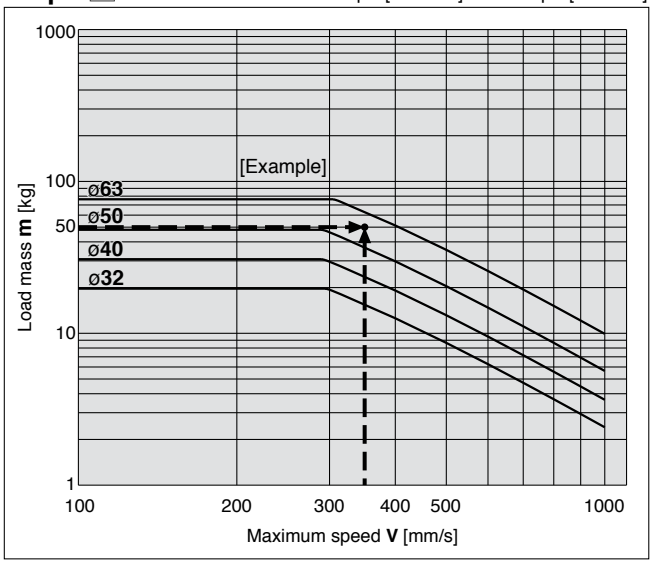
Graph 5

44 psi [0.3 MPa] ≤ **P** < 58 psi [0.4 MPa]



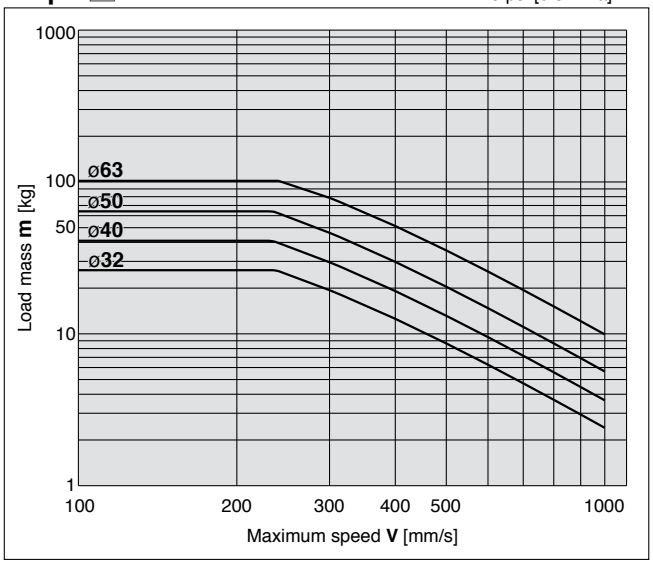
Graph 6

58 psi [0.4 MPa] ≤ **P** < 73 psi [0.5 MPa]



Graph 7

73 psi [0.5 MPa] ≤ **P**



Cylinder with Lock
Double Acting, Single Rod
MWB Series
ø32, ø40, ø50, ø63

RoHS

How to Order

MWB **B** **40** □ – **50** □ □ – □ □ – □

With auto switch **MDWB** **B** **40** □ – **50** □ □ – □ □ – **M9BW** □ – □

With auto switch
(Built-in magnet)

Mounting

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

∗ Mounting brackets other than center trunnion type are shipped together.

Bore size

32	32 mm
40	40 mm
50	50 mm
63	63 mm

Port thread

Nil	Rc
TN	NPT
TF	G

Cylinder stroke [mm]
Refer to page 6 for standard strokes.

Suffix (Rod boot)

Nil	None
J	Nylon tarpaulin
K	Heat resistant tarpaulin

Pivot bracket

Nil	No bracket
N	Pivot bracket

∗ Only for D and T mounting types.
∗ Pivot bracket is shipped together with the product.
∗ For details, refer to page 14.

Suffix (Cushion)

Nil	Air cushion
N∗1	Rubber bumper

∗1 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.

Auto switch

Nil	Without auto switch

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

Number of auto switches

Nil	2
S	1
3	3
n	n

Rod end bracket

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.
∗ Excludes made to order -XA□.

Made to order
For details, refer to page 6.

Refer to the Ordering Example of Cylinder Assembly on page 6.

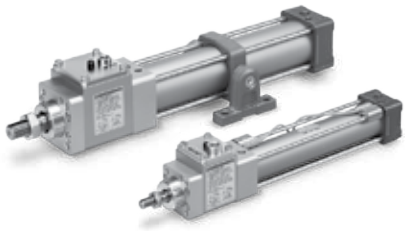
Applicable Auto Switches/Refer to the **Web Catalog** or Best Pneumatics for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Tie-rod mounting	Auto switch model: Band mounting	Lead wire length [m]: 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state 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 indicator)	Grommet		3-wire (NPN)		5 V, 12 V		**M9NW**	–	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PW**	–	●	●	●	○	○		
				2-wire		12 V		**M9BW**	–	●	●	●	○	○	–	
	Water resistant (2-color indicator)			3-wire (NPN)		5 V, 12 V		**M9NA**∗1	–	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PA**∗1	–	○	○	●	○	○		
				2-wire		12 V		**M9BA**∗1	–	○	○	●	○	○	–	
	With diagnostic output (2-color indicator)			4-wire (NPN)		5 V, 12 V		**F59F**	–	●	–	●	○	○	IC circuit	
	Magnetic field resistant (2-color indicator)			2-wire (Non-polar)		–		**P3DWA**∗2	–	●	–	●	●	○	–	
								P4DW	–	–	–	●	●	○		
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	–	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
		DIN terminal					100 V, 200 V	–	**A34**	–	–	–	–	–		
								–	**A44**	–	–	–	–	–		Relay, PLC
	Diagnostic indication (2-color indicator)	Grommet				–	–	**A59W**	–	●	–	●	–	–		

∗1 Water resistant type auto switches can be mounted on the above models, but SMC cannot guarantee water resistance. A water resistant type cylinder is recommended for use in an environment which requires water resistance.
∗2 The D-P3DWA cannot be mounted on ø32.

∗ Lead wire length symbols: 0.5 m·····Nil (Example) M9NW 3 m····· L (Example) M9NWL
1 m·····M (Example) M9NWM 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 28 for details.
∗ The D-A9□/M9□/P3DWA□ auto switches are shipped together, but not assembled. (Only the auto switch mounting brackets are assembled for the D-A9□/M9□ before shipment.)



Cylinder Specifications

Bore size [mm]	32	40	50	63
Action	Double acting, Single rod			
Fluid	Air			
Proof pressure	218 psi [1.5 MPa]			
Max. operating pressure	145 psi [1.0 MPa]			
Min. operating pressure	12 psi [0.08 MPa]			
Ambient and fluid temperature	Without auto switch: 14 to 158°F [–10 to 70°C] With auto switch: 14 to 140°F [–10 to 60°C] (No freezing)			
Lubricant	Not required (Non-lube)			
Piston speed	50 to 1000 mm/s∗1			
Stroke length tolerance	Up to 250 st: $^{+1.0}_{0}$, 251 to 1000 st: $^{+1.4}_{0}$, 1001 to 1500 st: $^{+1.8}_{0}$, 1501 to 2000 st: $^{+2.2}_{0}$			
Cushion	Air cushion or Rubber bumper			
Port size (Rc, NPT, G)	1/8	1/4		3/8
Mounting	Basic, Axial foot, Rod flange, Head flange Single clevis, Double clevis, Center trunnion			

∗1 Load limits exist depending upon piston speed when locked, mounting direction and operating pressure.

Lock Unit Specifications

Bore size [mm]	32	40	50	63
Locking action	Exhaust locking			
Max. operating pressure	145 psi [1.0 MPa]			
Min. operating pressure	44 psi [0.3 MPa] or more			
Locking direction	Both directions			
Holding force (Max. static load) lbf [N] ∗1	153 [680]	220 [980]	353 [1570]	551 [2450]

∗1 The holding force (max. static load) shows the maximum capability and does not show the normal holding capability. So, select an appropriate cylinder while referring to page 3.

Standard Strokes

∗ For cases with auto switches, refer to the table of minimum stroke for auto switch mounting on page 25.

[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 2500
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		

∗ Manufacture of intermediate strokes is possible. (Spacers are not used.)
∗ Applicable strokes should be confirmed according to the usage. For details, refer to the Air Cylinders Model Selection in the **Web Catalog** or Best Pneumatics. In addition, the products that exceed the stroke range ① might not be able to fulfill the specifications due to the deflection etc.
∗ Please consult with SMC for manufacturability and the part numbers when exceeding the stroke range ②.
∗ The stroke range with rod boot is available up to 1000 mm. Please consult with SMC when exceeding 1000 mm stroke.

Stopping Accuracy

Bore size [mm]	32	40	50	63
Lock type	Exhaust locking			
Stopping accuracy [mm]	±1.0			
Conditions	· Mounting orientation: Horizontal · Supply pressure: 73 psi [0.5 MPa] · Piston speed: 300 mm/s · Load condition: Upper limit of allowed value Solenoid valve for locking is mounted on the unlock port. Maximum value of stopping position dispersion from 100 measurements			

Made to Order
(For details, refer to the MB series in the **Web Catalog**.)

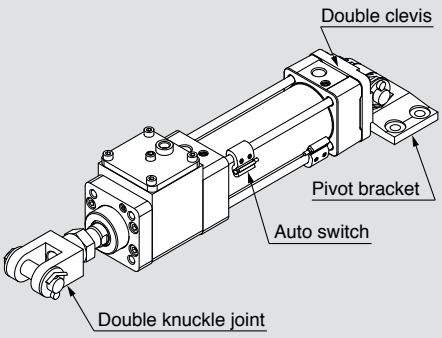
Symbol	Specifications
-XA□	Change of rod end shape

Refer to pages 23 to 28 for cylinders with auto switches.

- Auto Switch Proper Mounting Position (Detection at stroke end) and Mounting Height
- Minimum Stroke for Auto Switch Mounting
- Auto Switch Mounting Brackets/Part No.
- Operating Range

Ordering Example of Cylinder Assembly

Cylinder model: MDWBD32-50-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	●	●	●	●	●	●	●

∗ Refer to page 15 for dimensions and part numbers of the accessories. (Except rod boot)

Mounting Brackets/Part No.

Bore size [mm]	32	40	50	63
Axial foot∗1	MB-L03	MB-L04	MB-L05	MNB-L06∗
Rod/Head flange	MNB-F03∗	MNB-F04∗	MNB-F05∗	MNB-F06∗
Single clevis	MB-C03	MB-C04	MB-C05	MB-C06
Double clevis	MB-D03	MB-D04	MB-D05	MB-D06

∗1 Order two foots per cylinder.
∗ Accessories for each mounting bracket are as follows.
Axial foot, Rod/Head flange, Single clevis: Body mounting bolt
Double clevis: Clevis pin, Split pins, Flat washers and Body mounting bolt
∗ All are common to the MB series air cylinders, except the sections marked with a "∗".

Theoretical Output

(Unit: N)

Bore size [mm]	Rod size [mm]	Operating direction	Piston area [mm²]	Operating pressure [MPa] 0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
32	12	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

∗ Theoretical output [N] = Pressure [MPa] x Piston area [mm²] (0.225 lbf = 1N)

Weight

[kg]

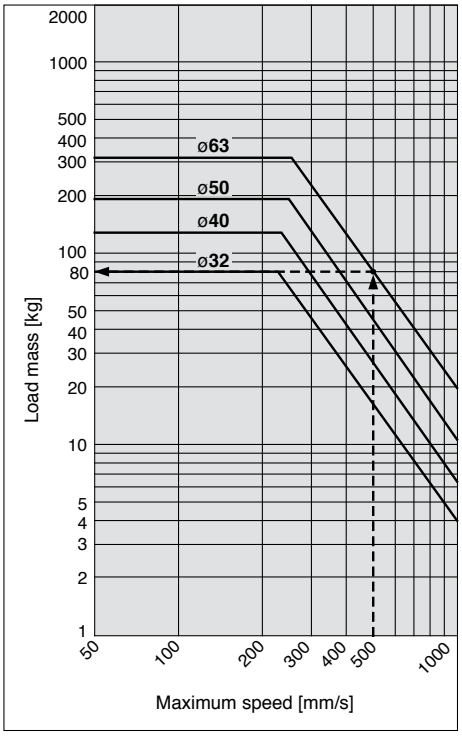
Bore size [mm]			32	40	50	63
Basic weight (at 0 stroke)	Basic	Lock unit	0.42	0.83	1.15	1.79
		Cylinder (at 0 stroke)	0.43	0.70	1.16	1.51
		Total	0.85	1.53	2.31	3.30
Mounting bracket weight (including bracket mounting bolts)	Foot bracket (2 pcs.)		0.12	0.14	0.22	0.26
	Rod/Head flange		0.24	0.32	0.53	0.74
	Single clevis bracket		0.25	0.23	0.34	0.63
	Double clevis bracket		0.26	0.27	0.43	0.79
	Trunnion bracket		0.29	0.36	0.48	0.80
Additional weight per 50 mm of stroke			0.11	0.16	0.26	0.27
Accessories	Single knuckle joint		0.15	0.23	0.26	0.26
	Double knuckle joint (with pin)		0.22	0.37	0.43	0.43

Rod Boot Material

Symbol	Material	Max. ambient temp.
J	Nylon tarpaulin	158°F [70°C]
K	Heat resistant tarpaulin	230°F [110°C]∗1

∗1 Max. ambient temperature for rod boot itself

Allowable Kinetic Energy of the Cylinder∗



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.

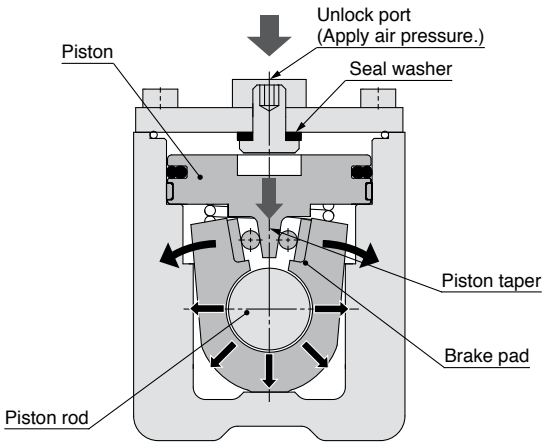
∗ The allowable kinetic energy of the cylinder is shown without the intermediate stop or emergency stop. Refer to page 3 or 4 for the kinetic energy with intermediate or emergency stop.

Calculation example)
MWBL32-100 (Axial foot, ø32, 100 mm stroke)
- Basic weight···0.42 (Lock unit, ø32)
- Basic weight···0.43 (Cylinder, ø32)
- Additional weight···0.11/50 mm stroke
- Cylinder stroke···100 mm stroke
- Foot bracket···0.12

0.42 + 0.43 + (0.11/50) x 100 + 0.12 = **1.19 kg**

Working Principle

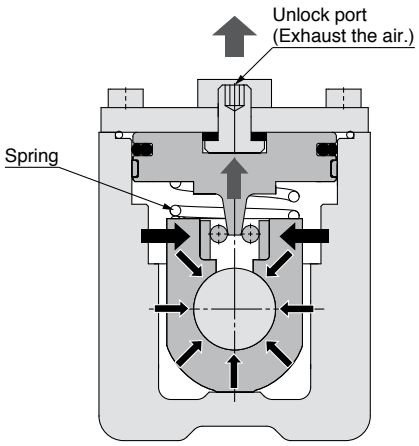
Normal operation (Operation pressurized by air)



Unlocked (when air pressure is applied)

When air is supplied to the unlock port, the piston moves downward, the brake pad is opened by the tapered portion at the bottom of the piston and the piston rod will be free to move. This is the lock released state.

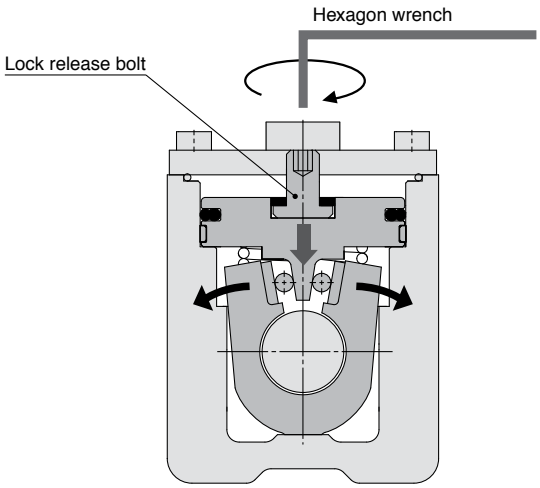
* Check that there is no air leakage from the unlock port.



Locked (when air is exhausted)

When the air supplied to the unlock port is exhausted, the piston moves upward due to the spring force at the bottom of the piston and rigidity of the brake pad. Then, the brake pad is closed and holds the piston rod, locking its movement. This is the locked state.

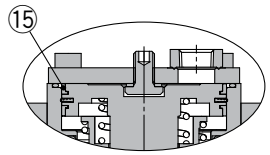
Manual lock release



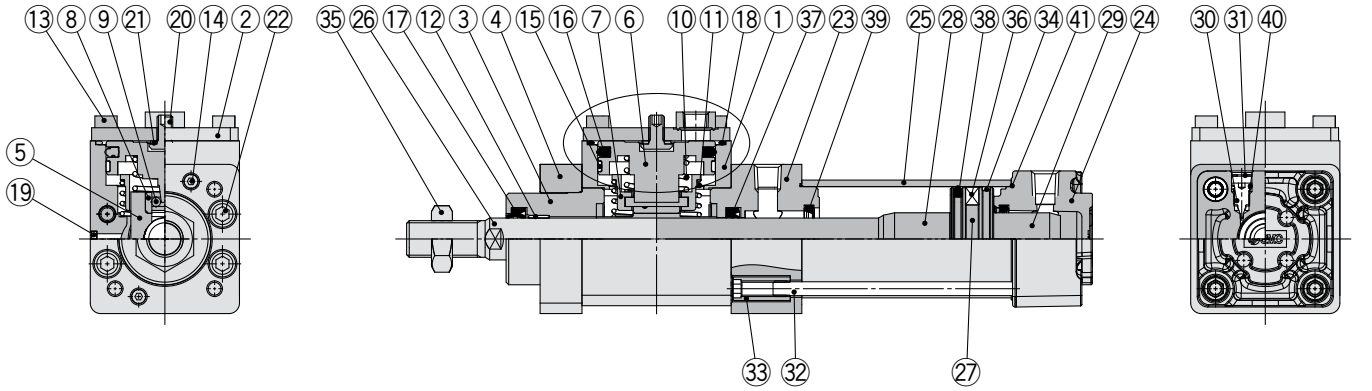
Manual lock released

When the lock release bolt is screwed-in, the piston moves downward, the brake pad is opened by the tapered portion of the piston and the piston rod will be freed. This holds the lock in the released state. Refer to page 33 for how to return to the locked state.

Construction



ø**63**



Component Parts

No.	Description	Material	Q'ty	Note
1	**Brake unit**	Aluminum alloy	1	Hard anodized
2	**Cap**	Rolled steel	1	Zinc chromated
3	**Collar**	Aluminum alloy	1	Chromated
4	**Retaining plate**	Aluminum alloy	1	Anodized
5	**Brake pad**	Cast iron	1	
6	**Piston A**	Aluminum alloy	1	
7	**Roller holder**	Carbon steel	1	
8	**Roller receiver**	Stainless steel	2	Heat treatment
9	**Needle roller**	Carbon steel	2	Heat treatment
10	**Piston spring**	Spring steel	1	Zinc chromated
11	**Roller spring**	Spring steel	1	Zinc chromated
12	**Bushing**	Bearing alloy	1	
13	Hexagon socket head cap screw	Alloy steel	4	
14	Hexagon socket head cap screw	Alloy steel	2	
15	**Wear ring A**	Resin	1	
			2	ø63
16	**Piston seal A**	NBR	1	
17	**Rod seal A**	NBR	1	
18	**Gasket**	NBR	1	
19	**Element**	Bronze	1	
20	**Release bolt**	Alloy steel	1	
21	**Seal washer**	NBR + Stainless steel	1	
22	Hexagon socket head cap screw	Alloy steel	4	
23	**Rod cover**	Aluminum alloy	1	Anodized
24	**Head cover**	Aluminum die-cast	1	Chromated
25	**Cylinder tube**	Aluminum alloy	1	Hard anodized
26	**Piston rod**	Carbon steel	1	Hard chrome plating
27	**Piston B**	Aluminum alloy	1	

Component Parts

No.	Description	Material	Q'ty	Note
28	**Cushion ring**	Aluminum alloy	1	Anodized
29	**Cushion ring B**	Aluminum alloy	1	Anodized
30	**Cushion valve**	Steel wire	2	Zinc chromated
31	**Retaining ring**	Spring steel	2	ø40 to ø63 only
32	**Tie-rod**	Carbon steel	4	Zinc chromated
33	**Tie-rod nut**	Carbon steel	8	Zinc chromated
34	**Wear ring B**	Resin	1	
35	**Rod end nut**	Carbon steel	1	Zinc chromated
36	**Magnet**	—	(1)	
37	**Rod seal B**	NBR	1	
38	**Piston seal B**	NBR	1	
39	**Cushion seal**	Urethane	2	
40	**Cushion valve seal**	NBR	2	
41	**Cylinder tube gasket**	NBR	2	

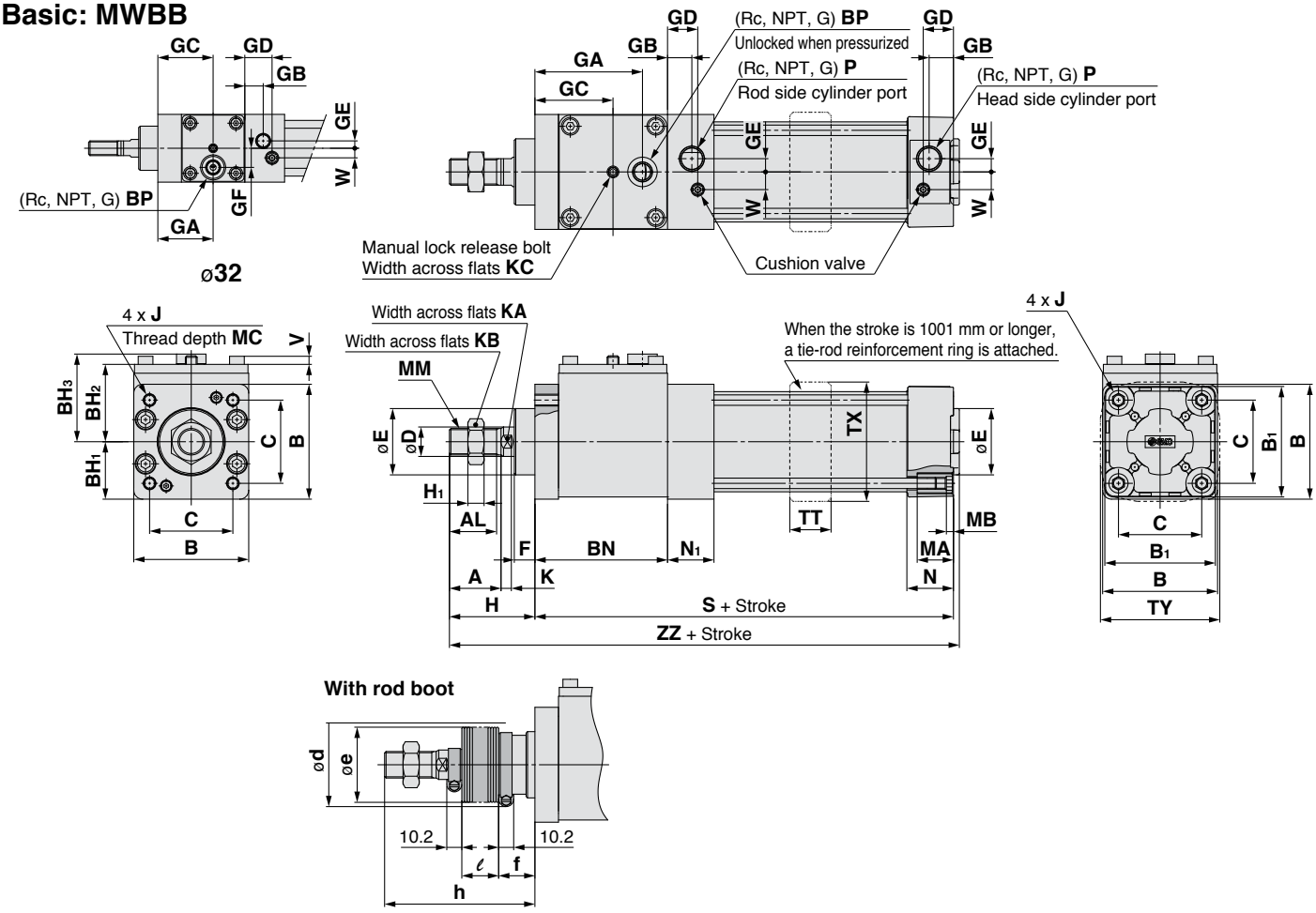
Replacement Parts/Seal Kit

Bore size [mm]	Kit no.	Contents
32	MWB32-PS	A set of ⑰ Rod seal A, ㊲ Rod seal B, ㊳ Piston seal B, ㊴ Cushion seal, and ㊶ Cylinder tube gasket
40	MWB40-PS	
50	MWB50-PS	
63	MWB63-PS	

* Never dissemble the lock unit. It should be replaced as a unit. Refer to page 3 4 for the part numbers for placing an order. The seal kit shown above contains the rod seal for the cylinder and lock unit. Order the seal kit suitable for the cylinder bore size.
* The seal kit shown above includes a grease pack.
(ø32, ø40, ø50: 10 g, ø63: 20 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)

Dimensions

Basic: MWBB



[mm]

Bore size	A	AL	B	B_1	BH_1	BH_2	BH_3	BN	BP	C	D	E	F	GA	GB	GC	GD	GE	GF	H	H_1	J
32	22	19.5	46	46	23	38.5	46.5	59	1/8	32.5	12	30	13	37.5	13	37.5	18.5	4	13	47	6	M6 x 1.0
40	30	27	57	52	28.5	42.5	48.5	73	1/8	38	16	35	13	59.5	14	44.5	19.5	4	—	51	8	M6 x 1.0
50	35	32	66	65	33	49	55.5	78	1/8	46.5	20	40	14	64	15.5	47	23	5	—	58	11	M8 x 1.25
63	35	32	78	75	39	52.5	59.5	90	1/4	56.5	20	45	14	73	16.5	53	20.5	9	—	58	11	M8 x 1.25

[mm]

Bore size	K	KA	KB	KC	MA	MB	MC	MM	N	N_1	P	S	TT	TX	TY	V	W	ZZ
32	6	10	17	3	16	4	16	M10 x 1.25	27	27	1/8	143	17	48	49	3.5	6.5	194
40	6	14	22	3	16	4	16	M14 x 1.5	27	27	1/4	157	22	55	58	4.5	9	212
50	7	18	27	4	16	5	16	M18 x 1.5	31.5	31.5	1/4	172	22	68	71	4.5	10.5	234
63	7	18	27	4	16	5	16	M18 x 1.5	31.5	31.5	3/8	184	28	81	81	5.5	12	246

With Rubber Bumper [mm]

Bore size	S	ZZ
32	149	200
40	163	218
50	180	242
63	192	254

With Rod Boot

[mm]

Bore size	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	150	175	—	—	—
40	56	41	23	12.5	25	37.5	50	75	100	125	150	175	200	—	—
50	64	51	25	12.5	25	37.5	50	75	100	125	150	175	200	225	250
63	64	51	25	12.5	25	37.5	50	75	100	125	150	175	200	225	250

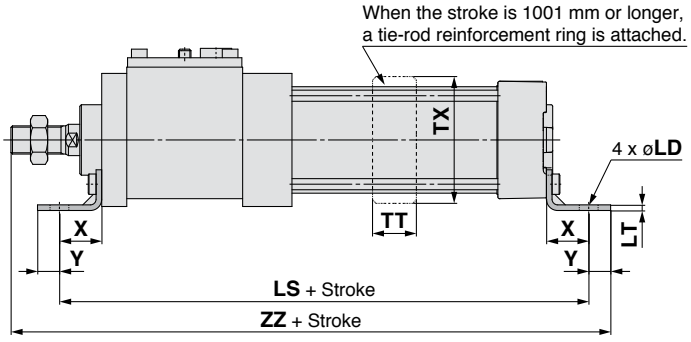
[mm]

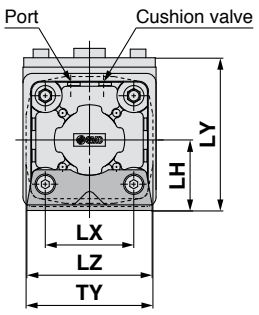
Bore size	h											
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000
32	73	86	98	111	136	161	186	211	236	—	—	—
40	81	94	106	119	144	169	194	219	244	269	—	—
50	89	102	114	127	152	177	202	227	252	277	302	327
63	89	102	114	127	152	177	202	227	252	277	302	327

Dimensions: With Mounting Bracket

* Refer to Basic (B) for other dimensions.

Axial foot: MWBL





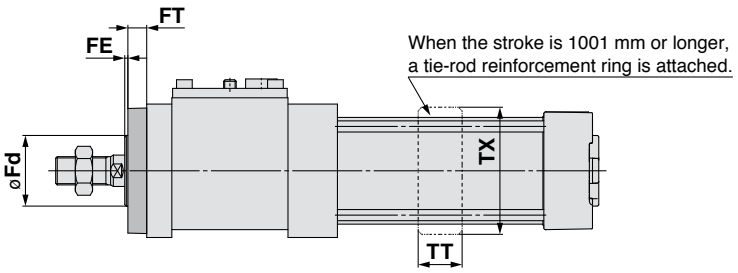
[mm]

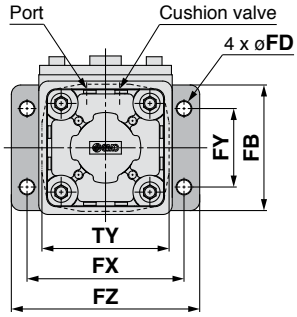
Bore size	LD	LH	LS	LT	LX	LY	LZ	TT	TX	TY	X	Y	ZZ
32	7	30	187	3.2	32	53	50	17	48	49	22	9	221
40	9	33	205	3.2	38	59	55	22	55	58	24	11	243
50	9	40	226	3.2	46	72.5	70	22	68	71	27	11	268
63	12	48	238	3.6	56	93	80	28	81	81	27	14	283

With Rubber Bumper [mm]

Bore size	LS	ZZ
32	193	227
40	211	249
50	234	276
63	246	291

Rod flange: MWBF





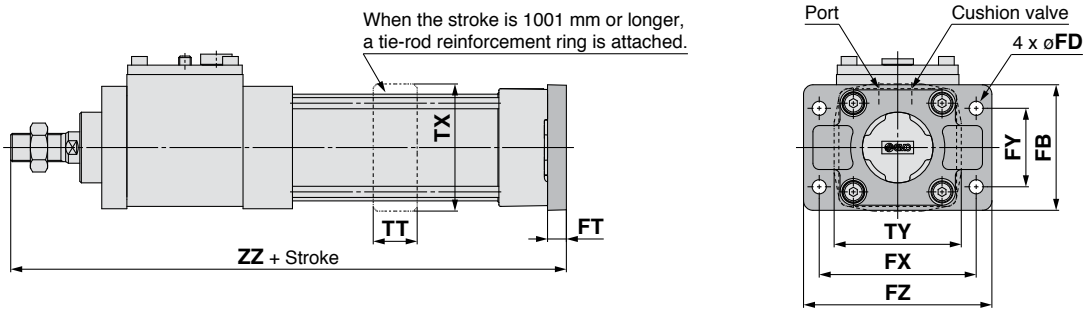
[mm]

Bore size	FB	FD	Fd	FE	FT	FX	FY	FZ	TT	TX	TY
32	56	7	30	3	10	72	38	87	17	48	49
40	65	9	35	3	10	83	46	101	22	55	58
50	77	9	40	2	12	100	52	120	22	68	71
63	92	9	45	2	12	115	62	135	28	81	81

Dimensions: With Mounting Bracket

* Refer to Basic (B) for other dimensions.

Head flange: MWBG



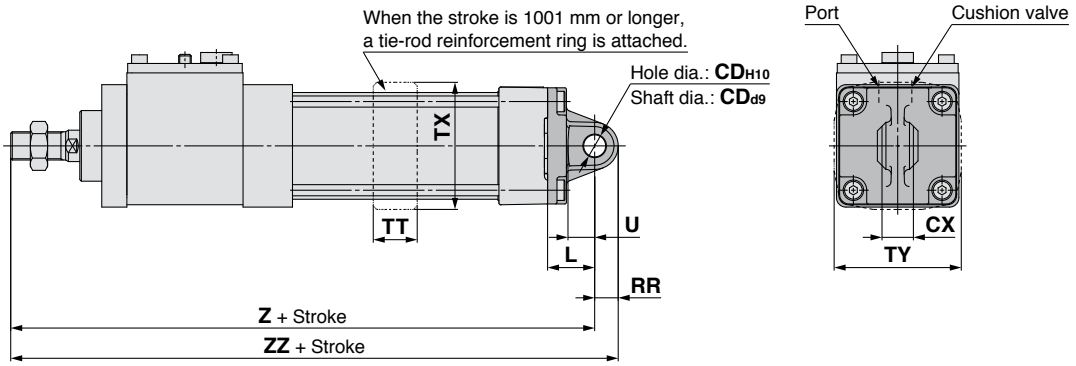
[mm]

Bore size	FB	FD	FT	FX	FY	FZ	TT	TX	TY	ZZ
32	56	7	10	72	38	87	17	48	49	200
40	65	9	10	83	46	101	22	55	58	218
50	77	9	12	100	52	120	22	68	71	242
63	92	9	12	115	62	135	28	81	81	254

With Rubber Bumper [mm]

Bore size	ZZ
32	206
40	224
50	250
63	262

Single clevis: MWBC



[mm]

Bore size	CD_{H10}	CD_{d9}	CX	L	RR	U	TT	TX	TY	Z	ZZ
32	$10^{+0.058}_{0}$	$10^{-0.040}_{-0.076}$	$14^{-0.1}_{-0.3}$	23	10.5	13	17	48	49	213	223.5
40	$10^{+0.058}_{0}$	$10^{-0.040}_{-0.076}$	$14^{-0.1}_{-0.3}$	23	11	13	22	55	58	231	242
50	$14^{+0.070}_{0}$	$14^{-0.050}_{-0.093}$	$20^{-0.1}_{-0.3}$	30	15	17	22	68	71	260	275
63	$14^{+0.070}_{0}$	$14^{-0.050}_{-0.093}$	$20^{-0.1}_{-0.3}$	30	15	17	28	81	81	272	287

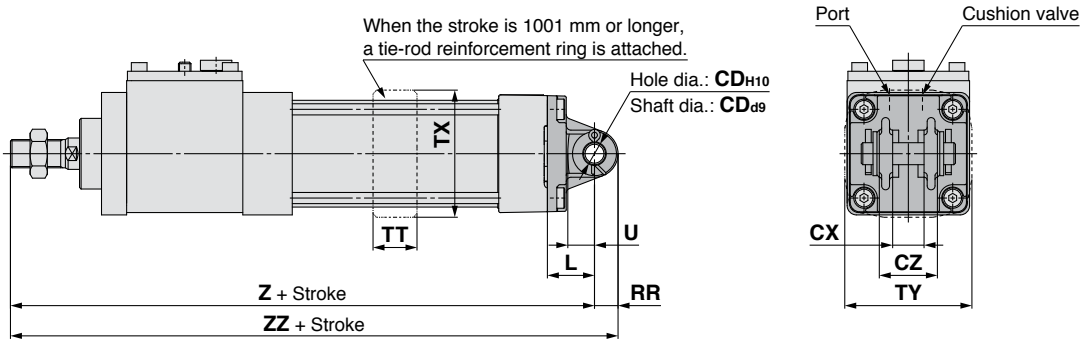
With Rubber Bumper [mm]

Bore size	Z	ZZ
32	219	229.5
40	237	248
50	268	283
63	280	295

Dimensions: With Mounting Bracket

* Refer to Basic (B) for other dimensions.

Double clevis: MWBD



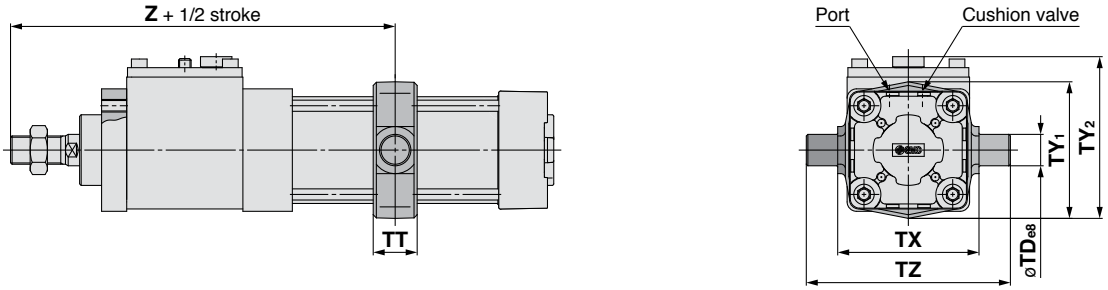
[mm]

Bore size	CD_{H10}	CD_{d9}	CX	CZ	L	RR	U	TT	TX	TY	Z	ZZ
32	$10^{+0.058}_{0}$	$10^{-0.040}_{-0.076}$	$14^{+0.3}_{+0.1}$	28	23	10.5	13	17	48	49	213	223.5
40	$10^{+0.058}_{0}$	$10^{-0.040}_{-0.076}$	$14^{+0.3}_{+0.1}$	28	23	11	13	22	55	58	231	242
50	$14^{+0.070}_{0}$	$14^{-0.050}_{-0.093}$	$20^{+0.3}_{+0.1}$	40	30	15	17	22	68	71	260	275
63	$14^{+0.070}_{0}$	$14^{-0.050}_{-0.093}$	$20^{+0.3}_{+0.1}$	40	30	15	17	28	81	81	272	287

With Rubber Bumper [mm]

Bore size	Z	ZZ
32	219	229.5
40	237	248
50	268	283
63	280	295

Center trunnion: MWBT



[mm]

Bore size	TD_{e8}	TT	TX	TY_1	TY_2	TZ	Z
32	$12^{-0.032}_{-0.059}$	17	50	49	71	74	148
40	$16^{-0.032}_{-0.059}$	22	63	58	77.5	95	166
50	$16^{-0.032}_{-0.059}$	22	75	71	91	107	183
63	$20^{-0.040}_{-0.073}$	28	90	81	100	130	195

With Rubber Bumper [mm]

Bore size	Z
32	151
40	169
50	187
63	199

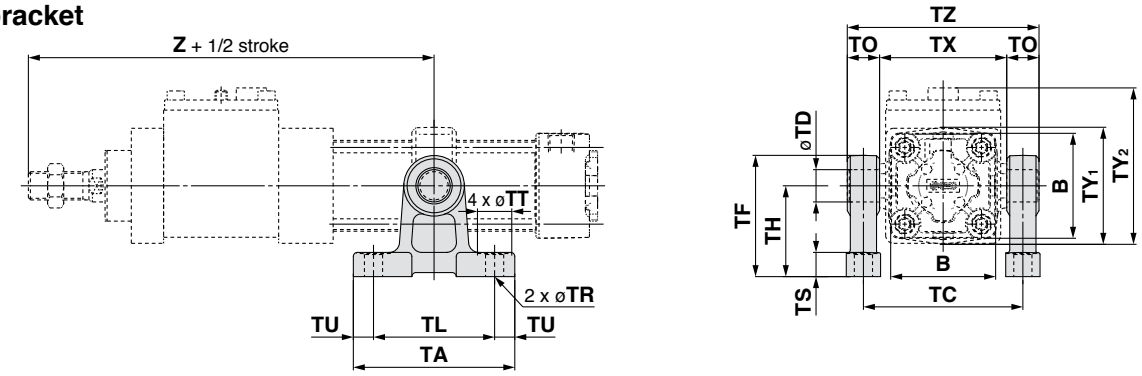
Pivot Bracket: Trunnion and Double Clevis Pivot Bracket

Part No.

Bore size [mm]	32	40	50	63
Trunnion pivot bracket*1	MB-S03	MB-S04	MB-S04	MB-S06
Double clevis pivot bracket	MB-B03	MB-B03	MB-B05	MB-B05

*1 Order 2 trunnion pivot brackets per cylinder.

Trunnion pivot bracket



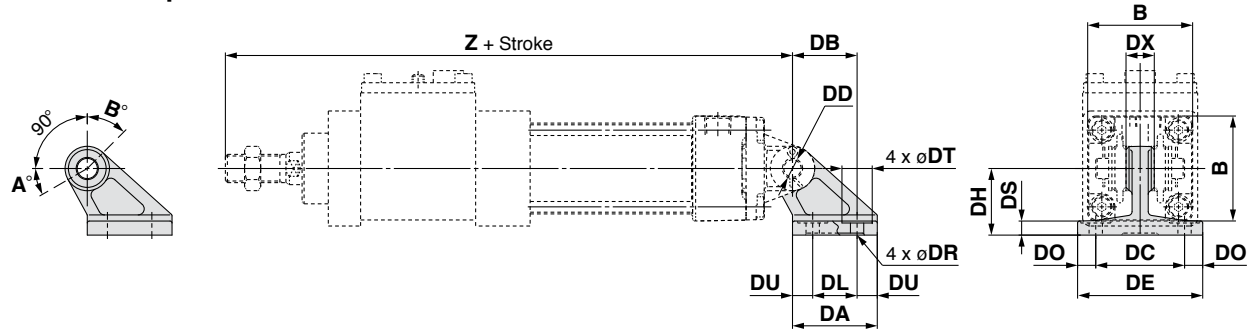
[mm]

Bore size	Part no.	B	TA	TL	TU	TC	TX	TZ	TO	TR	TT	TS	TH	TF	TY_1	TY_2	Z	TD_{H10}
32	**MB-S03**	46	62	45	8.5	62	50	74	12	7	13	10	35	47	49	71	148	$12^{+0.070}_{0}$
40	**MB-S04**	52	80	60	10	80	63	97	17	9	17	12	45	60	58	77.5	166	$16^{+0.070}_{0}$
50		65	80	60	10	92	75	109	17	9	17	12	45	60	71	91	183	$16^{+0.070}_{0}$
63	**MB-S06**	75	100	70	15	110	90	130	20	11	22	14	60	80	81	100	195	$20^{+0.084}_{0}$

With Rubber Bumper [mm]

Bore size	Z
32	151
40	169
50	187
63	199

Double clevis pivot bracket



[mm]

Bore size	Part no.	B	DA	DB	DL	DU	DC	DX	DE	DO	DR	DT	DS	DH	Z	DD_{H10}
32	**MB-B03**	46	42	32	22	10	44	14	62	9	6.6	15	7	33	213	$10^{+0.058}_{0}$
40		52	42	32	22	10	44	14	62	9	6.6	15	7	33	231	$10^{+0.058}_{0}$
50	**MB-B05**	65	53	43	30	11.5	60	20	81	10.5	9	18	8	45	260	$14^{+0.070}_{0}$
63		75	53	43	30	11.5	60	20	81	10.5	9	18	8	45	272	$14^{+0.070}_{0}$

With Rubber Bumper [mm]

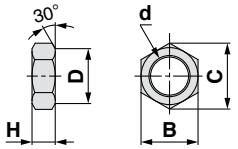
Bore size	Z
32	219
40	237
50	268
63	280

Rotating Angle

Bore size [mm]	A°	B°	A° + B° + 90°
32, 40	25°	45°	160°
50, 63	40°	60°	190°

Dimensions of Accessories

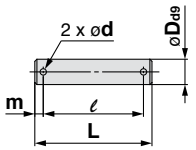
Rod end nut
(Standard)



[mm]

Bore size [mm]	Part no.	d	H	B	C	D
32	**NT-03**	M10 x 1.25	6	17	19.6	16.5
40	**NT-04**	M14 x 1.5	8	22	25.4	21
50, 63	**NT-05**	M18 x 1.5	11	27	31.2	26

Knuckle joint pin
Clevis pin

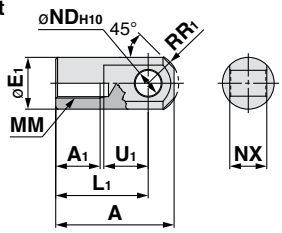


[mm]

Bore size [mm]	Part no.	D_{d9}	L	ℓ	m	d (Drill through)	Applicable split pin
32, 40	**CD-M03**∗1	$10^{-0.040}_{-0.076}$	44	36	4	3	ø3 x 18 L
50, 63	**CD-M05**∗1	$14^{-0.050}_{-0.093}$	60	51	4.5	4	ø4 x 25 L

∗1 Split pins and flat washers are included.

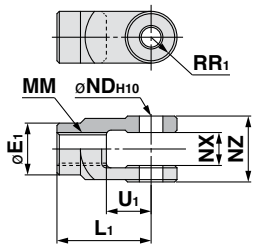
I type
Single knuckle joint



[mm]

Bore size [mm]	Part no.	A	A_1	E_1	L_1	MM	R_1	U_1	ND_{H10}	NX
32	**I-03M**	40	14	20	30	M10 x 1.25	12	16	$10^{+0.058}_{0}$	$14^{-0.10}_{-0.30}$
40	**I-04M**	50	19	22	40	M14 x 1.5	12.5	19	$10^{+0.058}_{0}$	$14^{-0.10}_{-0.30}$
50, 63	**I-05M**	64	24	28	50	M18 x 1.5	16.5	24	$14^{+0.070}_{0}$	$20^{-0.10}_{-0.30}$

Y type
Double knuckle joint



[mm]

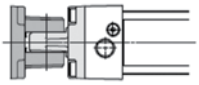
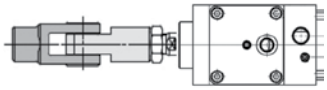
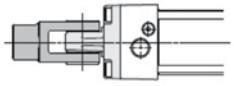
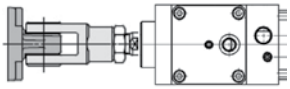
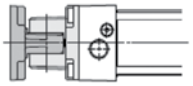
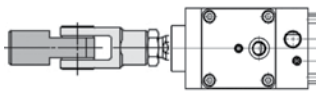
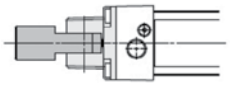
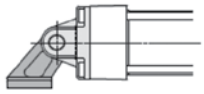
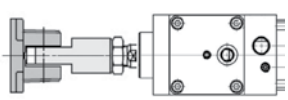
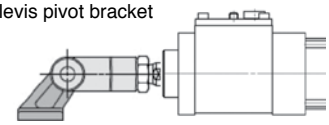
Bore size [mm]	Part no.	E_1	L_1	MM	R_1	U_1	ND_{H10}	NX	NZ
32	**Y-03M**∗1	20	30	M10 x 1.25	10	16	$10^{+0.058}_{0}$	$14^{+0.30}_{+0.10}$	$28^{-0.10}_{-0.30}$
40	**Y-04M**∗1	22	40	M14 x 1.5	11	19	$10^{+0.058}_{0}$	$14^{+0.30}_{+0.10}$	$28^{-0.10}_{-0.30}$
50, 63	**Y-05M**∗1	28	50	M18 x 1.5	14	24	$14^{+0.070}_{0}$	$20^{+0.30}_{+0.10}$	$40^{-0.10}_{-0.30}$

∗1 A pin, split pins and flat washers are included.

Bracket Combinations

Bracket combination available ····▶ Refer to the figure below.

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

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

Cylinder with Lock
Double Acting, Double Rod
MWBW Series
ø32, ø40, ø50, ø63

RoHS

How to Order

MWBW **B** **40** □ – **50** □ □ – □ □

With auto switch **MDWBW** **B** **40** □ – **50** □ □ – □ □ – **M9BW** □

With auto switch
(Built-in magnet)

Double rod

Mounting

B	Basic
L	Axial foot
F	Rod flange
G	Head flange
T	Center trunnion

∗ Mounting brackets other than center trunnion type are shipped together.

Bore size

32	32 mm
40	40 mm
50	50 mm
63	63 mm

Port thread

Nil	Rc
TN	NPT
TF	G

Cylinder stroke [mm]
Refer to page 17 for standard strokes.

Suffix (Rod boot)

Nil	None
J	Nylon tarpaulin (Lock unit side)
JJ	Nylon tarpaulin (Both sides)
K	Heat resistant tarpaulin (Lock unit side)
KK	Heat resistant tarpaulin (Both sides)

Pivot bracket

Nil	No bracket
N	Pivot bracket

∗ Only for T mounting type.
∗ Pivot bracket is shipped together with the product.

Suffix (Cushion)

Nil	Air cushion
N∗1	Rubber bumper

∗1 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.

Auto switch

Nil	Without auto switch

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

Rod end bracket

Nil	No bracket
V	Single knuckle joint
W	Double knuckle joint

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

Number of auto switches

Nil	2
S	1
3	3
n	n

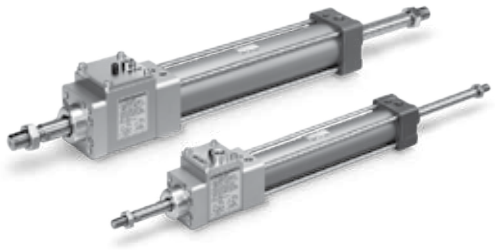
Applicable Auto Switches/Refer to the **Web Catalog** or Best Pneumatics for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Tie-rod mounting	Auto switch model: Band mounting	Lead wire length [m]: 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state 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)		5 V, 12 V		—	**G39**	—	—	—	—	—	—	
				2-wire		12 V		—	**K39**	—	—	—	—	—		
	Diagnostic indication (2-color indicator)	Grommet		3-wire (NPN)		5 V, 12 V		**M9NW**	—	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PW**	—	●	●	●	○	○		
				2-wire		12 V		**M9BW**	—	●	●	●	○	○	—	
	Water resistant (2-color indicator)			3-wire (NPN)	24 V	5 V, 12 V	—	**M9NA**∗1	—	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PA**∗1	—	○	○	●	○	○		
				2-wire		12 V		**M9BA**∗1	—	○	○	●	○	○	—	
	With diagnostic output (2-color indicator)			4-wire (NPN)		5 V, 12 V		**F59F**	—	●	—	●	○	○	IC circuit	
	Magnetic field resistant (2-color indicator)			2-wire (Non-polar)		—		**P3DWA**∗2	—	●	—	●	●	○	—	
								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**	—	—	—	—	—	—	
		DIN terminal					100 V, 200 V	—	**A34**	—	—	—	—	—		PLC
	Diagnostic indication (2-color indicator)	Grommet				—		—	**A44**	—	—	—	—	—		Relay, PLC
							—	**A59W**	—	●	—	●	—	—		

∗1 Water resistant type auto switches can be mounted on the above models, but SMC cannot guarantee water resistance. Please contact SMC regarding water resistant types with the above model numbers.
∗2 The D-P3DWA cannot be mounted on ø32.

∗ 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 28 for details.
∗ The D-A9□/M9□/P3DWA□ auto switches are shipped together, but not assembled. (Only the auto switch mounting brackets are assembled for the D-A9□/M9□ before shipment.)



Cylinder Specifications

Bore size [mm]	32	40	50	63
Action	Double acting, Double rod			
Fluid	Air			
Proof pressure	218 psi [1.5 MPa]			
Max. operating pressure	145 psi [1.0 MPa]			
Min. operating pressure	12 psi [0.08 MPa]			
Ambient and fluid temperature	Without auto switch: 14 to 158°F [–10 to 70°C] With auto switch: 14 to 140°F [–10 to 60°C] (No freezing)			
Lubricant	Not required (Non-lube)			
Piston speed	50 to 1000 mm/s∗1			
Stroke length tolerance	Up to 250 st: $^{+1.0}_{0}$, 251 to 1000 st: $^{+1.4}_{0}$, 1001 to 1500 st: $^{+1.8}_{0}$			
Cushion	Air cushion or Rubber bumper			
Port size (Rc, NPT, G)	1/8	1/4		3/8
Mounting	Basic, Axial foot, Rod flange, Head flange, Center trunnion			

∗1 Load limits exist depending upon piston speed when locked, mounting direction and operating pressure.
∗ Kinetic energy absorbable by the cushion mechanism is identical to double acting, single rod.

Lock Unit Specifications

Bore size [mm]	32	40	50	63
Locking action	Exhaust locking			
Max. operating pressure	145 psi [1.0 MPa]			
Min. operating pressure	44 psi [0.3 MPa] or more			
Locking direction	Both directions			
Holding force (Max. static load) lbf [N] ∗1	153 [680]	220 [980]	353 [1570]	551 [2450]

∗1 The holding force (max. static load) shows the maximum capability and does not show the normal holding capability. So, select an appropriate cylinder while referring to page 3.

Standard Strokes

∗ For cases with auto switches, refer to the table of minimum stroke for auto switch mounting on page 25.

[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		

∗ Manufacture of intermediate strokes is possible. (Spacers are not used.)
∗ Applicable strokes should be confirmed according to the usage. For details, refer to the Air Cylinders Model Selection in the **Web Catalog** or Best Pneumatics. In addition, the products that exceed the stroke range ① might not be able to fulfill the specifications due to the deflection etc.
∗ Please consult with SMC for manufacturability and the part numbers when exceeding the stroke range ②.
∗ The stroke range with rod boot is available up to 1000 mm. Please consult with SMC when exceeding 1000 mm stroke.

Stopping Accuracy

Bore size [mm]	32	40	50	63
Lock type	Exhaust locking			
Stopping accuracy [mm]	±1.0			
Conditions	· Mounting orientation: Horizontal · Supply pressure: 73 psi [0.5 MPa] · Piston speed: 300 mm/s · Load condition: Upper limit of allowed value Solenoid valve for locking is mounted on the unlock port. Maximum value of stopping position dispersion from 100 measurements			

Refer to pages 23 to 28 for cylinders with auto switches.

· Auto Switch Proper Mounting Position (Detection at stroke end) and Mounting Height
· Minimum Stroke for Auto Switch Mounting
· Auto Switch Mounting Brackets/Part No.
· Operating Range

Accessories

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

∗ Refer to page 15 for dimensions and part numbers of the accessories. (Except rod boot)

Rod Boot Material

Symbol	Material	Max. ambient temp.
J	Nylon tarpaulin	158°F [70°C]
K	Heat resistant tarpaulin	230°F [110°C]∗1

∗1 Max. ambient temperature for rod boot itself

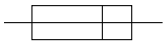
Mounting Brackets/Part No.

Bore size [mm]	**32**	**40**	**50**	**63**
Axial foot∗1	MB-L03	MB-L04	MB-L05	MNB-L06∗
Rod/Head flange	MNB-F03∗	MNB-F04∗	MNB-F05∗	MNB-F06∗

∗1 Order two foots per cylinder.
∗ Accessories for each mounting bracket are as follows.
Axial foot, Rod/Head flange: Body mounting bolt
∗ All are common to the MB series air cylinders, except the sections marked with a "∗".

Theoretical Output

OUT ←
IN →



(Unit: N)

Bore size [mm]	Rod size [mm]	Operating direction	Piston area [mm²]	Operating pressure [MPa]								
				0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
32	12	IN/OUT	691	138	207	276	346	415	484	553	622	691
40	16	IN/OUT	1056	211	317	422	528	634	739	845	950	1056
50	20	IN/OUT	1649	330	495	660	825	989	1154	1319	1484	1649
63	20	IN/OUT	2803	561	841	1121	1402	1682	1962	2242	2523	2803

∗ Theoretical output [N] = Pressure [MPa] x Piston area [mm²] (0.225 lbf = 1N)

Weight

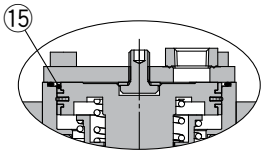
[kg]

Bore size [mm]			**32**	**40**	**50**	**63**
Basic weight (at 0 stroke)	Basic	Lock unit	0.42	0.83	1.15	1.79
		Cylinder (at 0 stroke)	0.51	0.86	1.44	1.79
		Total	0.93	1.69	2.59	3.58
Mounting bracket weight (including bracket mounting bolts)	Foot bracket (2 pcs.)		0.12	0.14	0.22	0.26
	Rod/Head flange		0.24	0.32	0.53	0.74
	Trunnion bracket		0.29	0.36	0.48	0.80
Additional weight per 50 mm of stroke			0.15	0.24	0.37	0.38
Accessories (1 pc.)	Single knuckle joint		0.15	0.23	0.26	0.26
	Double knuckle joint (with pin)		0.22	0.37	0.43	0.43

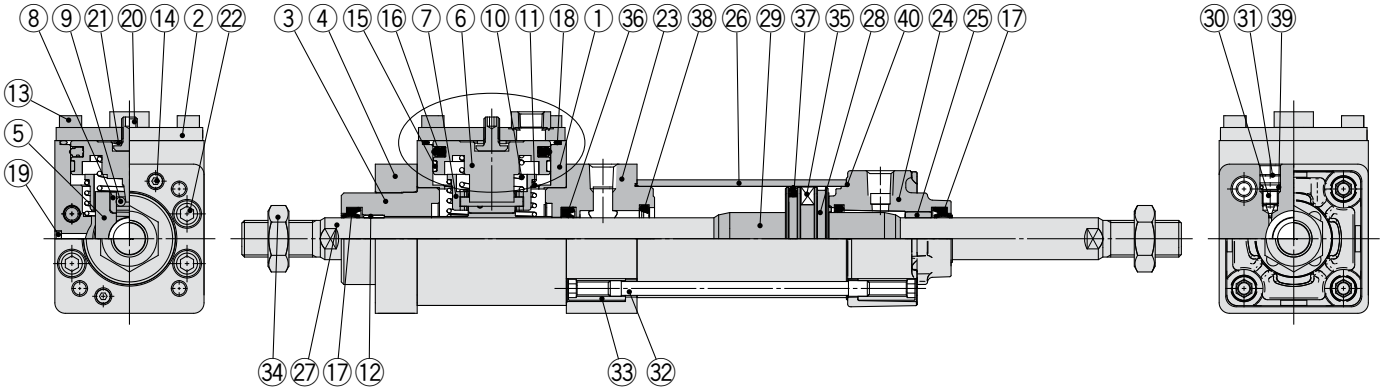
Calculation example)
MWBWL32-100 (Axial foot, ø32, 100 mm stroke)
- Basic weight···0.42 (Lock unit, ø32)
- Basic weight···0.51 (Cylinder, ø32)
- Additional weight···0.15/50 mm stroke
- Cylinder stroke···100 mm stroke
- Foot bracket···0.12

0.42 + 0.51 + (0.15/50) x 100 + 0.12 = **1.35 kg**

Construction



ø63



Component Parts

No.	Description	Material	Q'ty	Note
1	**Brake unit**	Aluminum alloy	1	Hard anodized
2	**Cap**	Rolled steel	1	Zinc chromated
3	**Collar**	Aluminum alloy	1	Chromated
4	**Retaining plate**	Aluminum alloy	1	Anodized
5	**Brake pad**	Cast iron	1	
6	**Piston A**	Aluminum alloy	1	
7	**Roller holder**	Carbon steel	1	
8	**Roller receiver**	Stainless steel	2	Heat treatment
9	**Needle roller**	Carbon steel	2	Heat treatment
10	**Piston spring**	Spring steel	1	Zinc chromated
11	**Roller spring**	Spring steel	1	Zinc chromated
12	**Bushing A**	Bearing alloy	1	
13	Hexagon socket head cap screw	Alloy steel	4	
14	Hexagon socket head cap screw	Alloy steel	2	
15	**Wear ring A**	Resin	1	
			2	ø63
16	**Piston seal A**	NBR	1	
17	**Rod seal A**	NBR	2	
18	**Gasket**	NBR	1	
19	**Element**	Bronze	1	
20	**Release bolt**	Alloy steel	1	
21	**Seal washer**	NBR + Stainless steel	1	
22	Hexagon socket head cap screw	Alloy steel	4	
23	**Rod cover A**	Aluminum alloy	1	Anodized
24	**Rod cover B**	Aluminum die-cast	1	Chromated
25	**Bushing B**	Bearing alloy	1	
26	**Cylinder tube**	Aluminum alloy	1	Hard anodized
27	**Piston rod**	Carbon steel	1	Hard chrome plating

Component Parts

No.	Description	Material	Q'ty	Note
28	**Piston B**	Aluminum alloy	1	
29	**Cushion ring**	Aluminum alloy	2	Anodized
30	**Cushion valve**	Steel wire	2	Zinc chromated
31	**Retaining ring**	Spring steel	2	ø40 to ø63 only
32	**Tie-rod**	Carbon steel	4	Zinc chromated
33	**Tie-rod nut**	Carbon steel	8	Zinc chromated
34	**Rod end nut**	Carbon steel	2	Zinc chromated
35	**Magnet**	—	(1)	
36	**Rod seal B**	NBR	1	
37	**Piston seal B**	NBR	1	
38	**Cushion seal**	Urethane	2	
39	**Cushion valve seal**	NBR	2	
40	**Cylinder tube gasket**	NBR	2	

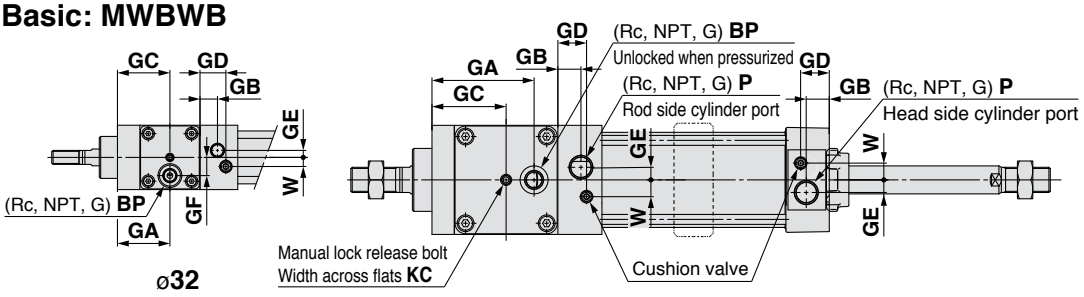
Replacement Parts/Seal Kit

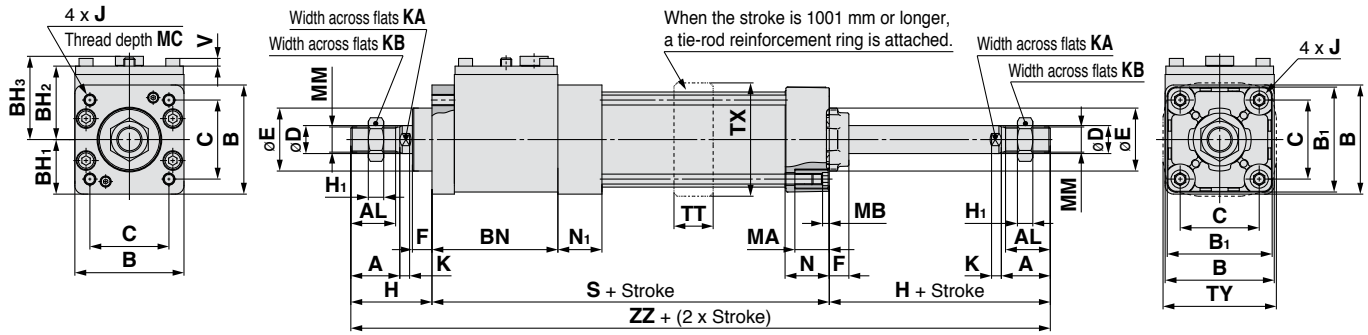
Bore size [mm]	Kit no.	Contents
32	MWBW32-PS	A set of ⑰ Rod seal A, ㊱ Rod seal B, ㊲ Piston seal B, ㊳ Cushion seal, and ㊵ Cylinder tube gasket
40	MWBW40-PS	
50	MWBW50-PS	
63	MWBW63-PS	

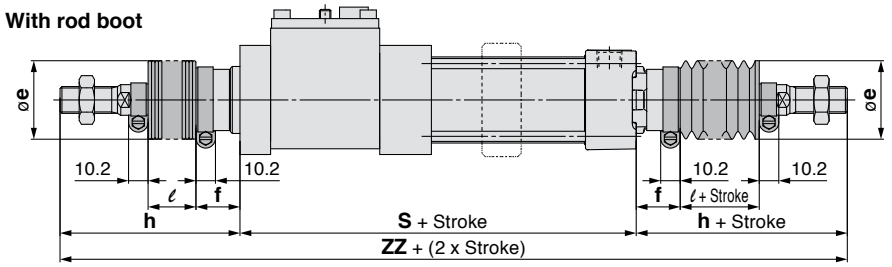
* Never dissemble the lock unit. It should be replaced as a unit. Refer to page 34 for the part numbers for placing an order. The seal kit shown above contains the rod seal for the cylinder and lock unit. Order the seal kit suitable for the cylinder bore size.
* The seal kit shown above includes a grease pack. (ø32, ø40, ø50: 10 g, ø63: 20 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)

Dimensions

Basic: MWBWB







∗ For one side rod boot type, a rod boot is mounted on the lock side (left side of the drawing above).
Overall length: h + H + S + (2 x Stroke)

[mm]

Bore size	A	AL	B	B_1	BH_1	BH_2	BH_3	BN	BP	C	D	E	F	GA	GB	GC	GD	GE	GF	H	H_1	J
32	22	19.5	46	46	23	38.5	46.5	59	1/8	32.5	12	30	13	37.5	13	37.5	18.5	4	13	47	6	M6 x 1.0
40	30	27	57	52	28.5	42.5	48.5	73	1/8	38	16	35	13	59.5	14	44.5	19.5	4	—	51	8	M6 x 1.0
50	35	32	66	65	33	49	55.5	78	1/8	46.5	20	40	14	64	15.5	47	23	5	—	58	11	M8 x 1.25
63	35	32	78	75	39	52.5	59.5	90	1/4	56.5	20	45	14	73	16.5	53	20.5	9	—	58	11	M8 x 1.25

[mm]

Bore size	K	KA	KB	KC	MA	MB	MC	MM	N	N_1	P	S	TT	TX	TY	V	W	ZZ
32	6	10	17	3	16	4	16	M10 x 1.25	27	27	1/8	143	17	48	49	3.5	6.5	237
40	6	14	22	3	16	4	16	M14 x 1.5	27	27	1/4	157	22	55	58	4.5	9	259
50	7	18	27	4	16	5	16	M18 x 1.5	31.5	31.5	1/4	172	22	68	71	4.5	10.5	288
63	7	18	27	4	16	5	16	M18 x 1.5	31.5	31.5	3/8	184	28	81	81	5.5	12	300

With Rubber Bumper [mm]

Bore size	S	ZZ
32	149	243
40	163	265
50	180	296
63	192	308

With Rod Boot

[mm]

Bore size	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	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600
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

[mm]

Bore size	ZZ∗1							
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600
32	289	315	339	365	415	465	515	—
40	319	345	369	395	445	495	545	—
50	350	376	400	426	476	526	576	626
63	362	388	412	438	488	538	588	638

With Rubber Bumper [mm]

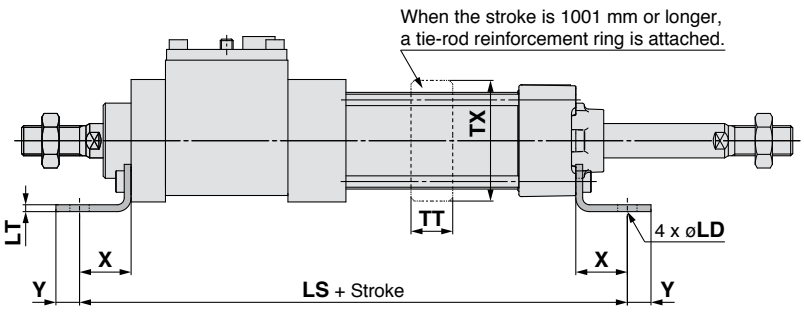
Bore size	ZZ∗1							
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600
32	295	321	345	371	421	471	521	—
40	325	351	375	401	451	501	551	—
50	358	384	408	434	484	534	584	634
63	370	396	420	446	496	546	596	646

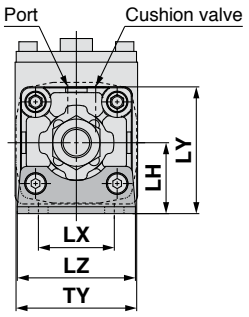
∗1 **ZZ** indicates dimensions for double side rod boot.

Dimensions: With Mounting Bracket

∗ Refer to Basic (B) for other dimensions.

Axial foot: MWBWL





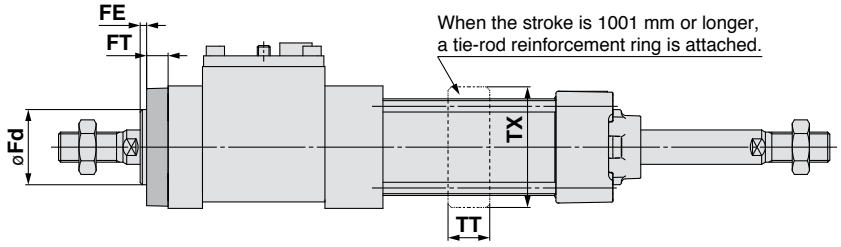
[mm]

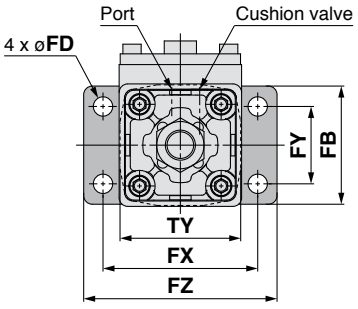
Bore size	LD	LH	LS	LT	LX	LY	LZ	TT	TX	TY	X	Y
32	7	30	187	3.2	32	53	50	17	48	49	22	9
40	9	33	205	3.2	38	59	55	22	55	58	24	11
50	9	40	226	3.2	46	72.5	70	22	68	71	27	11
63	12	48	238	3.6	56	93	80	28	81	81	27	14

With Rubber Bumper [mm]

Bore size	LS
32	193
40	211
50	234
63	246

Rod flange: MWBWF





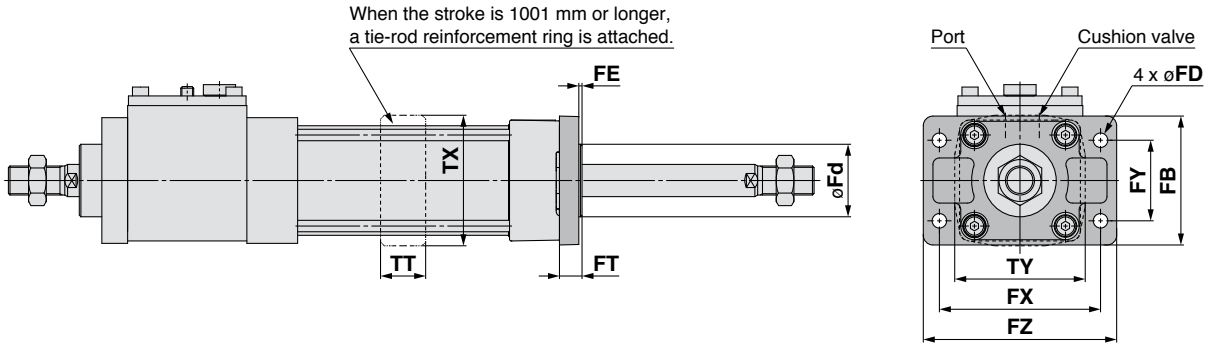
[mm]

Bore size	FB	FD	Fd	FE	FT	FX	FY	FZ	TT	TX	TY
32	56	7	30	3	10	72	38	87	17	48	49
40	65	9	35	3	10	83	46	101	22	55	58
50	77	9	40	2	12	100	52	120	22	68	71
63	92	9	45	2	12	115	62	135	28	81	81

Dimensions: With Mounting Bracket

∗ Refer to Basic (B) for other dimensions.

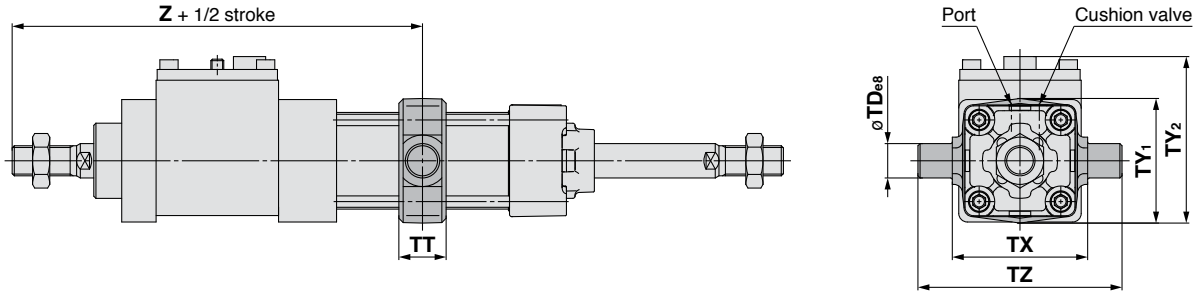
Head flange: MWBWG



[mm]

Bore size	FB	FD	Fd	FE	FT	FX	FY	FZ	TT	TX	TY
32	56	7	24.5	3	10	72	38	87	17	48	49
40	65	9	29.5	3	10	83	46	101	22	55	58
50	77	9	35.5	2	12	100	52	120	22	68	71
63	92	9	38.5	2	12	115	62	135	28	81	81

Center trunnion: MWBWT



[mm]

Bore size	TD_{e8}	TT	TX	TY_1	TY_2	TZ	Z
32	$12^{-0.032}_{-0.059}$	17	50	49	71	74	148
40	$16^{-0.032}_{-0.059}$	22	63	58	77.5	95	166
50	$16^{-0.032}_{-0.059}$	22	75	71	91	107	183
63	$20^{-0.040}_{-0.073}$	28	90	81	100	130	195

With Rubber Bumper [mm]

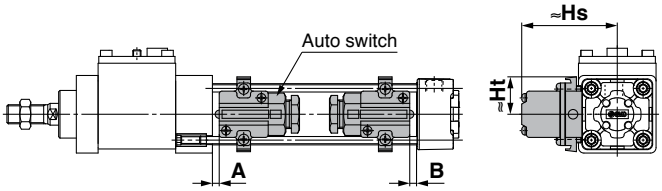
Bore size	Z
32	151
40	169
50	187
63	199

Auto Switch Mounting

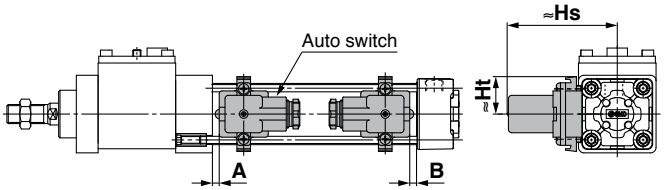
Auto Switch Proper Mounting Position (Detection at stroke end) and Mounting Height

<Band mounting>

D-G39/K39/A3□

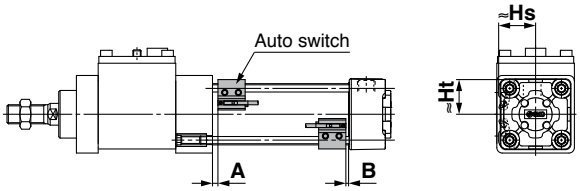


D-A44

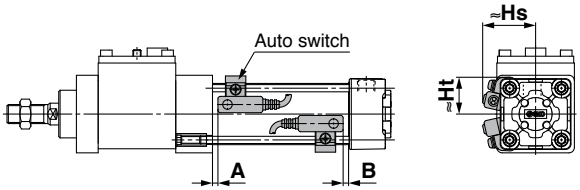


<Tie-rod mounting>

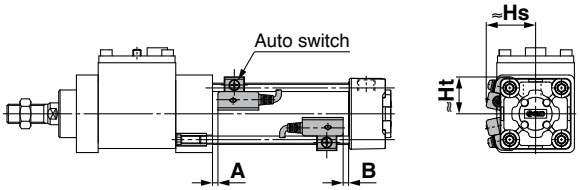
D-M9□/M9□V
D-M9□W/M9□WV
D-M9□A/M9□AV
D-A9□/A9□V
D-Y59□/Y69□/Y7P/Y7PV
D-Y7□W/Y7□WV/Y7BA
D-Z7□/Z80



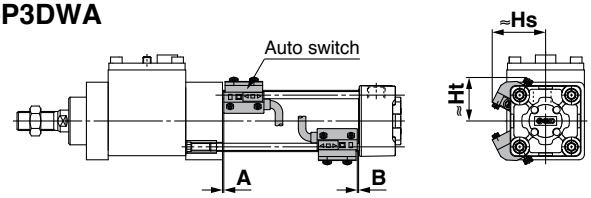
D-A5□/A6□
D-A59W



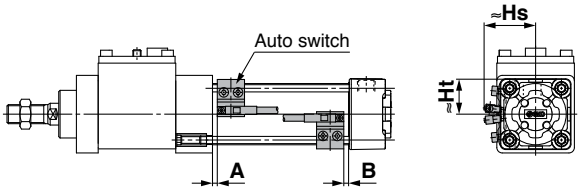
D-F5□/J5□
D-F5□W/J59W/F5BA
D-F59F/F5NT



D-P3DWA



D-P4DW



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

Auto Switch Proper Mounting Position

[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-P3DWA		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	—	—	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

∗ 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).

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

Auto Switch Mounting Height

[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-P3DWA		D-P4DW	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
32	24.5	23	27.5	23	30.5	23	32.5	25	35	24.5	67	27.5	77	27.5	25.5	23	26.5	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	39	25.5	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	43	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	48	36	51.5	44

Minimum Stroke for Auto Switch Mounting

Mounting Brackets except Center Trunnion

n: Number of auto switches [mm]

Auto switch model	Number of auto switches	ø32, ø40, ø50, ø63
D-M9□ D-M9□W	2 (Different surfaces, same surface) 1	15
	n	$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)∗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···)∗1
D-M9□A	2 (Different surfaces, same surface) 1	15
	n	$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)∗1
D-M9□AV	2 (Different surfaces, same surface) 1	15
	n	$15 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)∗1
D-A9□	2 (Different surfaces, same surface) 1	15
	n	$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)∗1
D-A9□V	2 (Different surfaces, same surface) 1	10
	n	$10 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)∗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
	n (Same surface)	$15 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)∗1
	1	10
D-A5□ D-A6□	2 (Different surfaces, same surface) 1	15
	n (Same surface)	$15 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)∗1
D-A59W	2 (Different surfaces, same surface)	20
	n (Same surface)	$20 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)∗1
	1	15
D-F5NT	2 (Different surfaces, same surface)	15
	n (Same surface)	$15 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)∗1
	1	10
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···)∗1

∗1 When “n” is an odd number, an even number that is one larger than the odd number is to be 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	ø32	ø40, ø50, ø63
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···)∗1	
D-Y7BA	2 (Different surfaces, same surface) 1	20	
	n	$20 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)∗1	
D-P3DWA	2 (Different surfaces, same surface) 1	—	15
	n	—	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)∗1
D-P4DW	2 (Different surfaces, same surface) 1	15	
	n	$15 + 65\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)∗1	

∗1 When “n” is an odd number, an even number that is one larger than the odd number is to be used for the calculation.

Center Trunnion

n: Number of auto switches [mm]

Auto switch model	Number of auto switches	ø32	ø40, ø50	ø63
D-M9□ **D-M9□W**	2 (Different surfaces, same surface) 1	75	80	85
	n	$75 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$85 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2
D-M9□V **D-M9□WV**	2 (Different surfaces, same surface) 1	50	55	60
	n	$50 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$55 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$60 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2
D-M9□A	2 (Different surfaces, same surface) 1	80	85	90
	n	$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$85 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$90 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2
D-M9□AV	2 (Different surfaces, same surface) 1	55	60	65
	n	$55 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$60 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$65 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2
D-A9□	2 (Different surfaces, same surface) 1	70	75	80
	n	$70 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$75 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2
D-A9□V	2 (Different surfaces, same surface) 1	45	50	55
	n	$45 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$50 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$55 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2

∗2 When “n” is an odd number, a multiple of 4 that is larger than the odd number is to be 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	ø32	ø40	ø50	ø63
D-G39 D-K39 D-A3□	2 (Different surfaces)	60	65		75
	2 (Same surface)	90	95		100
	n (Different surfaces)	60 + 30 (n – 2) (n = 2, 4, 6, 8···)∗1	65 + 30 (n – 2) (n = 2, 4, 6, 8···)∗1		75 + 30 (n – 2) (n = 2, 4, 6, 8···)∗1
	n (Same surface)	90 + 100 (n – 2) (n = 2, 4, 6, 8···)∗1	95 + 100 (n – 2) (n = 2, 4, 6, 8···)∗1		100 + 100 (n – 2) (n = 2, 4, 6, 8···)∗1
	1	60	65		75
D-A44	2 (Different surfaces)	70	75		80
	2 (Same surface)				
	n (Different surfaces)	70 + 30 (n – 2) (n = 2, 4, 6, 8···)∗1	75 + 30 (n – 2) (n = 2, 4, 6, 8···)∗1		80 + 30 (n – 2) (n = 2, 4, 6, 8···)∗1
	n (Same surface)	70 + 50 (n – 2) (n = 2, 4, 6, 8···)∗1	75 + 50 (n – 2) (n = 2, 4, 6, 8···)∗1		80 + 50 (n – 2) (n = 2, 4, 6, 8···)∗1
	1	70	75		80
D-F5□/J59 D-F5□W D-J59W D-F5BA D-F59F	2 (Different surfaces, same surface)	90	95		110
	n (Same surface)	$90 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$95 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2		$110 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2
	1	90	95		110
D-F5NT	2 (Different surfaces, same surface)	100	105		120
	n (Same surface)	$100 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$105 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2		$120 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2
	1	100	105		120
D-A5□ D-A6□	2 (Different surfaces, same surface) 1	60		80	105
	n (Same surface)	$60 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2		$80 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$105 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2
D-A59W	2 (Different surfaces, same surface)	60	70	85	110
	n (Same surface)	$60 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$70 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$85 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$110 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2
	1	60	70	85	110
D-Y59□ D-Y7P D-Y7□W D-Z7□ D-Z80	2 (Different surfaces, same surface) 1	80	85	90	
	n	$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$85 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$90 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	
D-Y69□ D-Y7PV D-Y7□WV	2 (Different surfaces, same surface) 1	60	65		70
	n	$60 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$65 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2		$70 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2
D-Y7BA	2 (Different surfaces, same surface) 1	85	90		100
	n	$85 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	$90 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2		$100 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2
D-P3DWA	2 (Different surfaces, same surface) 1	—	85		90
	n		$85 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2		$90 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2
D-P4DW	2 (Different surfaces, same surface) 1	120		130	
	n	$120 + 65\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2		$130 + 65\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)∗2	

∗1 When “n” is an odd number, an even number that is one larger than the odd number is to be used for the calculation.
∗2 When “n” is an odd number, a multiple of 4 that is larger than the odd number is to be used for the calculation.

Auto Switch Mounting Brackets/Part No.

[mm]

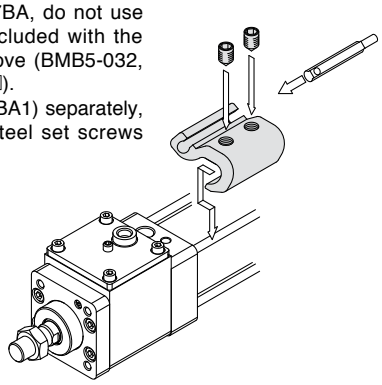
Auto switch model	Bore size [mm]			
	ø32	ø40	ø50	ø63
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV D-A9□/A9□V	BMB5-032	BMB5-032	BA7-040	BA7-040
D-A3□/A44 D-G39/K39	BMB2-032	BMB2-040	BMB1-050	BMB1-063
D-F5□/J59 D-F5□W/J59W D-F59F/F5BA D-F5NT D-A5□/A6□/A59W	BT-03	BT-03	BT-05	BT-05
D-P3DWA	—	BA10-040S	BA10-050S	BA10-050S
D-P4DW	BMB3T-040	BMB3T-040	BMB3T-050	BMB3T-050
D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BA D-Z7□/Z80	BMB4-032	BMB4-032	BMB4-050	BMB4-050

[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

* Refer to the **Web Catalog** or Best Pneumatics 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.
* 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			
	32	40	50	63
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	4	4.5	4.5	4.5
D-Y59□/Y69□ D-Y7P/Y7□V D-Y7□W/Y7□WV D-Y7BA	5.5	5.5	7	7.5
D-F5□/J59 D-F5□W/J59W D-F5BA/F5NT D-F59F	3.5	4	4	4.5
D-G39/K39	9	9	9	10
D-P3DWA	—	4.5	4.5	5
D-P4DW	4	4	4	4.5
D-A9□/A9□V	7	7.5	8.5	9.5
D-Z7□/Z80	7.5	8.5	7.5	9.5
D-A5□/A6□	9	9	10	11
D-A59W	13	13	13	14
D-A3□/A44	9	9	10	11

* 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 Best Pneumatics for the detailed specifications.

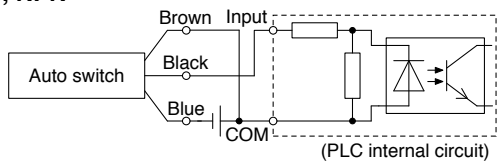
Type	Model	Electrical entry	Features
Solid state	D-M9NV/M9PV/M9BV	Grommet (Perpendicular)	—
	D-Y69A/Y69B/Y7PV		
	D-M9NWV/M9PWV/M9BWV		Diagnostic indication (2-color indicator)
	D-Y7NWV/Y7PWV/Y7BWV		
	D-M9NAV/M9PAV/M9BAV		Water resistant (2-color indicator)
	D-P3DW		Magnetic field resistant (2-color indicator)
	D-P4DW		
	D-F59/F5P/J59	Grommet (In-line)	—
	D-Y59A/Y59B/Y7P		
	D-Y7H		
	D-F59W/F5PW/J59W		Diagnostic indication (2-color indicator)
	D-Y7NW/Y7PW/Y7BW		
	D-F5BA/Y7BA		Water resistant (2-color indicator)
	D-F5NT		With timer
	D-P5DW		Magnetic field resistant (2-color indicator)
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 Best Pneumatics.
* 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 Best Pneumatics.

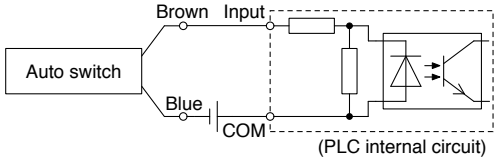
Prior to Use
Auto Switch Connections and Examples

Sink Input Specifications

3-wire, NPN

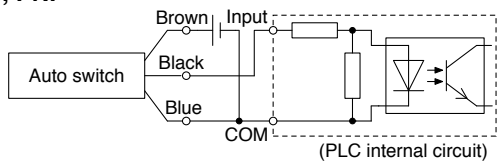


2-wire

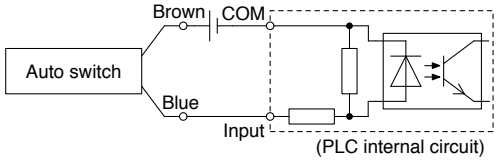


Source Input Specifications

3-wire, PNP



2-wire



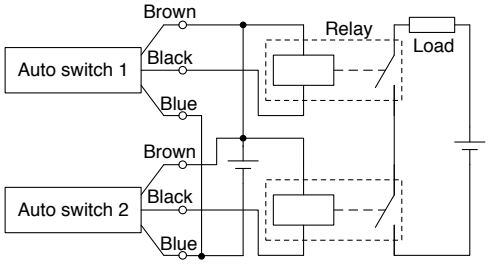
Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

Examples of AND (Series) and OR (Parallel) Connections

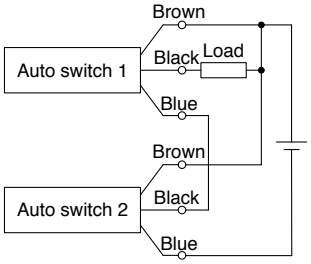
∗ When using solid state auto switches, ensure the application is set up so the signals for the first 50 ms are invalid.

3-wire AND connection for NPN output

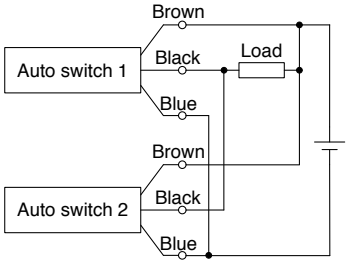
(Using relays)



(Performed with auto switches only)

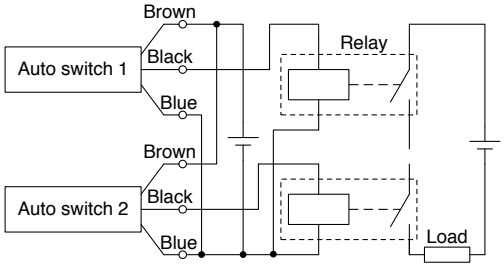


3-wire OR connection for NPN output

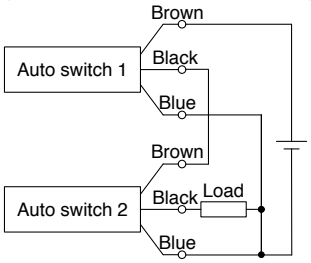


3-wire AND connection for PNP output

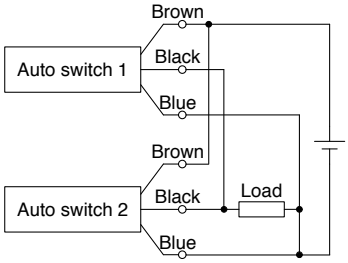
(Using relays)



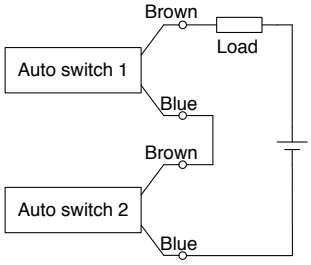
(Performed with auto switches only)



3-wire OR connection for PNP output



2-wire AND connection

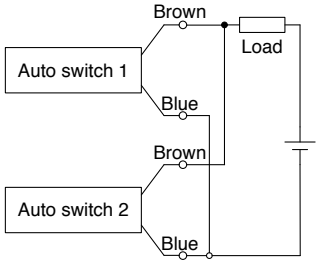


When two auto switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state.
The indicator lights will light up when both of the auto switches are in the ON state.
Auto switches with a load voltage less than 20 V cannot be used.

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.

MWB Series
Specific Product Precautions 1

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: http://www.smcworld.com

Design of Equipment and Machinery

⚠ Warning

1. Construct so that the human body will not come into direct contact with driven objects or the moving parts of the cylinders with lock.

Devise a safe structure by attaching protective covers that prevent direct contact with the human body, or in cases where there is a danger of contact, provide sensors or other devices to perform an emergency stop etc., before contact occurs.

2. Use a balance circuit, taking cylinder lurching into consideration.

In cases such as an intermediate stop, where a lock is operated at a desired position within the stroke and air pressure is applied from only one side of the cylinder, the piston will lurch at high speed when the lock is released. In such situations, there is a danger of causing human injury by having hands or feet, etc. caught, and also a danger for causing damage to the equipment. In order to prevent this lurching, a balance circuit such as the recommended pneumatic circuits (page 32) should be used.

Selection

⚠ Warning

1. When in the locked state, do not apply a load accompanied by an impact shock, strong vibration or turning force, etc.

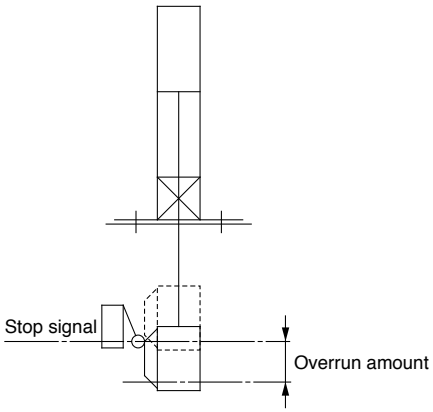
Use caution, because an external action such as an impacting load, strong vibration or turning force, may damage the locking mechanism or reduce its life.

2. Consider stopping accuracy and the amount of overrun when an intermediate stop is performed.

Due to the nature of a mechanical lock, there is a momentary lag with respect to the stop signal, and a time delay occurs before stopping. The cylinder stroke resulting from this delay is the overrun amount. The difference between the maximum and minimum overrun amounts is the stopping accuracy.

- **Place a limit switch before the desired stopping position, at a distance equal to the overrun amount.**
- **The limit switch must have a detection length (dog length) of the overrun amount + α.**
- **SMC's auto switches have operating ranges from 8 to 14 mm (depending on the auto switch model).**
  When the overrun amount exceeds this range,
  self-holding of the contact should be performed at the auto switch load side.

∗ For the stopping accuracy, refer to page 6.



Selection

⚠ Warning

3. In order to further improve stopping accuracy, the time from the stop signal to the operation of the lock should be shortened as much as possible.

To accomplish this, use a device such as a highly responsive electric control circuit or solenoid valve, and place the solenoid valve as close as possible to the cylinder.

4. Note that the stopping accuracy will be influenced by changes in piston speed.

When piston speed changes during the course of the cylinder stroke due to variations in the load or disturbances, etc., the dispersion of stopping positions will increase. Therefore, consideration should be given to establishing a standard speed for the piston just before it reaches the stopping position.

Moreover, the dispersion of stopping positions will increase during the cushioned portion of the stroke and during the accelerating portion of the stroke after the start of operation, due to the large changes in piston speed.

5. The holding force (max. static load) indicates the maximum capability to hold a static load without loads, vibration and impact. This does not indicate a load that can be held in ordinary conditions.

Select the most suitable bore sizes for the operating conditions in accordance with the selection procedures. The Model Selection (pages 3 and 4) is based on use at the intermediate stop (including emergency stops during operation). However, when the cylinder is in a locked state, kinetic energy does not act upon it. Under these conditions, use the load mass at the maximum speed (V) of 100 mm/s shown in graphs 5 to 7 on page 4 depending on the operating pressure and select models.

Mounting

⚠ Warning

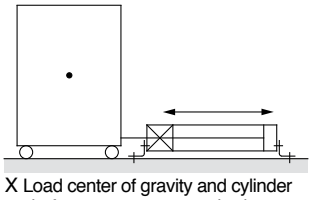
1. The manual lock is released as default. The lock will not operate in this condition. Before starting operation, engage the lock.

2. Be certain to connect the rod end to the load with the lock released.

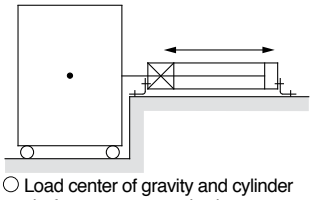
If connected in the locked state, a load greater than the turning force or holding force, etc. may operate on the piston rod and cause damage to the lock mechanism. As the MWB series is equipped with a manual lock release mechanism, it is possible to hold the lock released state without an air supply.

3. Do not apply offset loads to the piston rod.

Particular care should be taken to match the load's center of gravity with the center of the cylinder shaft. When there is a large discrepancy, the piston rod may be subjected to uneven wear or damage due to the inertial moment during locking stops.



X Load center of gravity and cylinder shaft center are not matched.



○ Load center of gravity and cylinder shaft center are matched.

∗ Can be used if all of the generated moment is absorbed by an effective guide.

MWB Series
Specific Product Precautions 2

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: http://www.smcworld.com

Mounting

⚠ Caution

1. Use the hexagon wrenches shown below when replacing brackets.

Bore size [mm]	Bolt	Hexagon wrench size	Tightening torque lbf·ft [N·m]
32, 40	MB-32-48-C1247	4	3.8 [5.1]
50, 63	MB-50-48-C1249	5	8.1 [11]

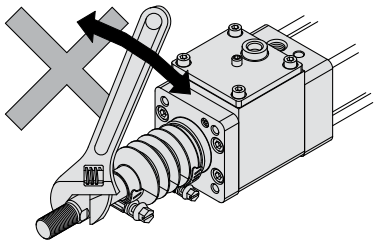
2. When replacing the head side bracket, the tie-rod nut on the cylinder body also loosens.

After retightening the tie-rod nut at the proper tightening torque (refer to the Mounting 1. above.), install the bracket.

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

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

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



4. 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.

Adjustment

⚠ Warning

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

As a retaining mechanism for the cushion valve, a crimped section (ø32) or retaining ring is installed (ø40 to ø63), and the cushion valve should not be opened beyond that point.

If not operated in accordance with the above precautions, the cushion valve may be ejected from the cover when air pressure is supplied.

Bore size [mm]	Hexagon wrench size of cushion valve
32, 40	2.5
50, 63	3

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

If air cushion is not intended to be used at the stoke end, select the cylinder with rubber bumper.

If this is not done, the tie-rod or piston assembly will be damaged.

⚠ Caution

1. Adjust the cylinder's air balance.

Balance the load by adjusting the air pressure in the rod and head sides of the cylinder with the load connected to the cylinder and the lock released. Lurching of the cylinder when unlocked can be prevented by carefully adjusting this air balance.

2. Adjust the mounting positions of the detectors on auto switches etc.

When intermediate stops are to be performed, adjust the mounting positions of detectors on auto switches etc., taking into consideration the overrun amount with respect to the desired stopping positions.

Specific Product Precautions 3

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: http://www.smcworld.com

Pneumatic Circuit

⚠ Warning

1. Be certain to use an pneumatic circuit which will apply balancing pressure to both sides of the piston when in a locked stop.

In order to prevent cylinder lurching after a lock stop, when restarting or when manually unlocking, a circuit should be used to which will apply balancing pressure to both sides of the piston, thereby canceling the force generated by the load in the direction of piston movement.

2. The effective area of the unlocking solenoid valve should be at least 50% of the effective area of the cylinder driving solenoid valve, and it should be installed as close to the cylinder as possible so that it is closer than the cylinder driving solenoid valve.

If the effective area of the unlocking solenoid valve is small or if it is installed at a distance from the cylinder, the time required for exhausting air for unlocking will be longer, which may cause a delay in the locking operation.

The delay in the locking operation may result in problems such as increase of overrunning when performing intermediate stop or emergency stop during operation, or if maintaining position from the operation stop state such as drop prevention, workpieces may be dropped depending on the timing of the load action to the operation delay of the lock.

3. Avoid backflow of the exhaust pressure when there is a possibility of interference of exhaust air, for example for a common exhaust type valve manifold.

The lock may not operate properly when the exhaust air pressure backflows due to interference of the exhaust air when exhausting air for lock release. It is recommended to use an individual exhaust type manifold or individual valves.

4. Allow at least 0.5 seconds from a locked stop (intermediate stop of the cylinder) until release of the lock.

When the locked stop time is too short, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

5. When restarting, control the switching signal for the unlocking solenoid valve so that it acts before or at the same time as the cylinder drive solenoid valve.

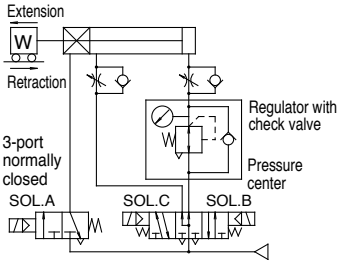
If the signal is delayed, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

6. Carefully check for dew condensation due to repeated air supply and exhaust of the locking solenoid valve.

The operating stroke of the lock part is very small. So, if the piping is long and the air supply and exhaust are repeated, the dew condensation caused by the adiabatic expansion accumulates in the lock part. This may corrode internal parts, causing air leak or lock release fault.

7. Basic circuit

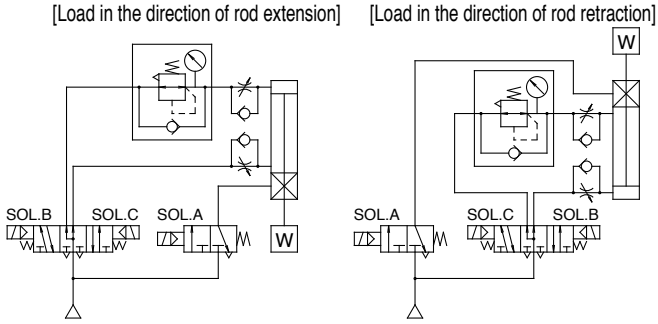
1) [Horizontal]



SOL.A	SOL.B	SOL.C	Action	
ON	ON	OFF	Extension	
OFF	OFF	OFF	Locked stop	0.5 s or more
ON	OFF	OFF	Unlocked	0 to 0.5 s
ON	ON	OFF	Extension	
ON	OFF	ON	Retraction	
OFF	OFF	OFF	Locked stop	0.5 s or more
ON	OFF	OFF	Unlocked	0 to 0.5 s
ON	OFF	ON	Retraction	

2) [Vertical]

[Load in the direction of rod extension] [Load in the direction of rod retraction]



* The symbol for the cylinder with lock in the basic circuit uses SMC original symbol.

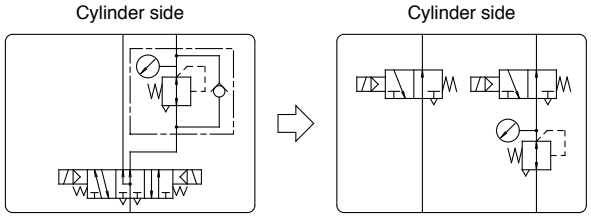
Specific Product Precautions 4

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: http://www.smcworld.com

Pneumatic Circuit

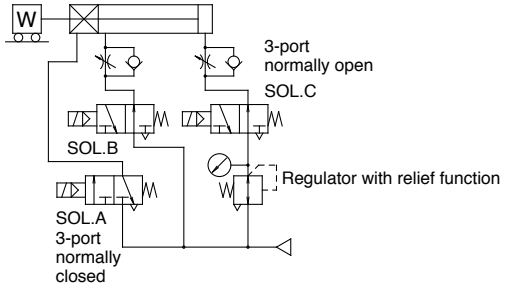
⚠ Caution

1. 3-position pressure center solenoid valve and regulator with check valve can be replaced with two 3-port normally open valves and a regulator with relief function.



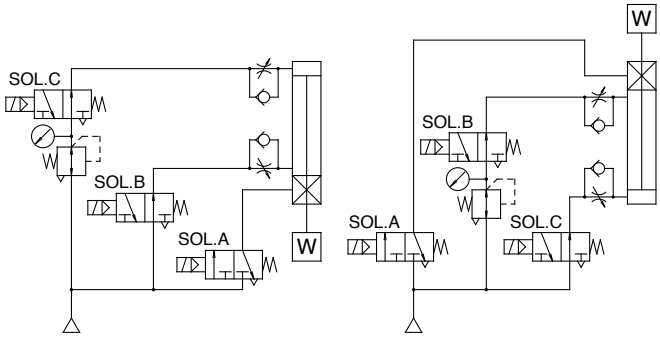
[Example]

1. [Horizontal]



2. [Vertical]

[Load in the direction of rod extension] [Load in the direction of rod retraction]



∗ The symbol for the cylinder with lock in the pneumatic circuit uses SMC original symbol.

Manual Lock Release

⚠ Warning

1. Never operate the lock release bolt until safety has been confirmed.

• When unlocking is performed with air pressure applied to only one side of the cylinder, the moving parts of the cylinder will lurch at high speed causing a serious hazard.

• When unlocking is performed, be sure to confirm that personnel are not within the load movement range and that no other problems will occur if the load moves.

2. Before operating the lock release bolt, exhaust any residual pressure which is in the system.

3. Take measures to prevent the load from dropping.

• Perform work with the load in its lowest position.

• Take measures for drop prevention by strut etc.

Manual Lock Release

⚠ Caution

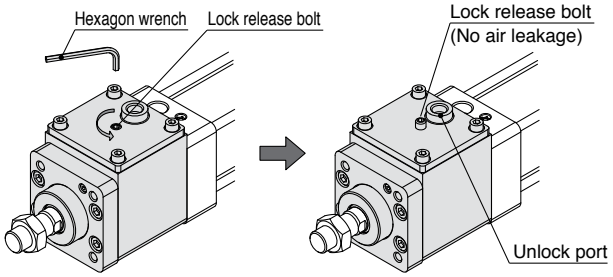
1. When releasing the locked state with the lock release bolt for the purpose of mounting or adjustment, be sure to return the lock release bolt to the locked state.

If the lock release bolt is not returned to the locked state, the lock might not function correctly or lock release might not be completed due to air leakage from the lock release bolt.

[How to return to locked state]

1) Rotate the lock release bolt counterclockwise by hand with a hexagon wrench until it stops. Once that position is reached, rotate it an additional 1/6th of a turn to securely tighten the lock release bolt.

∗ Do not use an electric screwdriver or pneumatic screwdriver.



Manual lock released **Locked**

Bore size [mm]	Hexagon wrench size of the lock release bolt
32, 40	3
50, 63	4

2) Pressurize the unlock port with 44 psi [0.3 MPa] or more and check that there is no air leakage from the lock release bolt and lock correctly functions.

Specific Product Precautions 5

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: http://www.smcworld.com

Maintenance

⚠ Caution

1. Lock units are replaceable.

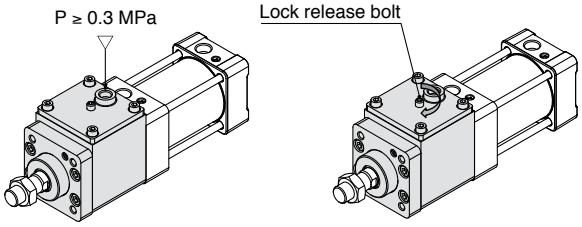
When ordering the lock unit for maintenance, select the suitable lock based on the cylinder bore size.

Bore size [mm]	Port type	Replacement lock unit part no.
32	Rc	MWB32-UA
	NPT	MWB32TN-UA
	G	MWB32TF-UA
40	Rc	MWB40-UA
	NPT	MWB40TN-UA
	G	MWB40TF-UA
50	Rc	MWB50-UA
	NPT	MWB50TN-UA
	G	MWB50TF-UA
63	Rc	MWB63-UA
	NPT	MWB63TN-UA
	G	MWB63TF-UA

∗ For lock unit with a rod boot, add –J to the part number suffix.
Example) MWB50-UA-J

2. How to replace lock units

1) To release the locked state, screw-in the lock release bolt to the body cap end or pressurize the unlock port with 0.3 MPa or more.

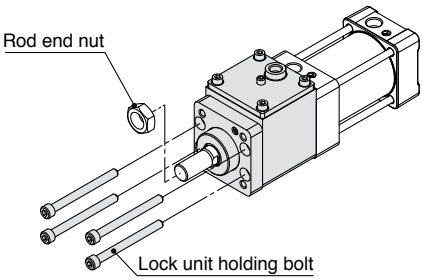


a) Lock released by air pressure

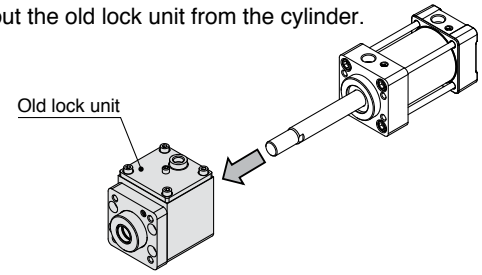
b) Manual lock release

2) Remove the lock unit holding bolt (hexagon socket head cap screw) with a hexagon wrench. For the applicable hexagon wrench, refer to the table below.
If using the rod end nut, remove it.

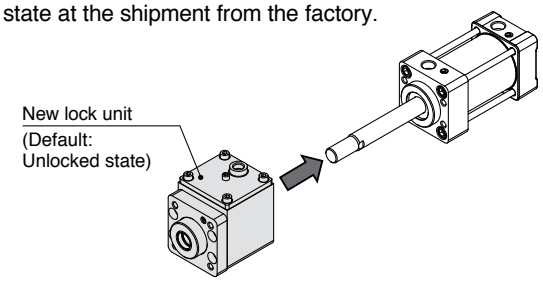
Bore size [mm]	Hexagon wrench size of the lock holding bolt
32	3
40, 50	5
63	6



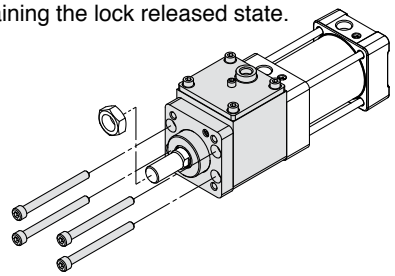
3) Pull out the old lock unit from the cylinder.



4) Insert a new lock unit into the cylinder.
The lock unit for maintenance is supplied with lock released state at the shipment from the factory.



5) Insert the lock unit holding bolt and tighten it temporarily. Check that the piston rod operates smoothly by hand while maintaining the lock released state.

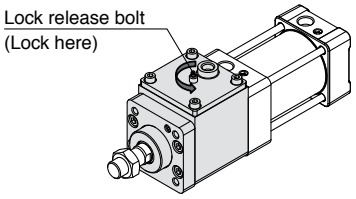


6) Confirm that the operation of 5) is performed correctly, and then tighten the lock unit holding bolt with an appropriate tightening torque as shown in the table below.

Bore size [mm]	Appropriate tightening torque of the lock unit holding bolt lbf·ft [N·m]
32	1.0 to 1.2 [1.35 to 1.65]
40, 50	2.0 to 2.4 [2.7 to 3.3]
63	3.5 to 4.2 [4.7 to 5.7]

7) After assembly is completed, rotate the lock release bolt counterclockwise by hand with a hexagon wrench until it stops. Once that position is reached, rotate it for an additional 1/6th of a turn to securely tighten the lock release bolt.

∗ Do not use an electric screwdriver or pneumatic screwdriver.



Bore size [mm]	Hexagon wrench size of the lock release bolt
32, 40	3
50, 63	4

Check that the cylinder is locked and confirm that the lock is released when air pressure of 0.3 MPa or more is applied to the unlock port on the lock unit. In addition to this, the piston rod should operate smoothly with the minimum operating pressure. Check that there is no air leakage from the lock release bolt.

⚠ Safety Instructions

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

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

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

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

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

⚠ Warning

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

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

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

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

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

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

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

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

⚠ Caution

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

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

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

Limited warranty and Disclaimer

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

*2) **Vacuum pads are excluded from this 1 year warranty.** A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

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

⚠ Caution

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

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

⚠ Safety Instructions	Be sure to read the "Handling Precautions for SMC Products" (M-E03-3) and "Operation Manual" before use.

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