

Compact Guide Cylinder

Series *MGP*

ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Compact Guide Cylinder **MGP** **M** **25** **—** **30** **Z** **—** **M9BW** **—**

Compact Guide Cylinder

Bearing type

M	Slide bearing
L	Ball bushing
A	High precision ball bushing

Bore size

12	12 mm	40	40 mm
16	16 mm	50	50 mm
20	20 mm	63	63 mm
25	25 mm	80	80 mm
32	32 mm	100	100 mm

Port thread type

Nil	M5 x 0.8
TN	NPT
TF	G

Number of auto switches

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

Auto switch

Nil	Without auto switch (Built-in magnet)
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Cylinder stroke (mm)
Refer to "Standard Strokes" on page 4.

* For bore sizes with ø12 and ø16, only M5 x 0.8 is available.

Applicable Auto Switches/Refer to pages 1719 to 1827 in Best Pneumatics No. 3 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)				Pre-wired connector	Applicable load			
					DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)					
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC	
				3-wire (PNP)		12 V		M9PV	M9P	●	●	●	○	○			
				2-wire		5 V, 12 V		M9BV	M9B	●	●	●	○	○			
	Diagnostic indication (2-color display)			3-wire (NPN)		5 V, 12 V		M9NVV	M9NW	●	●	●	○	○			
				3-wire (PNP)		12 V		M9PWV	M9PW	●	●	●	○	○			
	Water-resistant (2-color display)			2-wire		5 V, 12 V		M9BWV	M9BW	●	●	●	○	○			
				3-wire (NPN)		5 V, 12 V		M9NAV***	M9NA***	○	○	●	○	○			
				3-wire (PNP)		12 V		M9PAV***	M9PA***	○	○	●	○	○			
	Magnetic field resistant (2-color display)			2-wire		—		M9BAV***	M9BA***	○	○	●	○	○			
				2-wire (Non-polar)		—		—	P3DW**	●	—	●	●	○			
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96V	A96	●	—	●	—	—	IC circuit	—	
				2-wire	24 V	12 V	100 V	A93V	A93	●	—	●	●	—	—	—	Relay, PLC
						100 V or less	A90V	A90	●	—	●	—	—	—	IC circuit	—	

***Water-resistant type auto switch can be mounted to the models with the above mentioned part numbers, but this does not guarantee the water resistance of the cylinder. A water-resistant type cylinder is recommended for use in an environment which requires water resistance. However, please contact SMC for water-resistant products of ø12 and ø16.

* Lead wire length symbols: 0.5 m..... Nil (Example) M9NW
1 m..... M (Example) M9NWM
3 m..... L (Example) M9NWL
5 m..... Z (Example) M9NWX

* Solid state auto switches marked with "○" are produced upon receipt of order.
** Bore sizes ø25 to ø100 are available for the D-P3DW.

* Since there are other applicable auto switches than listed, refer to page 22 for details.

* For details about auto switches with pre-wired connector, refer to pages 1784 and 1785 in Best Pneumatics No. 3.

For D-P3DW□, refer to the catalog CAT. ES20-201.

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

Specifications



Bore size	ø12	ø16	ø20	ø25	ø32	ø40	ø50	ø63	ø80	ø100
Action	Double acting									
Fluid	Air									
Proof pressure	218psi (1.5 MPa)									
Maximum operating pressure	145psi (1.0 MPa)									
Minimum operating pressure	17psi (0.12 MPa)		14.5psi (0.1 MPa)							
Ambient and fluid temperature	14 to 140°F (−10 to 60°C) (No freezing)									
Piston speed ^{Note)}	50 to 500 mm/s								50 to 400 mm/s	
Cushion	Rubber bumper on both ends									
Lubrication	Not required (Non-lube)									
Stroke length tolerance	^{+1.5} ₀ mm									

Note) Maximum speed with no load.

Make a model selection, considering a load according to the graph on pages 8 to 14.

Standard Strokes

Bore size (mm)	Standard stroke (mm)
12, 16	10, 20, 30, 40, 50, 75, 100, 125, 150, 175, 200, 250
20, 25	20, 30, 40, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400
32 to 100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400

Manufacture of Intermediate Strokes

Refer to pages 21 to 23 for cylinders with auto switches.
- Auto switch proper mounting position (detection at stroke end) and mounting height - Minimum stroke for auto switch mounting - Operating range - Auto switch mounting brackets/Part no.

Description	Spacer installation Spacers are installed in the standard stroke cylinder. • ø12 to ø32: Available by the 1 mm stroke interval. • ø40 to ø100: Available by the 5 mm stroke interval.	
Part no.	Refer to "How to Order" for the standard model numbers.	
Applicable stroke (mm)	ø12, ø16	1 to 249
	ø20 to ø32	1 to 399
	ø40 to ø100	5 to 395
Example	Part no.: MGPM20-39 A spacer 1 mm in width is installed in a MGPM20-40. C dimension is 77 mm.	

Theoretical Output

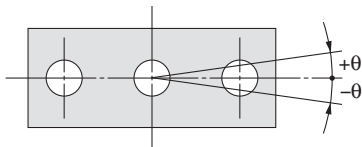


Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm ²)	Operating pressure psi (MPa)									
				29 (0.2)	44 (0.3)	58 (0.4)	73 (0.5)	87 (0.6)	102 (0.7)	116 (0.8)	131 (0.9)	145 (1.0)	
12	6	OUT	113	23	34	45	57	68	79	90	102	113	
		IN	85	17	25	34	42	51	59	68	76	85	
16	8	OUT	201	40	60	80	101	121	141	161	181	201	
		IN	151	30	45	60	75	90	106	121	136	151	
20	10	OUT	314	63	94	126	157	188	220	251	283	314	
		IN	236	47	71	94	118	141	165	188	212	236	
25	10	OUT	491	98	147	196	245	295	344	393	442	491	
		IN	412	82	124	165	206	247	289	330	371	412	
32	14	OUT	804	161	241	322	402	483	563	643	724	804	
		IN	650	130	195	260	325	390	455	520	585	650	
40	14	OUT	1257	251	377	503	628	754	880	1005	1131	1257	
		IN	1103	221	331	441	551	662	772	882	992	1103	
50	18	OUT	1963	393	589	785	982	1178	1374	1571	1767	1963	
		IN	1709	342	513	684	855	1025	1196	1367	1538	1709	
63	18	OUT	3117	623	935	1247	1559	1870	2182	2494	2806	3117	
		IN	2863	573	859	1145	1431	1718	2004	2290	2576	2863	
80	22	OUT	5027	1005	1508	2011	2513	3016	3519	4021	4524	5027	
		IN	4646	929	1394	1859	2323	2788	3252	3717	4182	4646	
100	26	OUT	7854	1571	2356	3142	3927	4712	5498	6283	7069	7854	
		IN	7323	1465	2197	2929	3662	4394	5126	5858	6591	7323	

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²)

(1N = 0.22 lbf)

Non-rotating Accuracy of Plate



Non-rotating accuracy θ when retracted and when no load is applied should be not more than the values shown in the table.

Bore size (mm)	Non-rotating accuracy θ		
	MGPM	MGPL	MGPA
12	$\pm 0.07^{\circ}$	$\pm 0.05^{\circ}$	$\pm 0.01^{\circ}$
16			
20	$\pm 0.06^{\circ}$	$\pm 0.04^{\circ}$	
25			
32	$\pm 0.05^{\circ}$	$\pm 0.03^{\circ}$	
40			
50	$\pm 0.04^{\circ}$	$\pm 0.03^{\circ}$	
63			
80	$\pm 0.03^{\circ}$	$\pm 0.03^{\circ}$	
100			

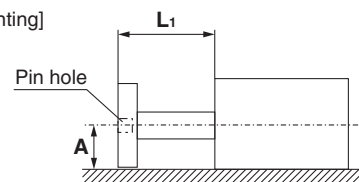
High Precision Ball Bushing/MGPA

⚠ Caution

Positioning accuracy for pin hole on the plate

Dispersion of dimensions when machining each component will be accumulated in the plate pin hole positioning accuracy when mounting this cylinder. Values below are referred as a guide.

[Side mounting]

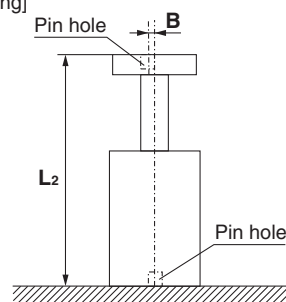


$$A = \text{Catalog dimension} \pm \begin{matrix} * \\ (0.1 + L_1 \times 0.0008) \end{matrix} \text{ [mm]}$$

* : To be 0.15 for $\phi 80$, $\phi 100$

Note) Displacement by load and self-weight deflection by plate and guide rod are not included.

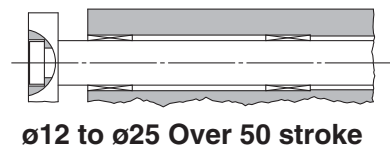
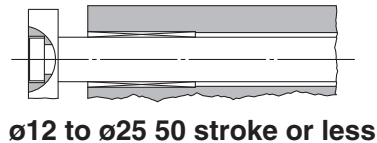
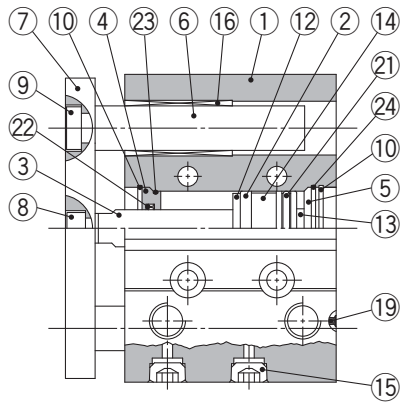
[Bottom mounting]



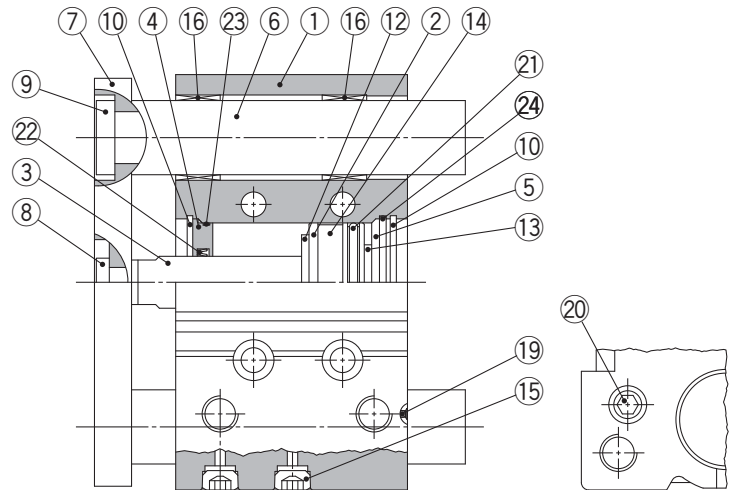
$$B = \pm (0.045 + L_2 \times 0.0016) \text{ [mm]}$$

Construction/Series MGPM

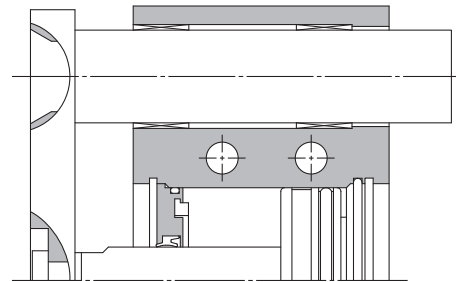
MGPM12 to 25



MGPM32 to 100



ø63 or more



ø50 or more

Component Parts

No.	Description	Material	Note
1	Body	Aluminum alloy	Hard anodized
2	Piston	Aluminum alloy	Chromated
3	Piston rod	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø100 Hard chrome plated
4	Collar	Aluminum alloy	Chromated
5	Head cover	Aluminum alloy	ø12 to ø63 Chromated
			ø80, ø100 Painted
6	Guide rod	Carbon steel	Hard chrome plated
7	Plate	Carbon steel	Nickel plated
8	Plate mounting bolt	Carbon steel	Nickel plated
9	Guide bolt	Carbon steel	Nickel plated
10	Retaining ring	Carbon tool steel	Phosphate coated
11	Retaining ring	Carbon tool steel	Phosphate coated
12	Bumper A	Urethane	
13	Bumper B	Urethane	
14	Magnet	—	
15	Plug Hexagon socket head plug	Carbon steel	ø12, ø16 Nickel plated
			ø20 to ø100
16	Slide bearing	Babbitt	

Component Parts

No.	Description	Material	Note
17	Ball bushing		
18	Spacer	Aluminum alloy	
19	Steel ball	Carbon steel	ø12 to ø50
20	Plug	Carbon steel	ø63 to ø100 Nickel plated
21 *	Piston seal	NBR	
22 *	Rod seal	NBR	
23 *	Gasket A	NBR	
24 *	Gasket B	NBR	

Replacement Parts/Seal Kit

Bore size (mm)	Kit no.	Contents	Bore size (mm)	Kit no.	Contents
12	MGP12-Z-PS	Set of nos. above 21, 22, 23, 24	40	MGP40-Z-PS	Set of nos. above 21, 22, 23, 24
16	MGP16-Z-PS		50	MGP50-Z-PS	
20	MGP20-Z-PS		63	MGP63-Z-PS	
25	MGP25-Z-PS		80	MGP80-Z-PS	
32	MGP32-Z-PS		100	MGP100-Z-PS	

* Seal kit includes 21 to 24. Order the seal kit, based on each bore size.

* Since the seal kit does not include a grease pack, order it separately.

Grease pack part no.: GR-S-010 (10 g)