Compact Guide Cylinder (Basic type) New

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

Up to 17% Weight reduced!

Weight reduced by up to 17% with a shorter guide rod and thinner plate

Guide rod shortened

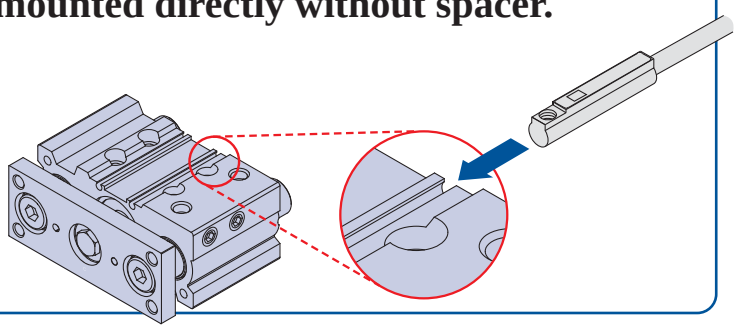
for MGPM40-25 stroke

Max. **22mm**

Space required between the bottom of the cylinder body and your equipment is **reduced.**

Space saving

Round type auto switches can be mounted directly without spacer.



3 types of bearing can be selected.

- **Slide bearing**
  Series MGPM
- **Ball bushing**
  Series MGPL
- **High precision ball bushing**
  Series MGPA

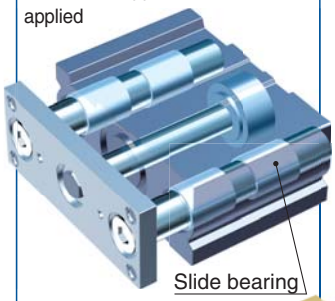
Series MGP

SMC

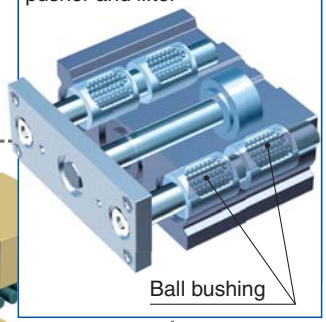
CAT.EUS20-219AA-UK

3 types of bearing can be selected.

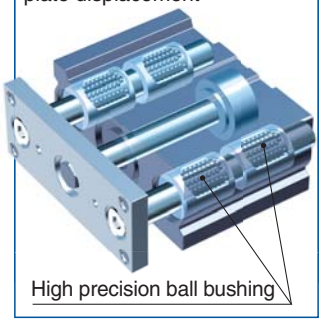
Slide bearing
Series MGPM
Suitable for lateral load applications such as a stopper where shock is applied

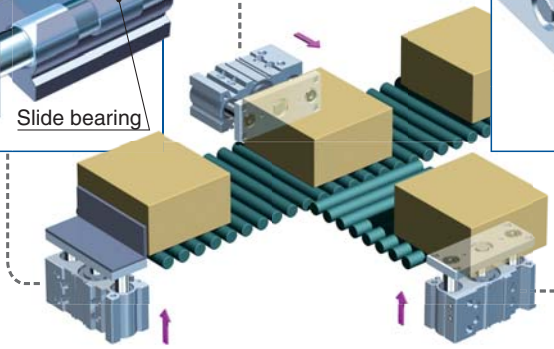


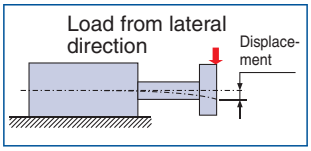
Ball bushing
Series MGPL
Smooth operation suitable for pusher and lifter



High precision ball bushing
Series MGPA
Suitable for minimising plate displacement







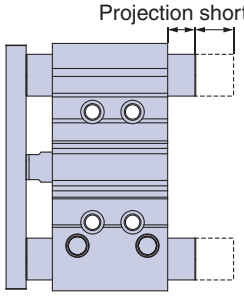
Weight reduced

Bore size	Reduction rate [%]	Weight [kg]
ø12	11	0.25
ø16	3	0.37
ø20	12	0.59
ø25	12	0.84
ø32	17	1.41
ø40	16	1.64
ø50	17	2.79
ø63	17	3.48
ø80	17	5.41
ø100	13	9.12

* Compared with slide bearing type, ø12 to ø25-20 stroke
* Compared with slide bearing type, ø32 to ø100-25 stroke

Guide rod shortened

Projection shortened



[mm]

Bore size	Guide rod	
	Shortened by	New dimension
ø32	22	15.5
ø40	22	9
ø50	18	16.5
ø63	18	11.5
ø80	10.5	8
ø100	10.5	10.5

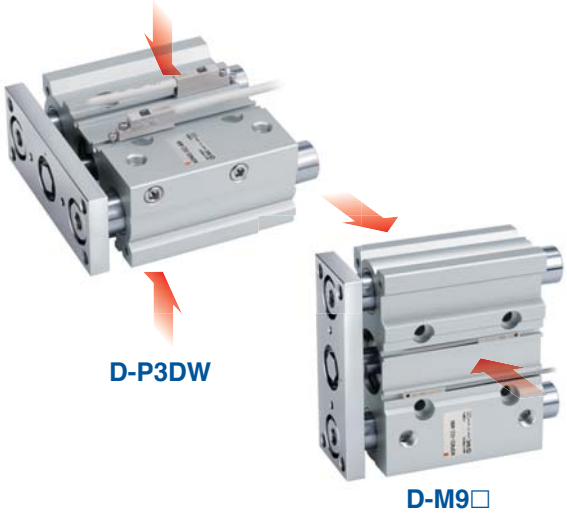
* Compared with slide bearing type, 25 stroke (ø32 to ø100)
(No projection for ø12 to ø25-25 stroke)

Performance, strength (rigidity), and mounting dimensions are equivalent to the conventional MGP series.

Small auto switches or magnetic field resistant auto switches can be mounted on 2 surfaces.

D-M9□ | D-A9□ | D-P3DW

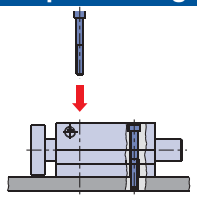
* The D-Y7 and D-Z7 auto switches are not mountable.



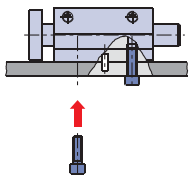
4 types of mounting are possible.

Easy positioning
Knock pin holes provided on each mounting surface

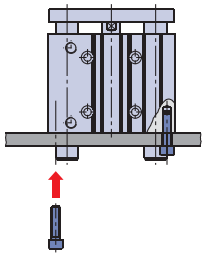
1. Top mounting



2. Side mounting

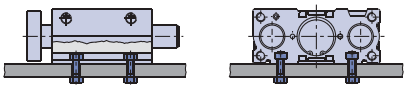


4. Bottom mounting



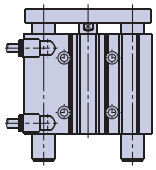
3. T-slot side mounting

Easy adjustment of workpiece and cylinder mounting

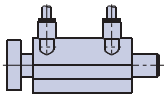


Piping is possible from 2 directions.

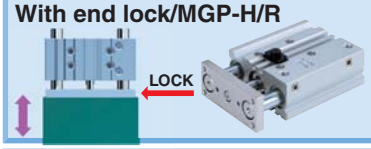
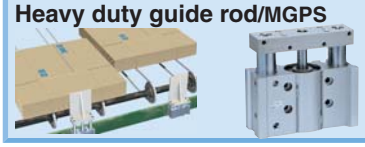
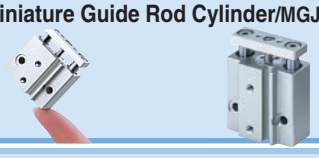
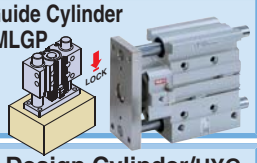
1. Top ported



2. Side ported



Compact Guide Cylinders, Series Variations

Series	Bearing	Bore size [6 10 12 16 20 25 32 40 50 63 80 100]	Page
Basic type/MGP (New Remodeled) 	Slide bearing Ball bushing High precision ball bushing	12 16 20 25 32 40 50 63 80 100	Page 3 of this catalogue
With air cushion/MGP-A 		16 20 25 32 40 50 63 80 100	Digital Catalogue www.smc.eu
With end lock/MGP-H/R 		20 25 32 40 50 63 80 100	Digital Catalogue www.smc.eu
Clean series/12/13-MGP 	Ball bushing	12 16 20 25 32 40 50 63 80	Digital Catalogue www.smc.eu
Water-resistant/MGP R/V 	Slide bearing	20 25 32 40 50 63 80 100	Digital Catalogue www.smc.eu
Heavy duty guide rod/MGPS 		50 80	Digital Catalogue www.smc.eu
Miniature Guide Rod Cylinder/MGJ 		6 10	Digital Catalogue www.smc.eu
Compact Guide Cylinder with Lock/MLGP 	Slide bearing Ball bushing	20 25 32 40 50 63 80 100	Digital Catalogue www.smc.eu
Hygienic Design Cylinder/HYG 	Slide bearing	20 25 32 40 50 63 80	Digital Catalogue www.smc.eu

New Series MGP (Basic type), Stroke Variations

Bearing type	Bore size [mm]	Stroke [mm] 10 20 25 30 40 50 75 100 125 150 175 200 250 300 350 400
MGPM Slide bearing MGPL Ball bushing MGPA High precision ball bushing	12 16 20 25 32 40 50 63 80 100	10 20 25 30 40 50 75 100 125 150 175 200 250 300 350 400

Combination of Standard Products and Made to Order Specifications

Series MGP

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

Symbol	Specification	Applicable bore size	Basic type		
Series			Basic type		
Bearing			Slide bearing	Ball bushing	High precision ball bushing
Type			MGPM	MGPL	MGPA
			ø12 to ø100		
20-	Copper and Fluorine-free Note 1)	ø12 to ø100	●	● Note 3)	● Note 3)
-XA□	Change of guide rod end shape		◎	◎	◎
-XB6	Heat resistant cylinder (-10 to 150°C) Note 2)		◎	—	—
-XB10	Intermediate stroke (Using exclusive body)		◎	◎	◎
-XB13	Low speed cylinder (5 to 50 mm/s)		◎	◎	○
-XC22	Fluororubber seals Note 2)		◎	—	—
-XC79	Machining tapped hole, drilled hole and pin hole additionally.		◎	◎	◎
-XC82	Bottom mounting style		◎	—	—
-X144	Symmetrical port position		◎	◎	◎
-X867	Lateral piping type (Change of plug position)		◎	◎	◎

Note 1) Refer to SMC website for details.
Note 2) Without cushion.
Note 3) Copper and fluorine-free are available as standard products. MGPL-Z and MGPA-Z are already copper and fluorine-free, so it's not possible to order 20-MGPL-Z or 20-MGPA-Z.

Series MGP
Specific Product Precautions 1

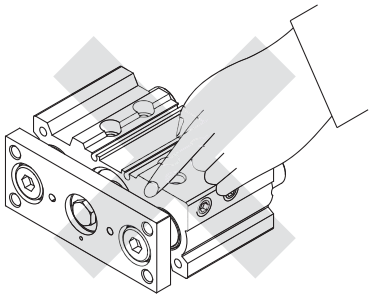
Be sure to read before handling. Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) and the Operation Manual for Actuator Precautions and Auto Switch Precautions. Please download it via our website. http://www.smcworld.com

Mounting

⚠Warning

1. Never place your hands or fingers between the plate and the body.

Be very careful to prevent your hands or fingers from getting caught in the gap between the cylinder body and the plate when air is applied.



⚠Caution

1. Use cylinders within the piston speed range.

An orifice is set for this cylinder, but the piston speed may exceed the operating range if the speed controller is not used. If the cylinder is used outside the operating speed range, it may cause damage to the cylinder and shorten the service life. Adjust the speed by installing the speed controller and use the cylinder within the limited range.

2. Pay attention to the operating speed when the product is mounted vertically.

When using the product in the vertical direction, if the load factor is large, the operating speed can be faster than the control speed of the speed controller (i.e. quick extension).
In such cases, it is recommended to use a dual speed controller.

3. Do not scratch or gouge the sliding portion of the piston rod and the guide rod.

Damaged seals, etc. will result in leakage or malfunction.

4. Do not dent or scratch the mounting surface of a body and a plate.

The flatness of the mounting surface may not be maintained, which would cause an increase in sliding resistance.

5. Make sure that the cylinder mounting surface has a flatness of 0.05 mm or less.

Insufficient flatness of a workpiece or bracket mounted on the mounting surface or plate of the cylinder and other parts can cause defective operation and an increase in the sliding resistance.

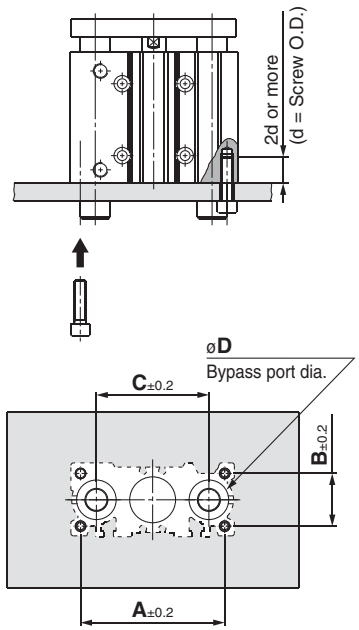
Mounting

⚠Caution

6. Bottom of cylinder

The guide rods protrude from the bottom of the cylinder at the end of the retracting stroke, and therefore, in cases where the cylinder is to be bottom mounted, it is necessary to provide bypass ports in the mounting surface for the guide rods, as well as holes for the hexagon socket head cap screws which are used for mounting.

Moreover, in applications where impact occurs from a stopper, etc., the mounting screws should be inserted to a depth of 2d or more.



Bore size [mm]	A [mm]	B [mm]	C [mm]	D [mm]		Hexagon socket head cap screw
				MGPM	MGPL/A	
12	50	18	41	10	8	M4 x 0.7
16	56	22	46	12	10	M5 x 0.8
20	72	24	54	14	12	M5 x 0.8
25	82	30	64	18	15	M6 x 1.0
32	98	34	78	22	18	M8 x 1.25
40	106	40	86	22	18	M8 x 1.25
50	130	46	110	27	22	M10 x 1.5
63	142	58	124	27	22	M10 x 1.5
80	180	54	156	33	28	M12 x 1.75
100	210	62	188	39	33	M14 x 2.0

Series MGP
Specific Product Precautions 2

Be sure to read before handling. Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) and the Operation Manual for Actuator Precautions and Auto Switch Precautions. Please download it via our website. http://www.smcworld.com

Piping

⚠Caution

Depending on the operating conditions, piping port positions can be changed by using a plug.

1. M5

After tightening by hand, tighten additional 1/6 to 1/4 rotation with a tightening tool.

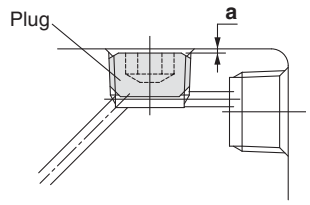
2. Tapered thread for Rc port (MGP) and NPT port (MGP□□TN)

Use the correct tightening torques listed below.

Before tightening the plug, wrap pipe tape around it. Also, with regard to the sunk dimension of a plug (dimension "a" in the drawing), use the stipulated figures as a guide and confirm the air leakage before operation.

∗ If tightening plugs on the top mounting port with more than the proper tightening torque, plugs will be screwed much deeply and air passage will be squeezed. Consequently, the cylinder speed will be restricted.

Connection thread (plug) size	Proper tightening torque [N·m]	**a** dimension
1/8	7 to 9	0.5 mm or less
1/4	12 to 14	1 mm or less
3/8	22 to 24	1 mm or less



3. Parallel pipe thread for G port (MGP□□TF)

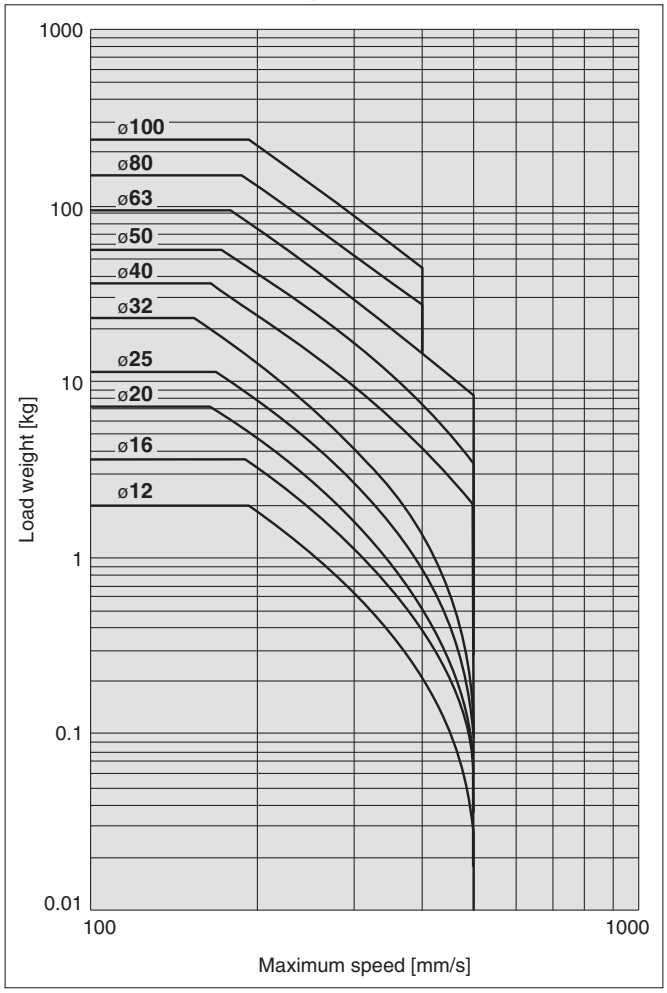
Screw in the plug to the surface of the body (dimension "a" in the drawing) by checking visually instead of using the tightening torque shown in the table.

Allowable Kinetic Energy

⚠Caution

Load weight and a maximum speed must be within the ranges shown in the graphs below.

MGP with rubber bumper



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

—	M5 x 0.8
	Rc
TN	NPT
TF	G

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

Cylinder stroke [mm]
Refer to "Standard Strokes" on page 4.

Auto switch

—	Without auto switch (Built-in magnet)

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

Number of auto switches

—	2 pcs.
S	1 pc.
n	n pcs.

Made to Order specification
For details, refer to page 4.

Applicable Auto Switches/Refer to Auto Swicth Guide for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model Perpendicular	Auto switch model In-line	Lead wire length [m] 0.5 (—)	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	—	**M9NV**	**M9N**	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9PV**	**M9P**	●	●	●	○	○		
				2-wire		12 V		**M9BV**	**M9B**	●	●	●	○	○	—	
	Diagnostic indication (2-colour display)			3-wire (NPN)		5 V,12 V		**M9NWV**	**M9NW**	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PWV**	**M9PW**	●	●	●	○	○		
				2-wire		12 V		**M9BWV**	**M9BW**	●	●	●	○	○	—	
	Water-resistant (2-colour display)			3-wire (NPN)		5 V,12 V		**M9NAV**∗∗∗	**M9NA**∗∗∗	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PAV**∗∗∗	**M9PA**∗∗∗	○	○	●	○	○		
				2-wire		12 V		**M9BAV**∗∗∗	**M9BA**∗∗∗	○	○	●	○	○	—	
	Magnetic field resistant (2-colour display)			2-wire (Non-polar)		—		—	**P3DW**∗∗	●	—	●	●	○		
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96V**	**A96**	●	—	●	—	—	IC circuit	—
			No	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…… — (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.
∗∗ Bore sizes ø32 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 Auto Switch Guide. For D-P3DW, refer to the D-P3DW catalogue.
∗ 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	1.5 MPa									
Maximum operating pressure	1.0 MPa									
Minimum operating pressure	0.12 MPa	0.1 MPa								
Ambient and fluid temperature	-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.

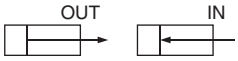
Standard Strokes

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

Description	Spacer installation type Spacers are installed in the standard stroke cylinder. • ø12 to 32: Available by the 1 mm stroke interval. • ø40 to 100: Available by the 5 mm stroke interval.		Exclusive body (-XB10) Dealing with the stroke by making an exclusive body. • All bore sizes are available by the 1 mm interval.	
Part no.	Refer to "How to Order" for the standard model numbers.		Suffix "-XB10" to the end of standard part number.	
Applicable stroke [mm]	ø12, ø16	1 to 249	ø12, ø16	11 to 249
	ø20, ø25, ø32	1 to 399	ø20, ø25	21 to 399
	ø40 to ø100	5 to 395	ø32 to ø100	26 to 399
Example	Part no.: MGPM20-39Z A spacer 1 mm in width is installed in a MGPM20-40. C dimension is 77 mm.		Part no.: MGPM20-39Z-XB10 Special body manufactured for 39 stroke. C dimension is 76 mm.	

Theoretical Output



[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
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]

Made to Order Specification
(For details, refer to pages 25 to 30.)

Symbol	Specifications
-XA□	Change of guide rod end shape
-XB6	Heat resistant cylinder (-10 to 150°C)
-XB10	Intermediate stroke (Using exclusive body)
-XB13	Low speed cylinder (5 to 50 mm/s)
-XC22	Fluororubber seals
-XC79	Machining tapped hole, drilled hole and pin hole additionally.
-XC82	Bottom mounting style
-X144	Symmetrical port position
-X867	Lateral piping type (Change of plug position)

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.

Weight

Slide Bearing: MGPM12 to 100

[kg]

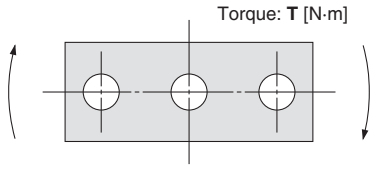
Bore size [mm]	Standard stroke [mm]															
	10	20	25	30	40	50	75	100	125	150	175	200	250	300	350	400
12	0.22	0.25	—	0.29	0.33	0.36	0.46	0.55	0.66	0.75	0.84	0.93	1.11	—	—	—
16	0.32	0.37	—	0.42	0.46	0.51	0.66	0.78	0.94	1.06	1.18	1.31	1.55	—	—	—
20	—	0.59	—	0.67	0.74	0.82	1.06	1.24	1.43	1.61	1.80	1.99	2.42	2.79	3.16	3.53
25	—	0.84	—	0.94	1.04	1.14	1.50	1.75	2.00	2.25	2.50	2.75	3.35	3.85	4.34	4.84
32	—	—	1.41	—	—	1.77	2.22	2.57	2.93	3.29	3.65	4.00	4.90	5.61	6.33	7.04
40	—	—	1.64	—	—	2.04	2.52	2.92	3.32	3.71	4.11	4.50	5.47	6.26	7.06	7.85
50	—	—	2.79	—	—	3.38	4.13	4.71	5.30	5.89	6.47	7.06	8.55	9.73	10.9	12.1
63	—	—	3.48	—	—	4.15	4.99	5.67	6.34	7.02	7.69	8.37	10.0	11.4	12.7	14.1
80	—	—	5.41	—	—	6.26	7.41	8.26	9.10	9.95	10.8	11.6	13.9	15.6	17.3	19.0
100	—	—	9.12	—	—	10.3	12.0	13.2	14.4	15.6	16.9	18.1	21.2	23.6	26.1	28.5

Ball Bushing: MGPL12 to 100, High Precision Ball Bushing: MGPA12 to 100

[kg]

Bore size [mm]	Standard stroke [mm]															
	10	20	25	30	40	50	75	100	125	150	175	200	250	300	350	400
12	0.21	0.24	—	0.27	0.32	0.35	0.43	0.50	0.59	0.67	0.75	0.83	0.99	—	—	—
16	0.31	0.35	—	0.40	0.47	0.51	0.62	0.72	0.85	0.96	1.06	1.17	1.38	—	—	—
20	—	0.60	—	0.66	0.79	0.85	1.01	1.17	1.36	1.52	1.68	1.84	2.17	2.49	2.81	3.13
25	—	0.87	—	0.96	1.12	1.20	1.41	1.62	1.86	2.06	2.27	2.48	2.92	3.33	3.75	4.16
32	—	—	1.37	—	—	1.66	2.08	2.37	2.74	3.03	3.31	3.60	4.25	4.82	5.39	5.97
40	—	—	1.59	—	—	1.92	2.38	2.70	3.11	3.44	3.77	4.09	4.81	5.46	6.11	6.76
50	—	—	2.65	—	—	3.14	3.85	4.34	4.97	5.47	5.96	6.45	7.57	8.56	9.54	10.5
63	—	—	3.33	—	—	3.91	4.71	5.29	6.01	6.59	7.17	7.75	9.05	10.2	11.4	12.5
80	—	—	5.27	—	—	6.29	7.49	8.21	8.92	9.64	10.4	11.1	12.9	14.3	15.7	17.2
100	—	—	8.62	—	—	10.1	11.8	12.9	13.9	15.0	16.0	17.1	19.6	21.7	23.8	25.9

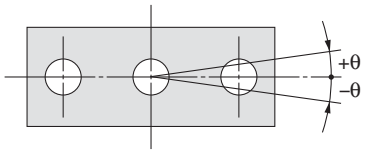
Allowable Rotational Torque of Plate



T [N·m]

Bore size [mm]	Bearing type	Stroke [mm]															
		10	20	25	30	40	50	75	100	125	150	175	200	250	300	350	400
12	**MGPM**	0.39	0.32	—	0.27	0.24	0.21	0.43	0.36	0.31	0.27	0.24	0.22	0.19	—	—	—
	MGPL/A	0.61	0.45	—	0.35	0.58	0.50	0.37	0.29	0.24	0.20	0.18	0.16	0.12	—	—	—
16	**MGPM**	0.69	0.58	—	0.49	0.43	0.38	0.69	0.58	0.50	0.44	0.40	0.36	0.30	—	—	—
	MGPL/A	0.99	0.74	—	0.59	0.99	0.86	0.65	0.52	0.43	0.37	0.32	0.28	0.23	—	—	—
20	**MGPM**	—	1.05	—	0.93	0.83	0.75	1.88	1.63	1.44	1.28	1.16	1.06	0.90	0.78	0.69	0.62
	MGPL/A	—	1.26	—	1.03	2.17	1.94	1.52	1.25	1.34	1.17	1.03	0.93	0.76	0.65	0.56	0.49
25	**MGPM**	—	1.76	—	1.55	1.38	1.25	2.96	2.57	2.26	2.02	1.83	1.67	1.42	1.24	1.09	0.98
	MGPL/A	—	2.11	—	1.75	3.37	3.02	2.38	1.97	2.05	1.78	1.58	1.41	1.16	0.98	0.85	0.74
32	**MGPM**	—	—	6.35	—	—	5.13	5.69	4.97	4.42	3.98	3.61	3.31	2.84	2.48	2.20	1.98
	MGPL/A	—	—	5.95	—	—	4.89	5.11	4.51	6.34	5.79	5.33	4.93	4.29	3.78	3.38	3.04
40	**MGPM**	—	—	7.00	—	—	5.66	6.27	5.48	4.87	4.38	3.98	3.65	3.13	2.74	2.43	2.19
	MGPL/A	—	—	6.55	—	—	5.39	5.62	4.96	6.98	6.38	5.87	5.43	4.72	4.16	3.71	3.35
50	**MGPM**	—	—	13.0	—	—	10.8	12.0	10.6	9.50	8.60	7.86	7.24	6.24	5.49	4.90	4.43
	MGPL/A	—	—	9.17	—	—	7.62	9.83	8.74	11.6	10.7	9.83	9.12	7.95	7.02	6.26	5.63
63	**MGPM**	—	—	14.7	—	—	12.1	13.5	11.9	10.7	9.69	8.86	8.16	7.04	6.19	5.52	4.99
	MGPL/A	—	—	10.2	—	—	8.48	11.0	9.74	13.0	11.9	11.0	10.2	8.84	7.80	6.94	6.24
80	**MGPM**	—	—	21.9	—	—	18.6	22.9	20.5	18.6	17.0	15.6	14.5	12.6	11.2	10.0	9.11
	MGPL/A	—	—	15.1	—	—	23.3	22.7	20.6	18.9	17.3	16.0	14.8	12.9	11.3	10.0	8.94
100	**MGPM**	—	—	38.8	—	—	33.5	37.5	33.8	30.9	28.4	26.2	24.4	21.4	19.1	17.2	15.7
	MGPL/A	—	—	27.1	—	—	30.6	37.9	34.6	31.8	29.3	27.2	25.3	22.1	19.5	17.3	15.5

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	±0.07°	±0.05°	±0.01°
16			
20	±0.06°	±0.04°	
25			
32	±0.05°	±0.03°	
40			
50	±0.04°	±0.03°	
63			
80	±0.03°	±0.03°	
100			

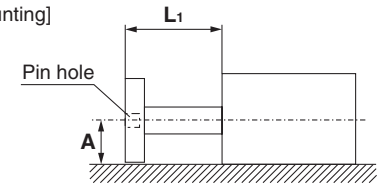
High Precision Ball Bushing/MGPA

⚠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]

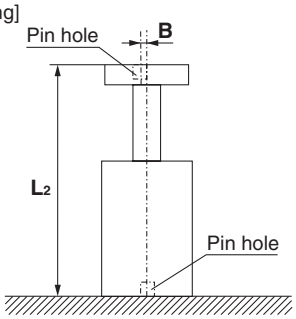


A = Catalogue dimension ± (0.1 + **L1** x 0.0008) [mm]

∗ : To be 0.15 for ø80, ø100

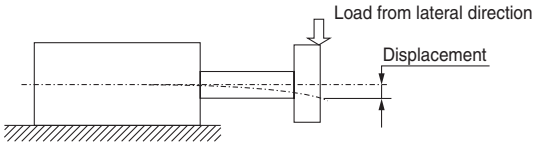
Note) Displacement by load and self-weight deflection by plate and guide rod are not included.

[Bottom mounting]

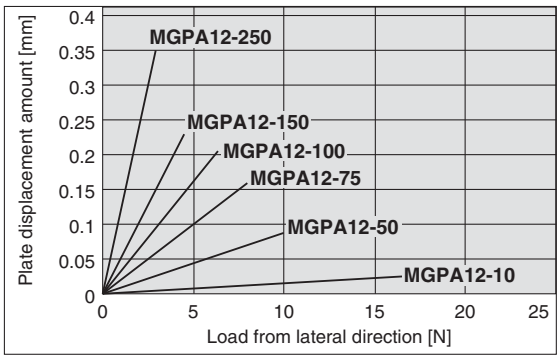


B = ± (0.045 + **L2** x 0.0016) [mm]

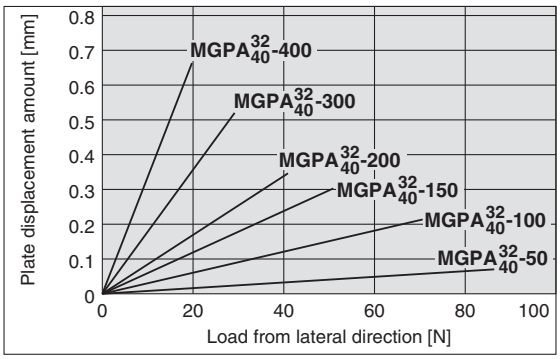
High Precision Ball Bushing/MGPA Plate Displacement Amount (Reference Values)



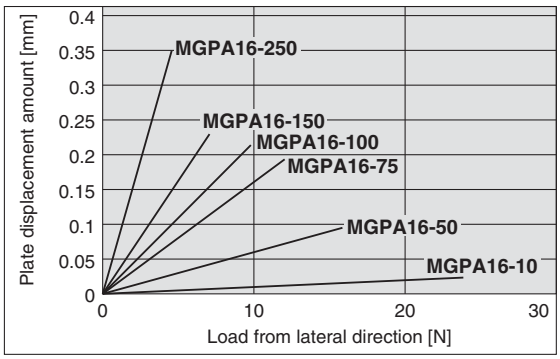
MGPA12



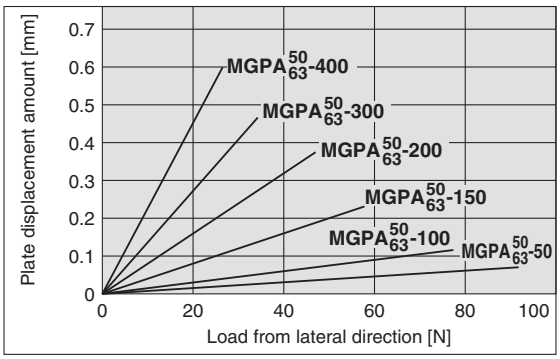
MGPA32/40



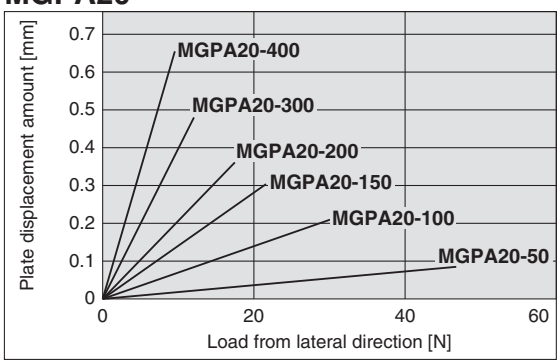
MGPA16



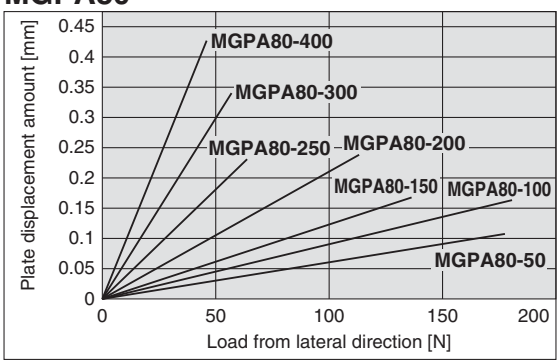
MGPA50/63



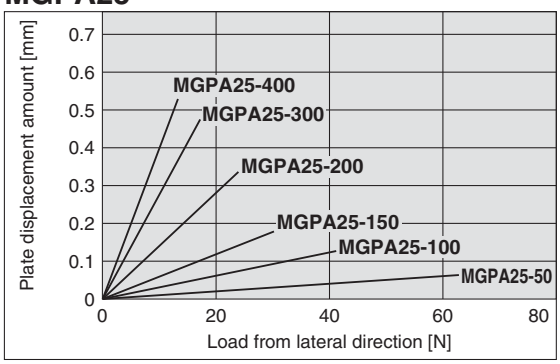
MGPA20



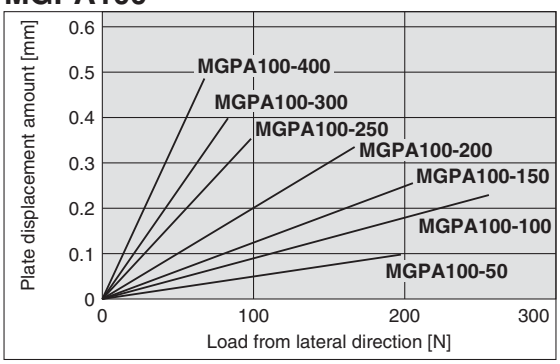
MGPA80



MGPA25



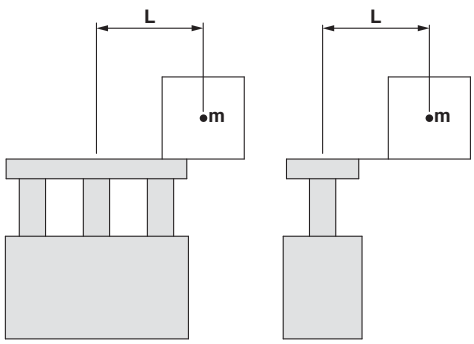
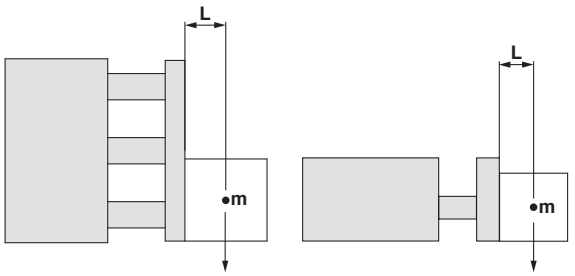
MGPA100



Note 1) The guide rod and self-weight for the plate are not included in the above displacement values.
Note 2) Allowable rotating torque, and operating range when used as a lifter, are the same as MGPL series.

Model Selection

Selection Conditions

	Vertical		Horizontal	
Mounting orientation				
Maximum speed [mm/s]	200 or less	400	200 or less	400
Graph (Slide bearing type)	(1), (2)	(3), (4)	(13), (14)	(15), (16)
Graph (Ball bushing type)	(5) to (8)	(9) to (12)	(17), (18)	(19), (20)

Selection Example 1 (Vertical Mounting)

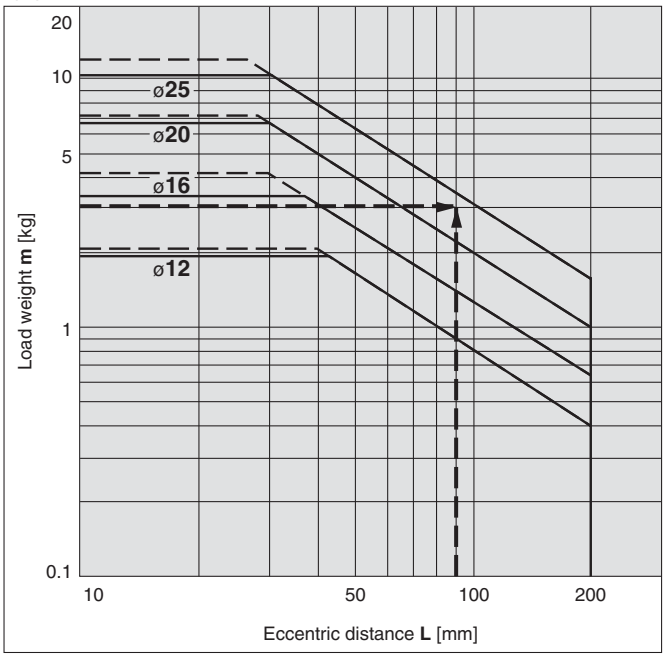
Selection conditions

Mounting: Vertical
Bearing type: Ball bushing
Stroke: 30 stroke
Maximum speed: 200 mm/s
Load weight: 3 kg
Eccentric distance: 90 mm

Find the point of intersection for the load weight of 3 kg and the eccentric distance of 90 mm on graph (5), based on vertical mounting, ball bushing, 30 stroke, and the speed of 200 mm/s.

→**MGPL25-30** is selected.

(5) Less than 40 stroke, V = 200 mm/s or less



Selection Example 2 (Horizontal Mounting)

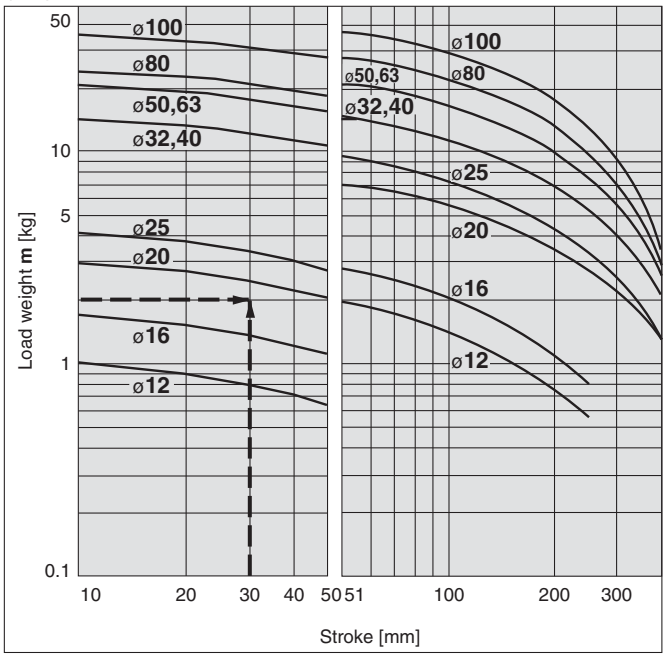
Selection conditions

Mounting: Horizontal
Bearing type: Slide bearing
Distance between plate and load centre of gravity: 50 mm
Maximum speed: 200 mm/s
Load weight: 2 kg
Stroke: 30 stroke

Find the point of intersection for the load weight of 2 kg and 30 stroke on graph (13), based on horizontal mounting, slide bearing, the distance of 50 mm between the plate and load centre of gravity, and the speed of 200 mm/s.

→**MGPM20-30** is selected.

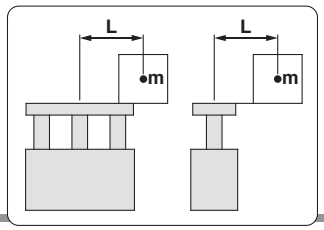
(13) L = 50 mm, V = 200 mm/s or less



· When the maximum speed exceeds 200 mm/s, the allowable load weight is determined by multiplying the value shown in the graph at 400 mm/s by the coefficient listed in the table below.

Max. speed	Up to 300 mm/s	Up to 400 mm/s	Up to 500 mm/s
Coefficient	1.7	1	0.6

· Use the “Guide Cylinder Selection Software”, when the eccentric distance is 200 mm or more.



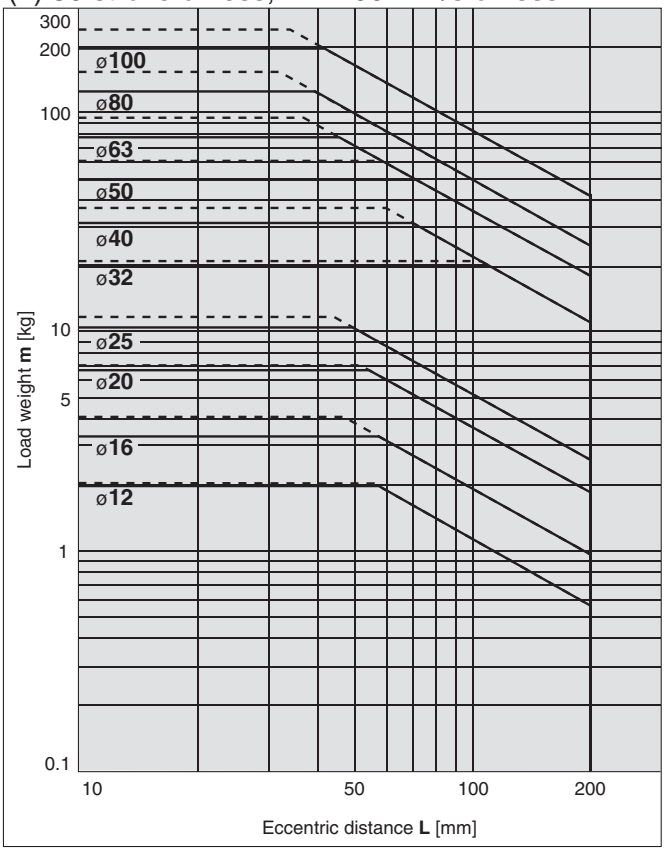
Vertical Mounting

Slide Bearing

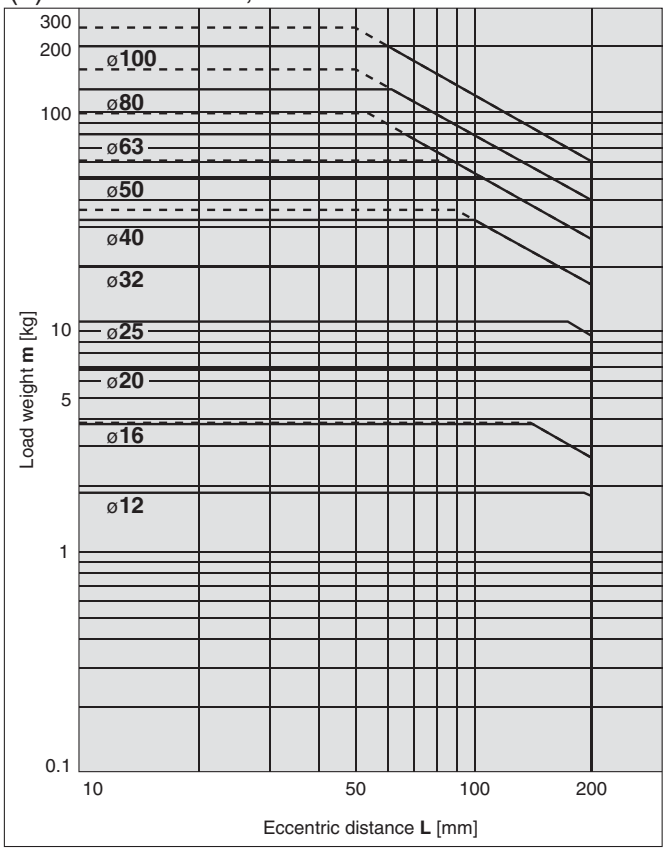
Operating pressure 0.4 MPa
Operating pressure 0.5 MPa or more

MGPM12 to 100

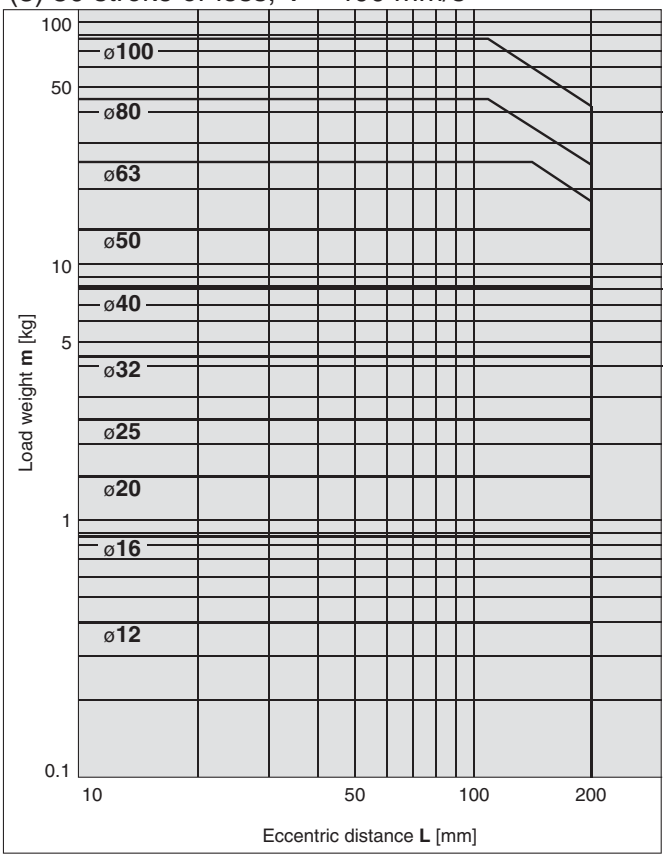
(1) 50 stroke or less, V = 200 mm/s or less



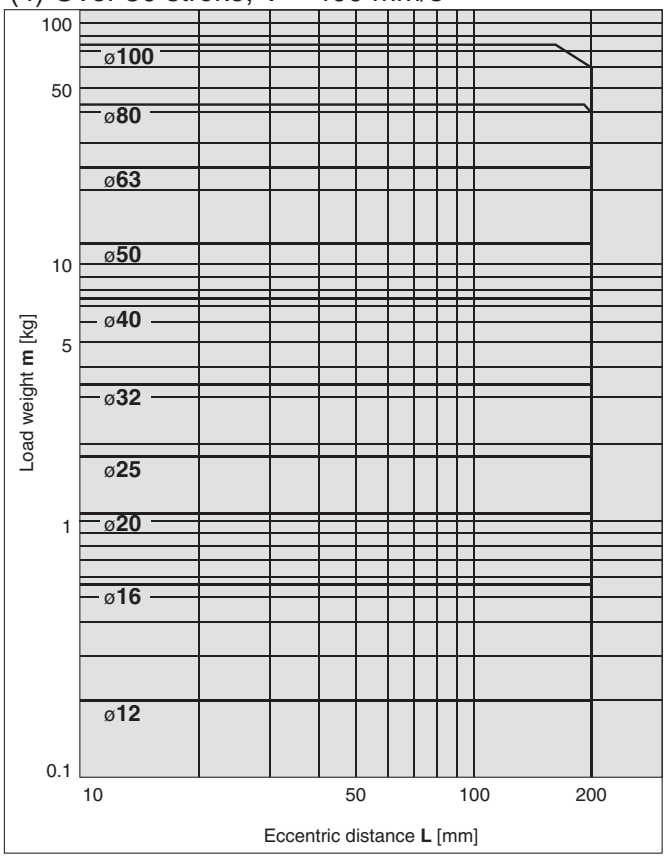
(2) Over 50 stroke, V = 200 mm/s or less



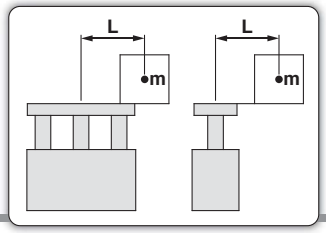
(3) 50 stroke or less, V = 400 mm/s



(4) Over 50 stroke, V = 400 mm/s



· Use the “Guide Cylinder Selection Software”, when the eccentric distance is 200 mm or more.



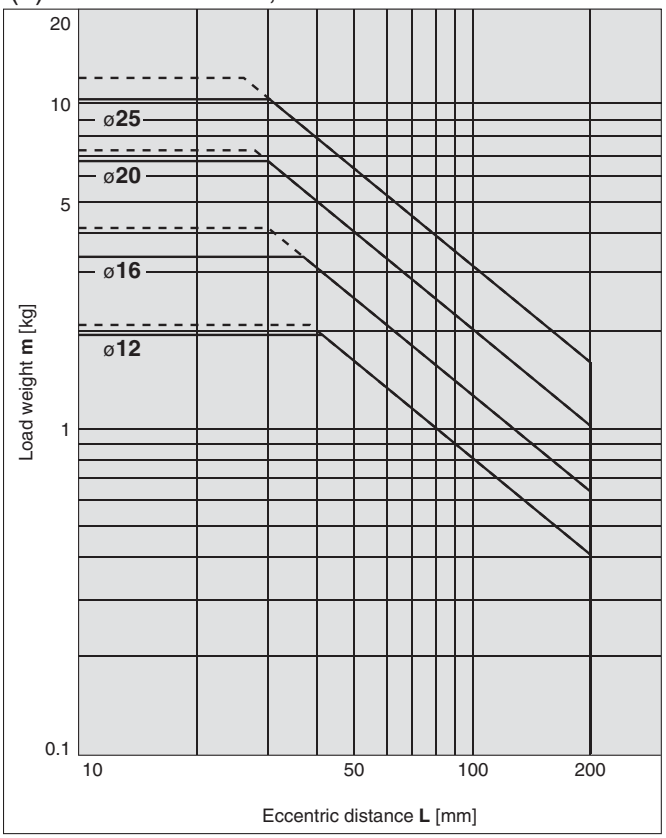
Vertical Mounting

Ball Bushing

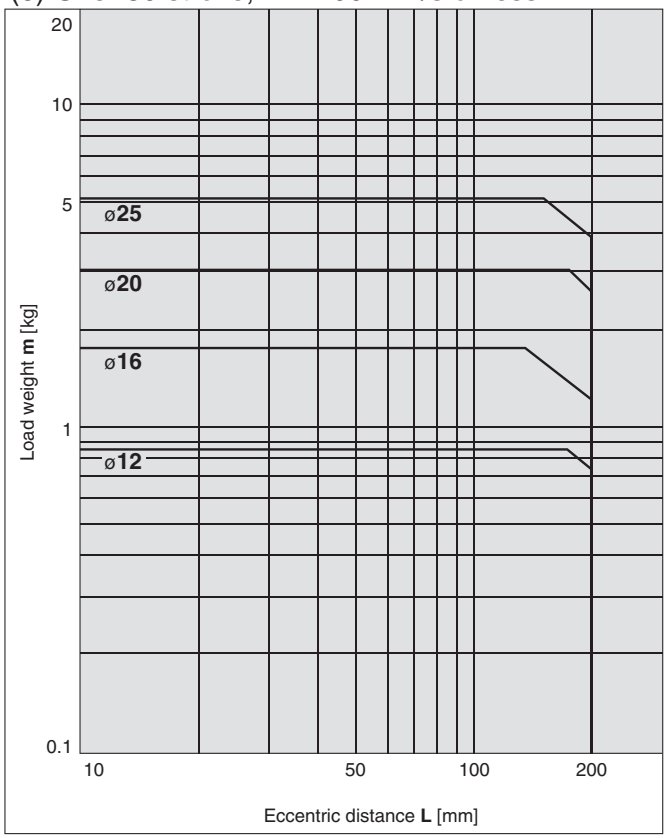
——— Operating pressure 0.4 MPa
- - - - - Operating pressure 0.5 MPa or more

MGPL12 to 25, MGPA12 to 25

(5) 30 stroke or less, V = 200 mm/s or less

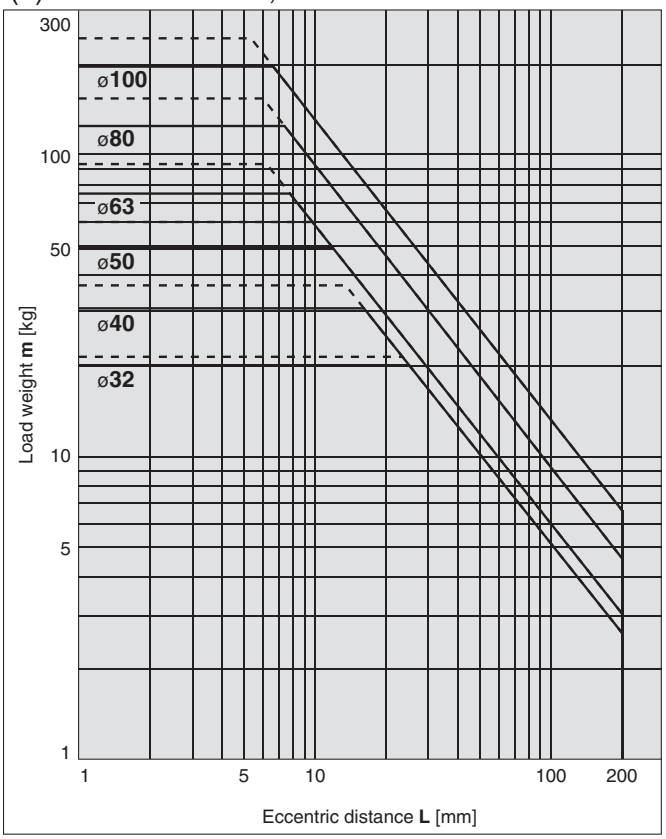


(6) Over 30 stroke, V = 200 mm/s or less

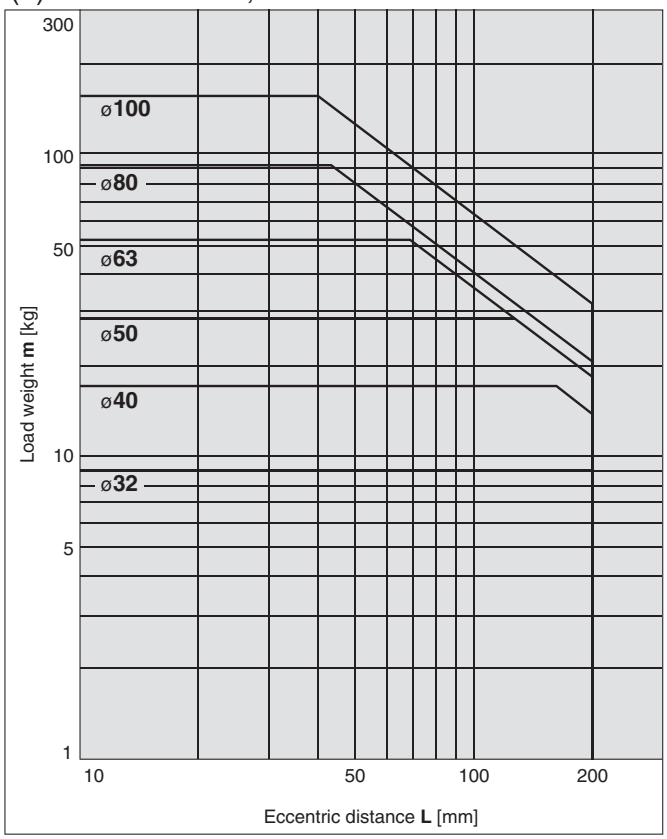


MGPL32 to 100, MGPA32 to 100

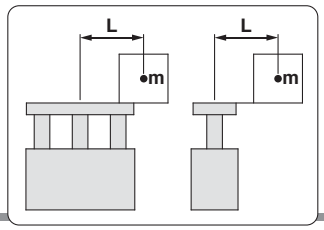
(7) 50 stroke or less, V = 200 mm/s or less



(8) Over 50 stroke, V = 200 mm/s or less



· Use the “Guide Cylinder Selection Software”, when the eccentric distance is 200 mm or more.



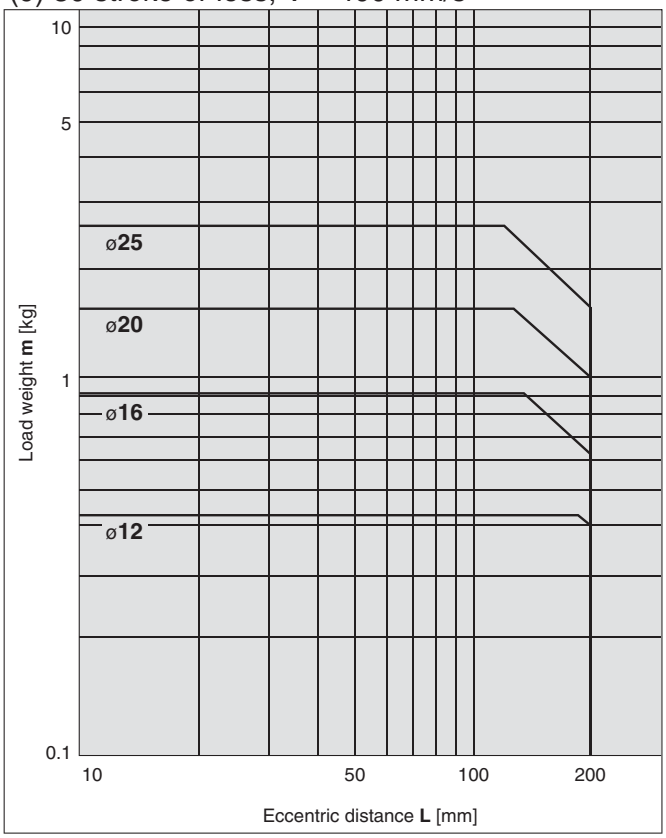
Vertical Mounting

Ball Bushing

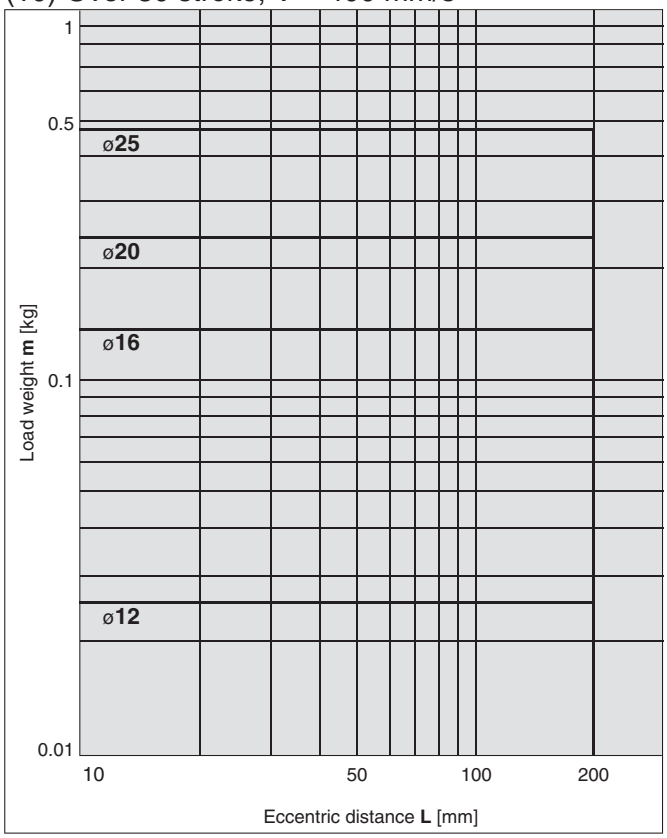
Operating pressure 0.4 MPa

MGPL12 to 25, MGPA12 to 25

(9) 30 stroke or less, V = 400 mm/s

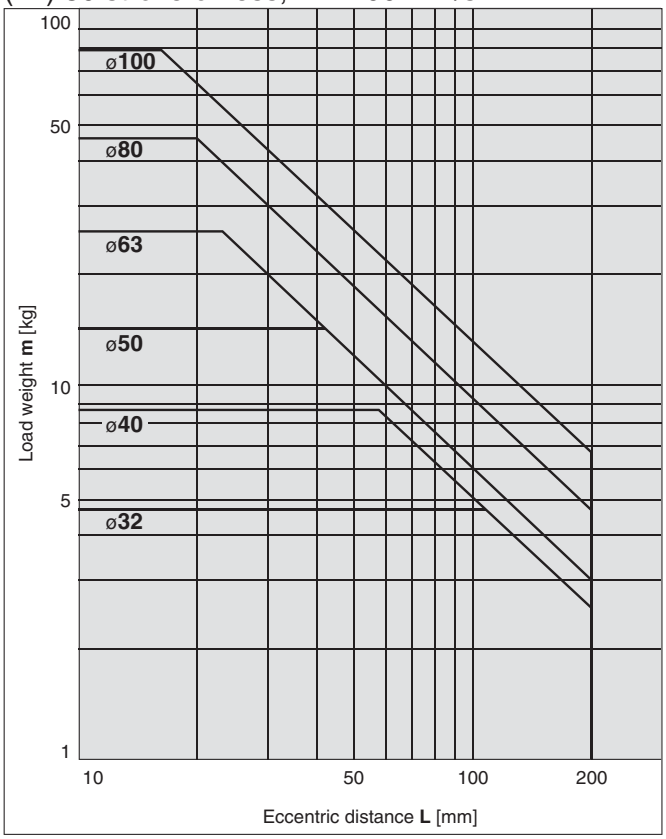


(10) Over 30 stroke, V = 400 mm/s

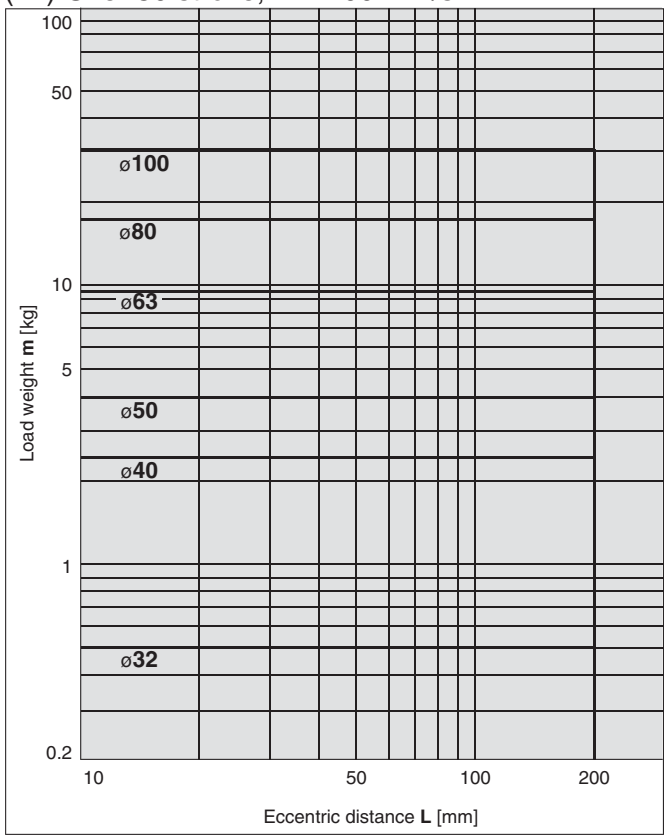


MGPL32 to 100, MGPA32 to 100

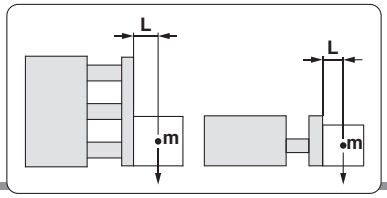
(11) 50 stroke or less, V = 400 mm/s



(12) Over 50 stroke, V = 400 mm/s



· Use the “Guide Cylinder Selection Software”, when the eccentric distance is 200 mm or more.

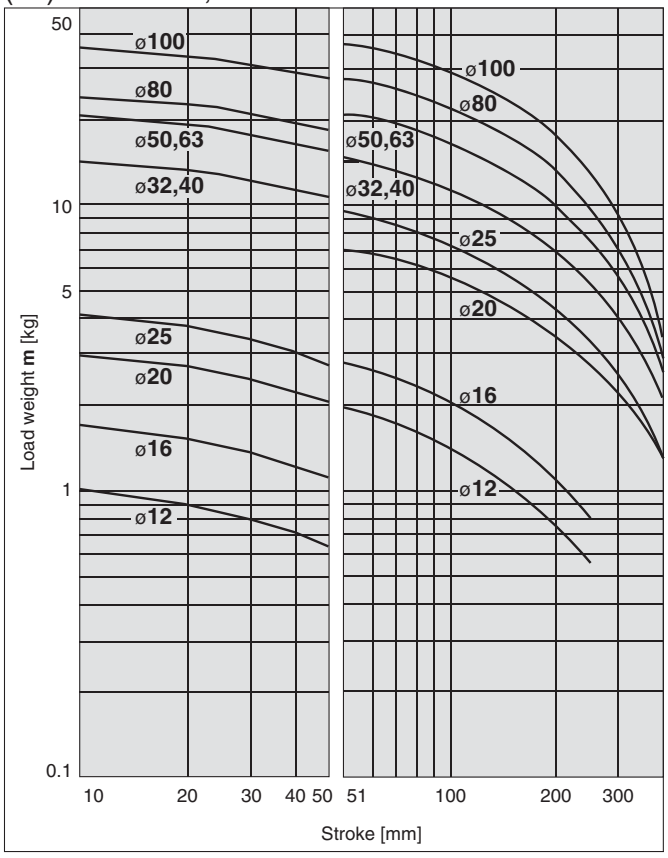


Horizontal Mounting

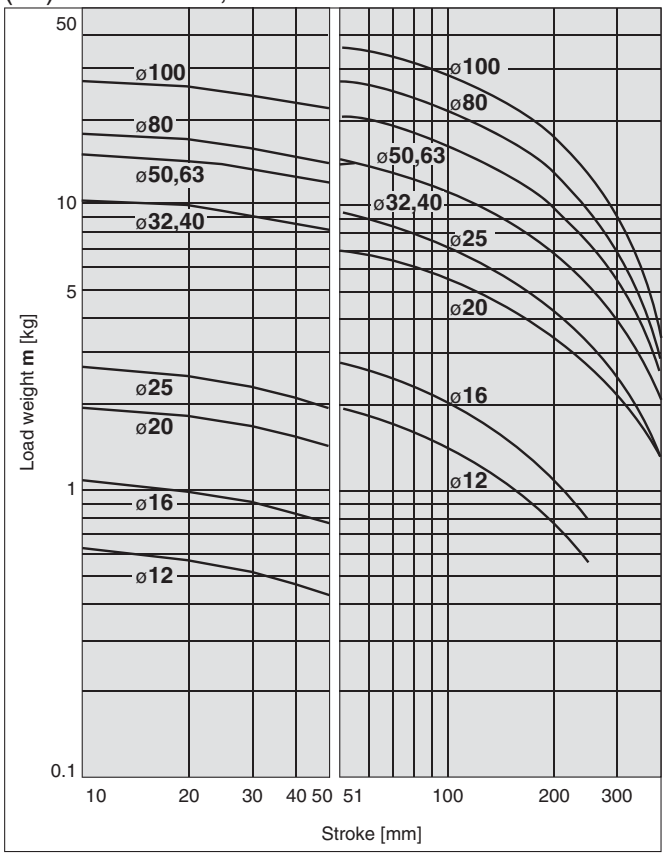
Slide Bearing

MGPM12 to 100

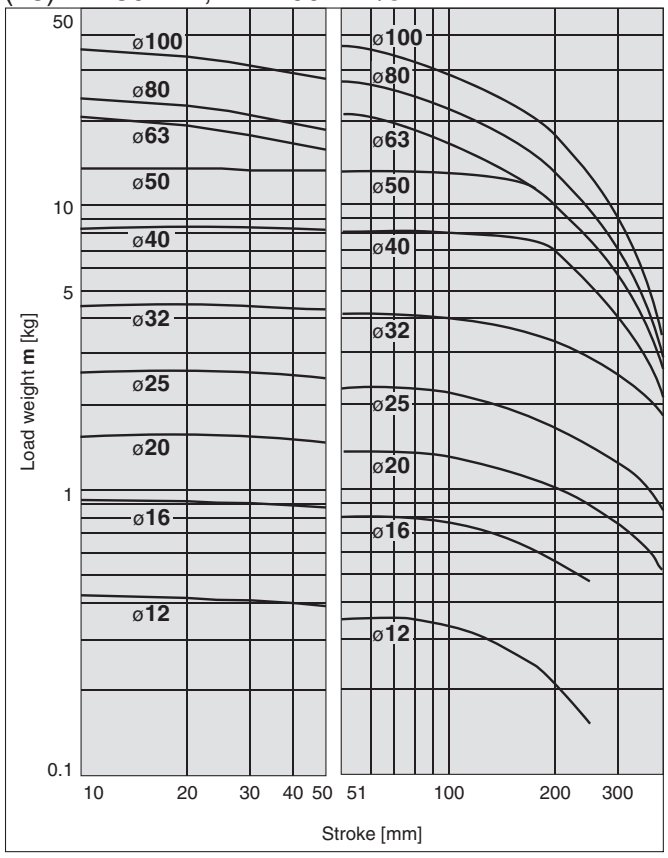
(13) L = 50 mm, V = 200 mm/s or less



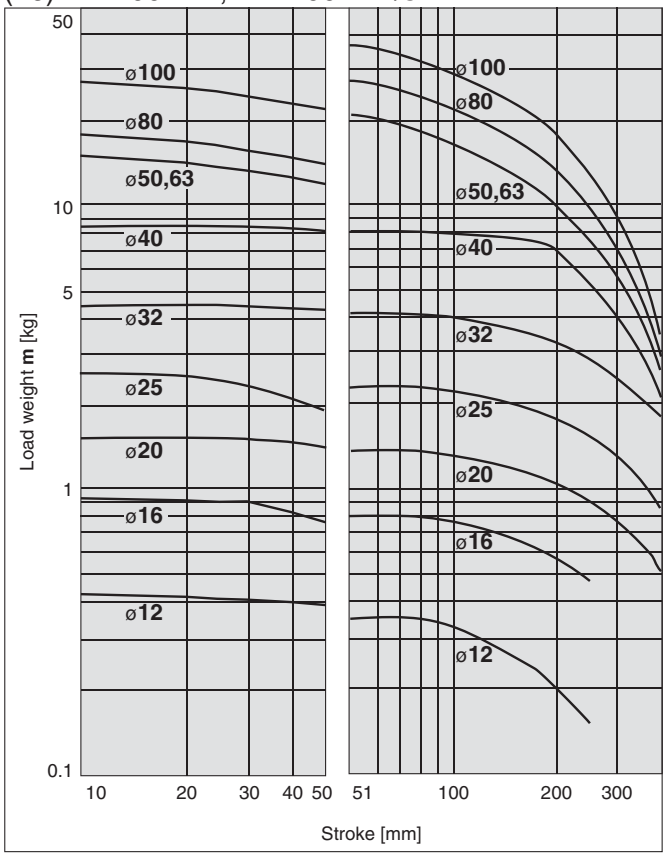
(14) L = 100 mm, V = 200 mm/s or less

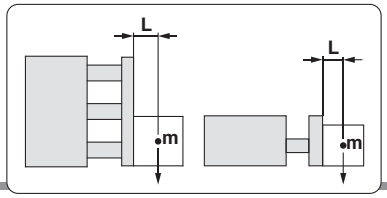


(15) L = 50 mm, V = 400 mm/s



(16) L = 100 mm, V = 400 mm/s



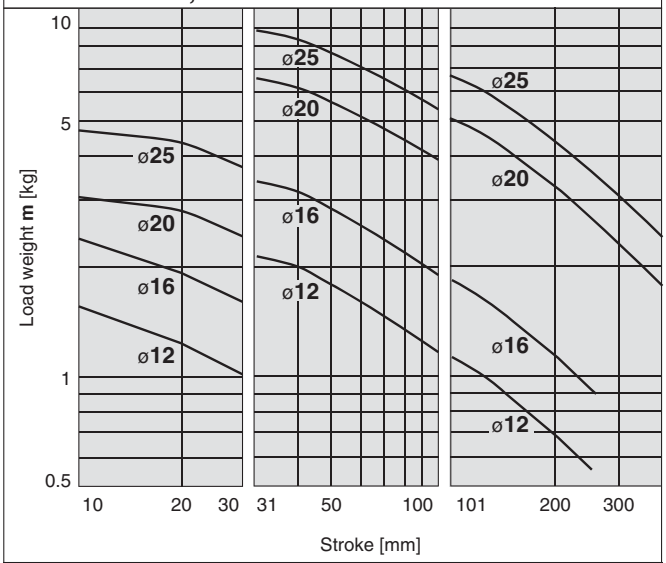


Horizontal Mounting

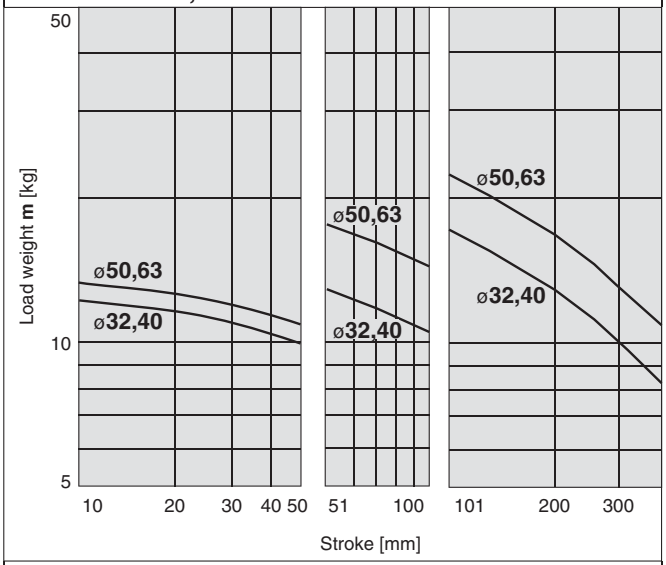
Ball Bushing

(17) L = 50 mm, V = 200 mm/s or less

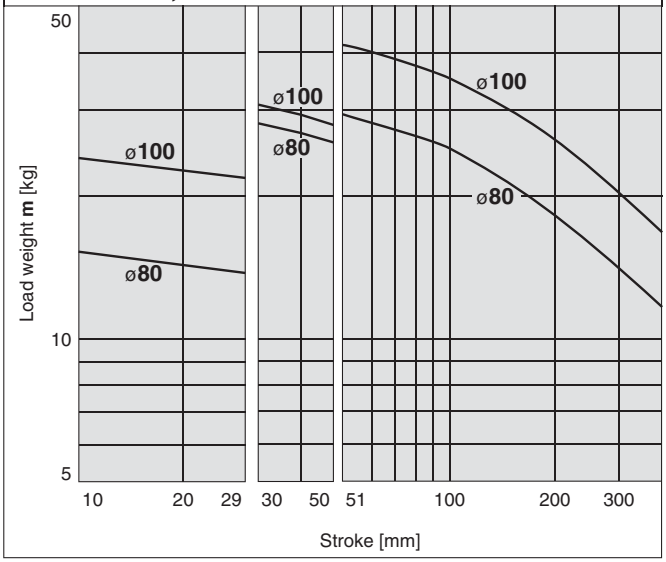
MGPL12 to 25, MGPA12 to 25



MGPL32 to 63, MGPA32 to 63

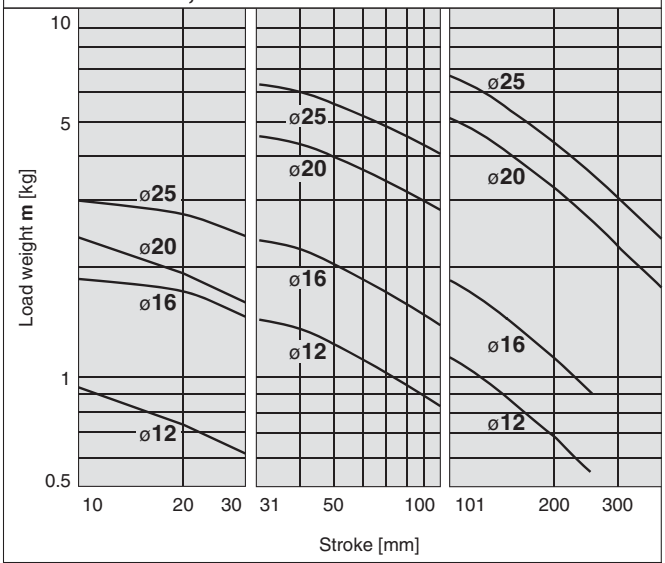


MGPL80/100, MGPA80/100

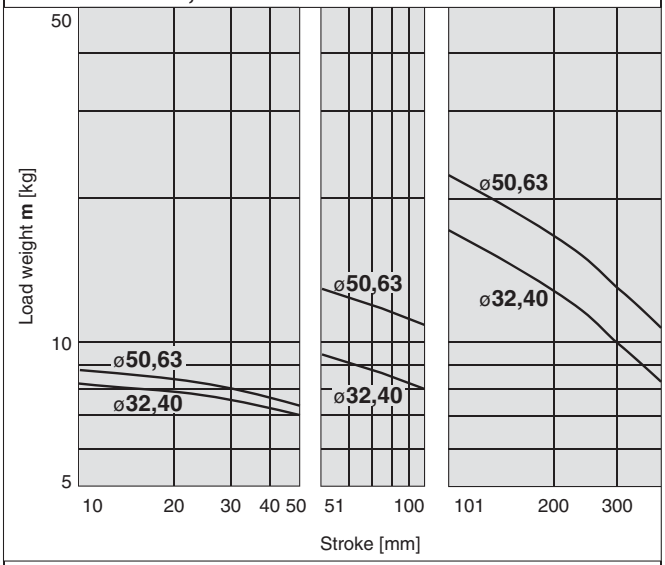


(18) L =100 mm, V = 200 mm/s or less

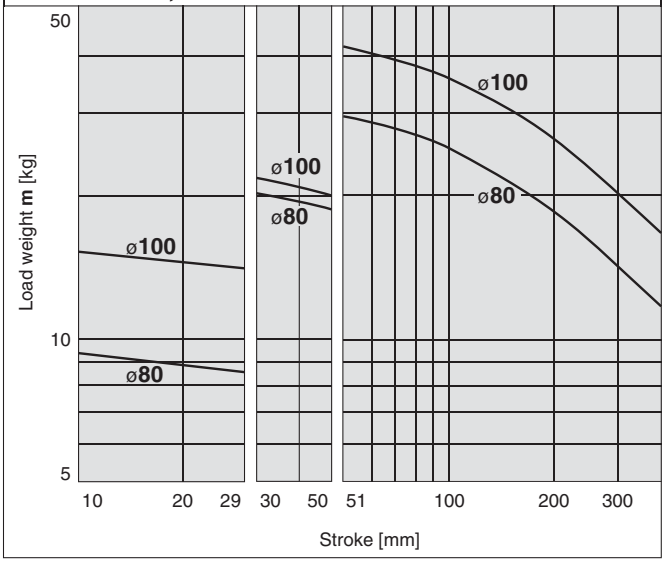
MGPL12 to 25, MGPA12 to 25

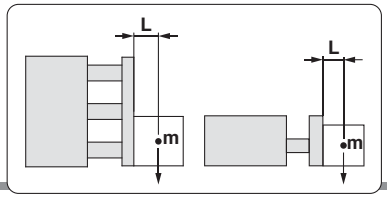


MGPL32 to 63, MGPA32 to 63



MGPL80/100, MGPA80/100



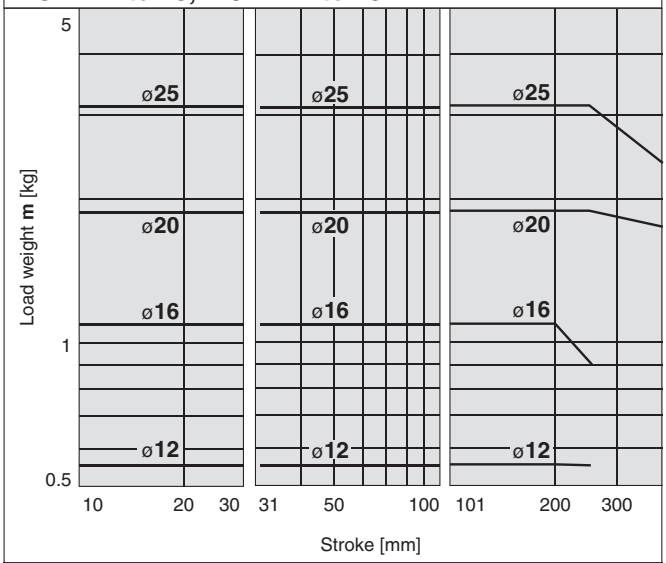


Horizontal Mounting

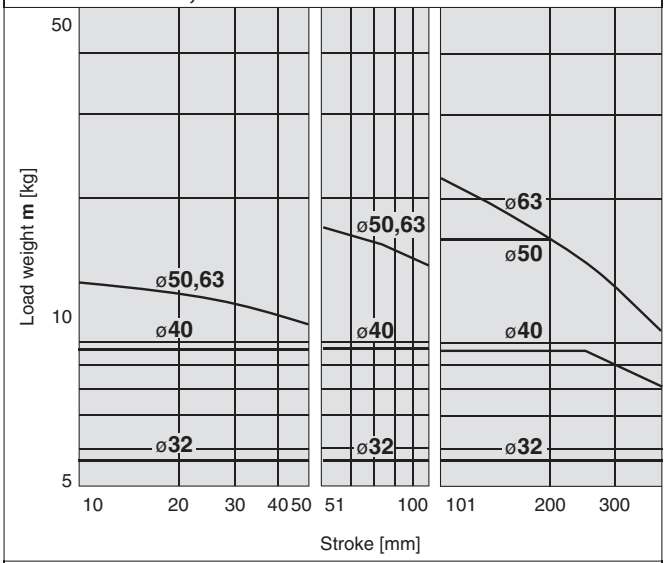
Ball Bushing

(19) L = 50 mm, V = 400 mm/s

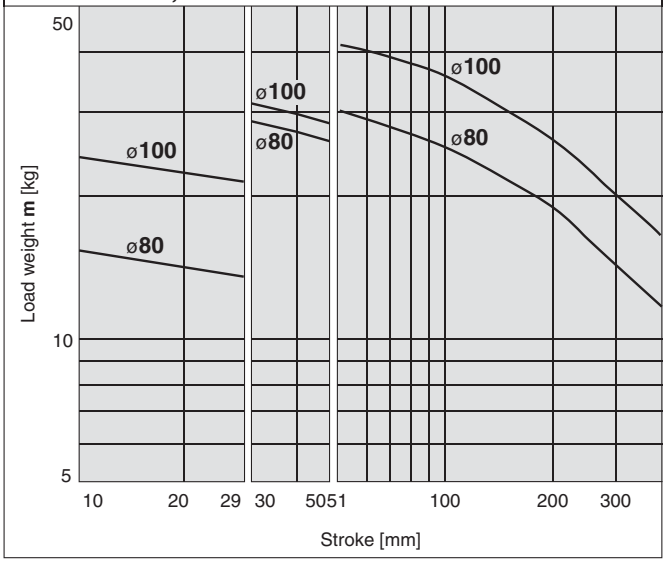
MGPL12 to 25, MGPA12 to 25



MGPL32 to 63, MGPA32 to 63

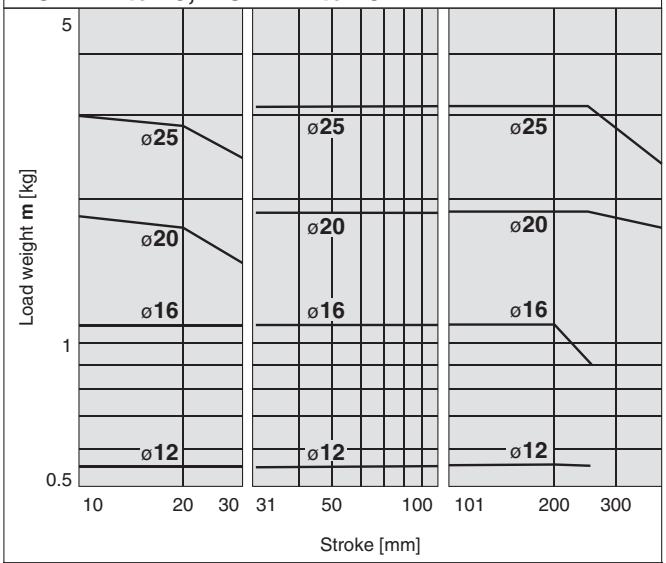


MGPL80/100, MGPA80/100

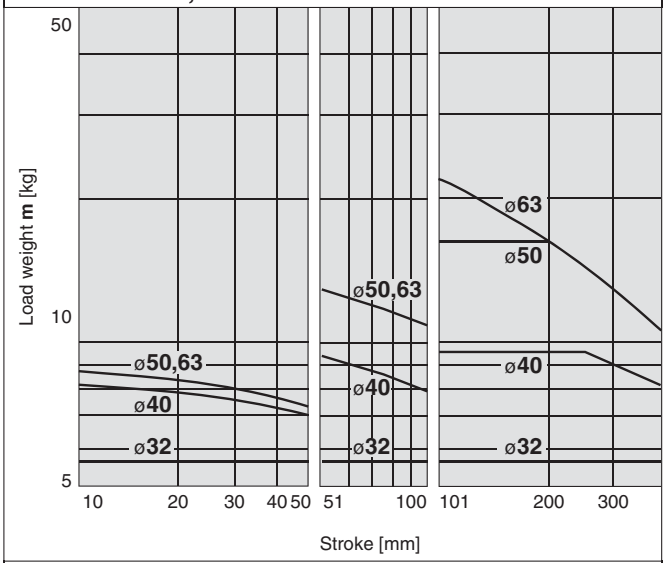


(20) L =100 mm, V = 400 mm/s

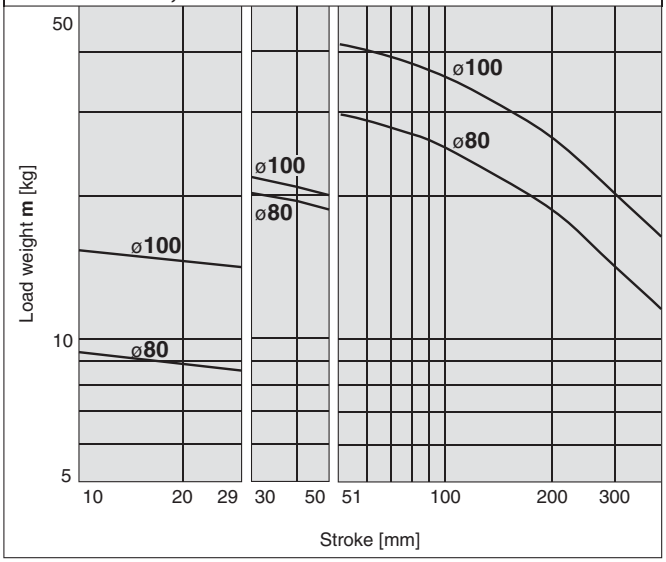
MGPL12 to 25, MGPA12 to 25



MGPL32 to 63, MGPA32 to 63

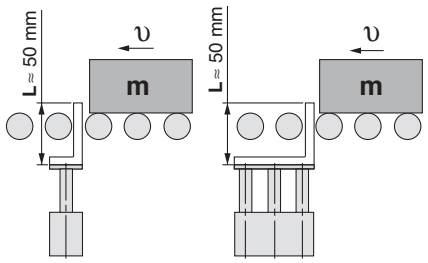


MGPL80/100, MGPA80/100



Operating Range when Used as Stopper

Bore Size: ø12 to ø25/MGPM12 to 25 (Slide bearing)



∗ When selecting a model with a longer **L** dimension, be sure to choose a bore size which is sufficiently large.

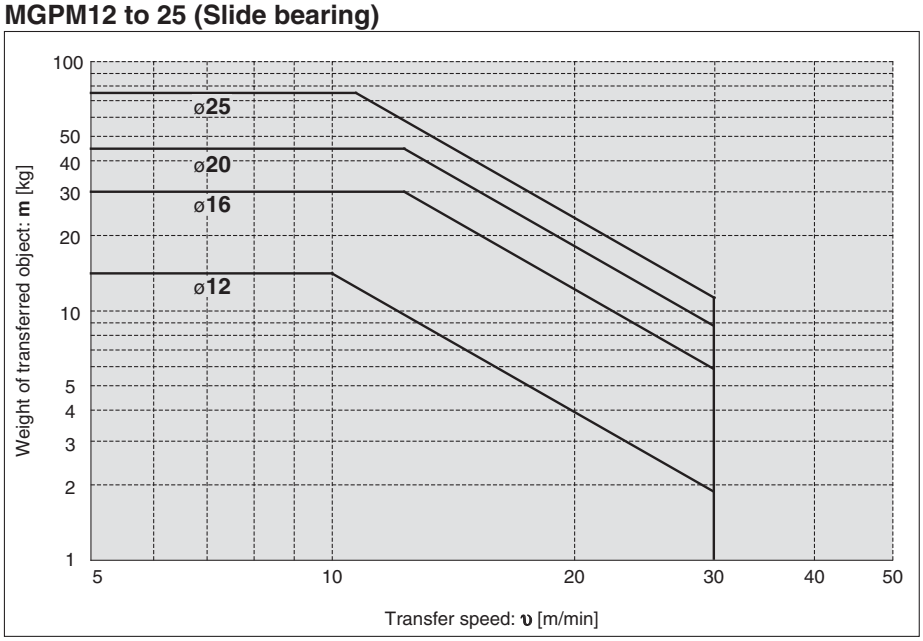
⚠Caution

Caution on handling

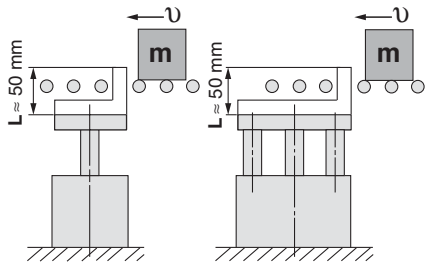
Note 1) When using as a stopper, select a model with 30 stroke or less.

Note 2) The MGPL (Ball bushing) and the MGPA (High precision ball bushing) cannot be used as a stopper.

MGPM12 to 25 (Slide bearing)



Bore Size: ø32 to ø100/MGPM32 to 100 (Slide bearing)



∗ When selecting a model with a longer **L** dimension, be sure to choose a bore size which is sufficiently large.

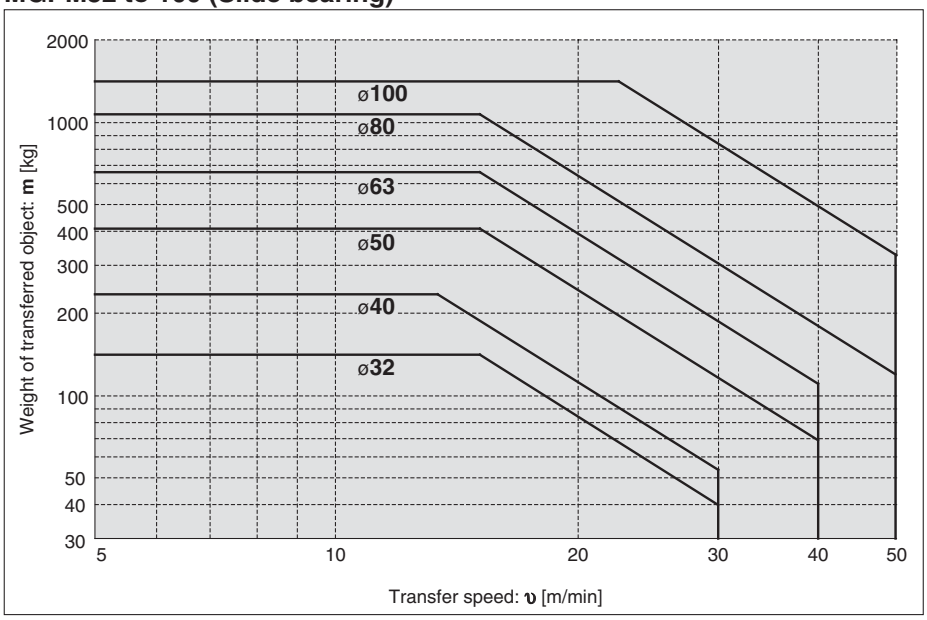
⚠Caution

Caution on handling

Note 1) When using as a stopper, select a model with 50 stroke or less.

Note 2) The MGPL (Ball bushing) and the MGPA (High precision ball bushing) cannot be used as a stopper.

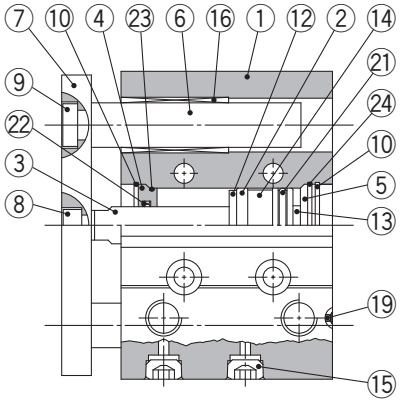
MGPM32 to 100 (Slide bearing)

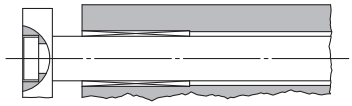


∗ Refer to graphs (13) and (15) if line pressure is applied by a roller conveyor after the workpiece is stopped.

Construction/Series MGPM

MGPM12 to 25

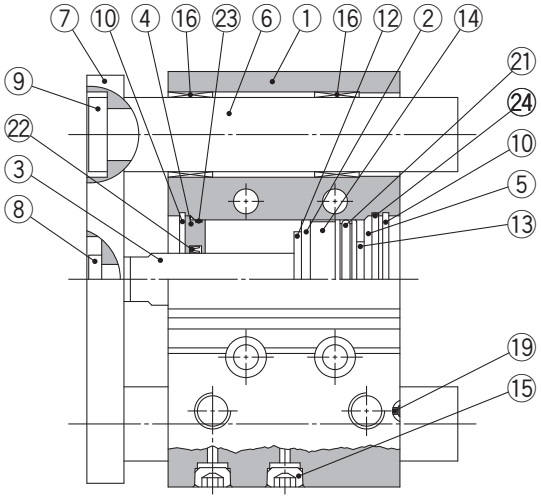




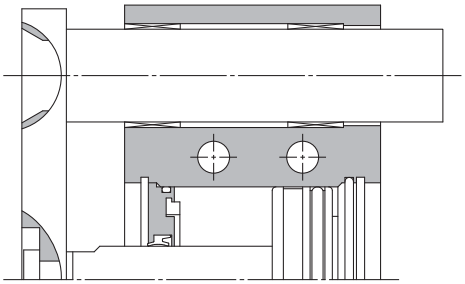
ø12 to ø25 50 stroke or less

ø12 to ø25 Over 50 stroke

MGPM32 to 100



ø63 or more



ø50 or more

Component Parts

No.	Description	Material	Note	
1	**Body**	Aluminium alloy	Hard anodised	
2	**Piston**	Aluminium alloy	Chromated	
3	**Piston rod**	Stainless steel	ø12 to ø25	
		Carbon steel	ø32 to ø100	Hard chrome plated
4	**Collar**	Aluminium alloy	Chromated	
5	**Head cover**	Aluminium 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**	Aluminium 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		

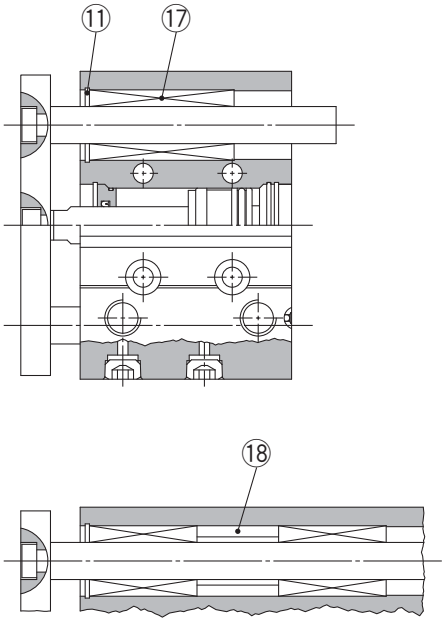
Replacement Parts/Seal Kit

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)

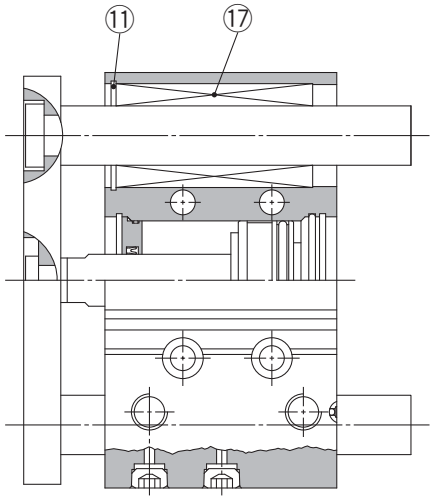
Construction/Series MGPL, Series MGPA

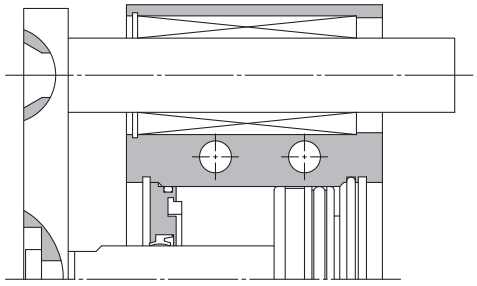
MGPL12 to 25
MGPA12 to 25



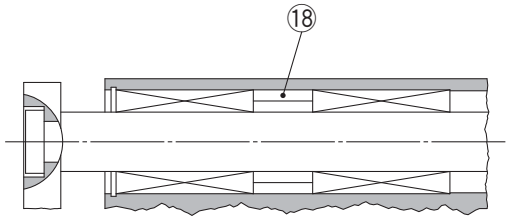
ø12 to ø25 Over 100 stroke

MGPL32 to 100
MGPA32 to 100



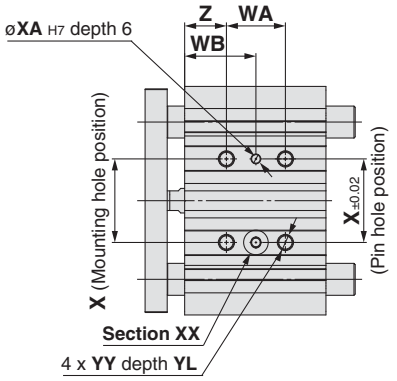


ø50 or more

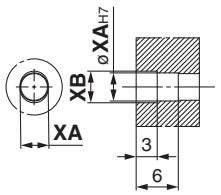


ø32 to ø63 Over 100 stroke
ø80, ø100 Over 200 stroke

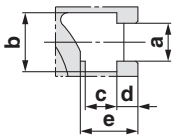
ø12 to ø25/MGPM, MGPL, MGPA



Section XX details

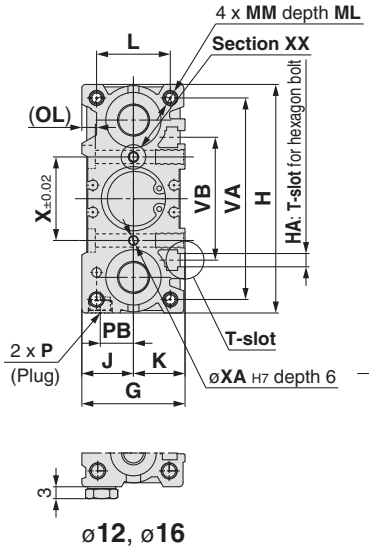


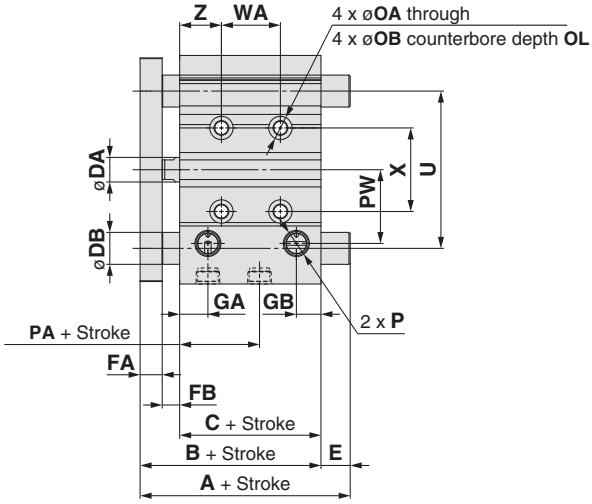
T-slot dimensions

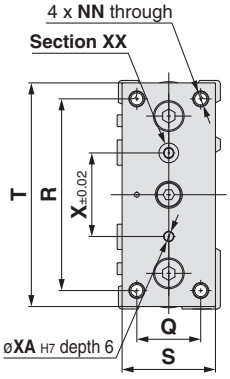


[mm]

Bore size [mm]	a	b	c	d	e
12	4.4	7.4	3.7	2	6.2
16	4.4	7.4	3.7	2.5	6.7
20	5.4	8.4	4.5	2.8	7.8
25	5.4	8.4	4.5	3	8.2







∗ The use of a slot (width XA, length XB, depth 3) allows for a relaxed pin pitch tolerance, with the pin hole (øXAH7, depth 6) as the reference, without affecting mounting accuracy.
∗ For intermediate strokes other than standard strokes, refer to "Manufacture of Intermediate Strokes" on page 4.
∗ Bore size ø12 and ø16: M5 x 0.8 port, Bore size ø20 or more: RC port.

MGPM, MGPL, MGPA Common Dimensions

[mm]

Bore size [mm]	Standard stroke [mm]	B	C	DA	FA	FB	G	GA	GB	H	HA	J	K	L	MM	ML	NN	OA	OB	OL	P		
																					—	TN	TF
12	10,20,30,40,50,75,100	42	29	6	7	6	26	10	7	58	M4	13	13	18	M4 x 0.7	10	M4 x 0.7	4.3	8	4.5	M5 x 0.8	—	—
16	125,150,175,200,250	46	33	8	7	6	30	10.5	7.5	64	M4	15	15	22	M5 x 0.8	12	M5 x 0.8	4.3	8	4.5	M5 x 0.8	—	—
20	20,30,40,50,75,100,125,150	53	37	10	8	8	36	11.5	9	83	M5	18	18	24	M5 x 0.8	13	M5 x 0.8	5.4	9.5	5.5	Rc1/8	NPT1/8	G1/8
25	175,200,250,300,350,400	53.5	37.5	10	9	7	42	11.5	10	93	M5	21	21	30	M6 x 1.0	15	M6 x 1.0	5.4	9.5	5.5	Rc1/8	NPT1/8	G1/8

Bore size [mm]	PA	PB	PW	Q	R	S	T	U	VA	VB	WA					WB					X	XA	XB	YY	YL	Z
											30 st or less	Over 30 st 100 st or less	Over 100 st 200 st or less	Over 200 st 300 st or less	Over 300 st	30 st or less	Over 30 st 100 st or less	Over 100 st 200 st or less	Over 200 st 300 st or less	Over 300 st						
12	13	8	18	14	48	22	56	41	50	37	20	40	110	200	—	15	25	60	105	—	23	3	3.5	M5 x 0.8	10	5
16	14.5	10	19	16	54	25	62	46	56	38	24	44	110	200	—	17	27	60	105	—	24	3	3.5	M5 x 0.8	10	5
20	13.5	10.5	25	18	70	30	81	54	72	44	24	44	120	200	300	29	39	77	117	167	28	3	3.5	M6 x 1.0	12	17
25	12.5	13.5	30	26	78	38	91	64	82	50	24	44	120	200	300	29	39	77	117	167	34	4	4.5	M6 x 1.0	12	17

MGPM (Slide bearing) A, DB, E Dimensions

[mm]

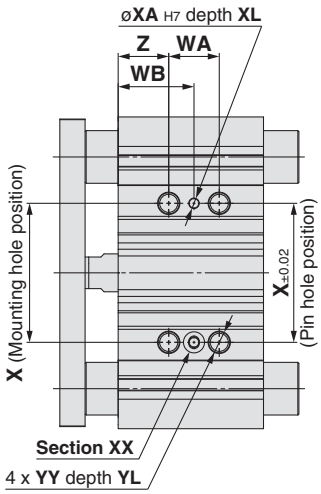
Bore size [mm]	A				DB	E			
	50 st or less	Over 50 st 100 st or less	Over 100 st 200 st or less	Over 200 st		50 st or less	Over 50 st 100 st or less	Over 100 st 200 st or less	Over 200 st
12	42	60.5	82.5	82.5	8	0	18.5	40.5	40.5
16	46	64.5	92.5	92.5	10	0	18.5	46.5	46.5
20	53	77.5	77.5	110	12	0	24.5	24.5	57
25	53.5	77.5	77.5	109.5	16	0	24	24	56

MGPL (Ball bushing)
MGPA (High precision ball bushing) A, DB, E Dimensions

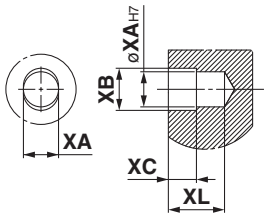
[mm]

Bore size [mm]	A				DB	E			
	30 st or less	Over 30 st 100 st or less	Over 100 st 200 st or less	Over 200 st		30 st or less	Over 30 st 100 st or less	Over 100 st 200 st or less	Over 200 st
12	43	55	84.5	84.5	6	1	13	42.5	42.5
16	49	65	94.5	94.5	8	3	19	48.5	48.5
20	59	76	100	117.5	10	6	23	47	64.5
25	65.5	81.5	100.5	117.5	13	12	28	47	64

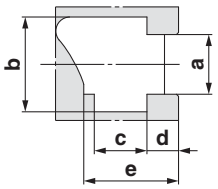
ø32 to ø63/MGPM, MGPL, MGPA



Section XX details

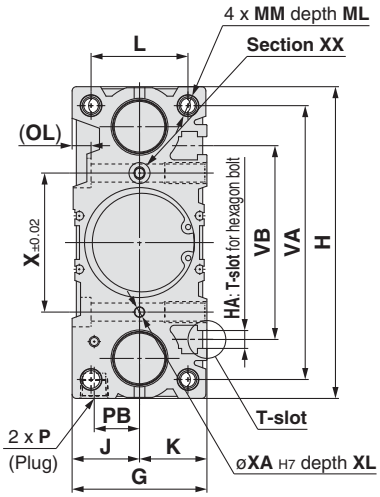


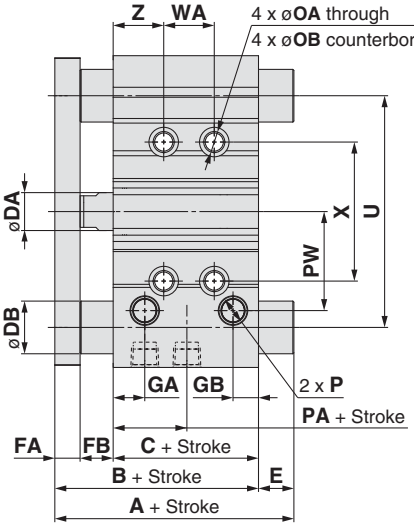
T-slot dimensions

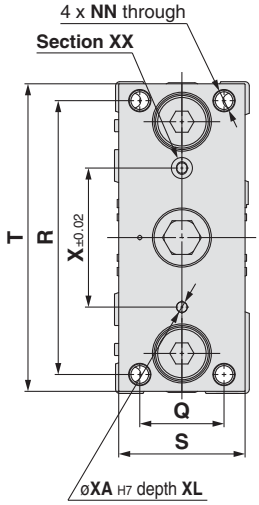


[mm]

Bore size [mm]	a	b	c	d	e
32	6.5	10.5	5.5	3.5	9.5
40	6.5	10.5	5.5	4	11
50	8.5	13.5	7.5	4.5	13.5
63	11	17.8	10	7	18.5







∗ The use of a slot (width XA, length XB, depth XC) allows for a relaxed pin pitch tolerance, with the pin hole (øXA H7, depth XL) as the reference, without affecting mounting accuracy.
∗ For intermediate strokes other than standard strokes, refer to “Manufacture of Intermediate Strokes” on page 4.
∗ Rc port only.

MGPM, MGPL, MGPA Common Dimensions

[mm]

Bore size [mm]	Standard stroke [mm]	B	C	DA	FA	FB	G	GA	GB	H	HA	J	K	L	MM	ML	NN	OA	OB	OL	P		
																					—	TN	TF
32	25,50,75	59.5	37.5	14	10	12	48	12	9	112	M6	24	24	34	M8 x 1.25	20	M8 x 1.25	6.7	11	7.5	Rc1/8	NPT1/8	G1/8
40	100,125,150	66	44	14	10	12	54	15	12	120	M6	27	27	40	M8 x 1.25	20	M8 x 1.25	6.7	11	7.5	Rc1/8	NPT1/8	G1/8
50	175,200,250	72	44	18	12	16	64	15	12	148	M8	32	32	46	M10 x 1.5	22	M10 x 1.5	8.6	14	9	Rc1/4	NPT1/4	G1/4
63	300,350,400	77	49	18	12	16	78	15.5	13.5	162	M10	39	39	58	M10 x 1.5	22	M10 x 1.5	8.6	—	9	Rc1/4	NPT1/4	G1/4

Bore size [mm]	PA	PB	PW	Q	R	S	T	U	VA	VB	WA					WB					X	XA	XB	XC	XL	YY	YL	Z
											25 st or less	Over 25 st 100 st or less	Over 100 st 200 st or less	Over 200 st 300 st or less	Over 300 st	25 st or less	Over 25 st 100 st or less	Over 100 st 200 st or less	Over 200 st 300 st or less	Over 300 st								
32	6.5	16	35.5	30	96	44	110	78	98	63	24	48	124	200	300	33	45	83	121	171	42	4	4.5	3	6	M8 x 1.25	16	21
40	13	18	39.5	30	104	44	118	86	106	72	24	48	124	200	300	34	46	84	122	172	50	4	4.5	3	6	M8 x 1.25	16	22
50	9	21.5	47	40	130	60	146	110	130	92	24	48	124	200	300	36	48	86	124	174	66	5	6	4	8	M10 x 1.5	20	24
63	13	28	58	50	130	70	158	124	142	110	28	52	128	200	300	38	50	88	124	174	80	5	6	4	8	M10 x 1.5	20	24

MGPM (Slide bearing) A, DB, E Dimensions

[mm]

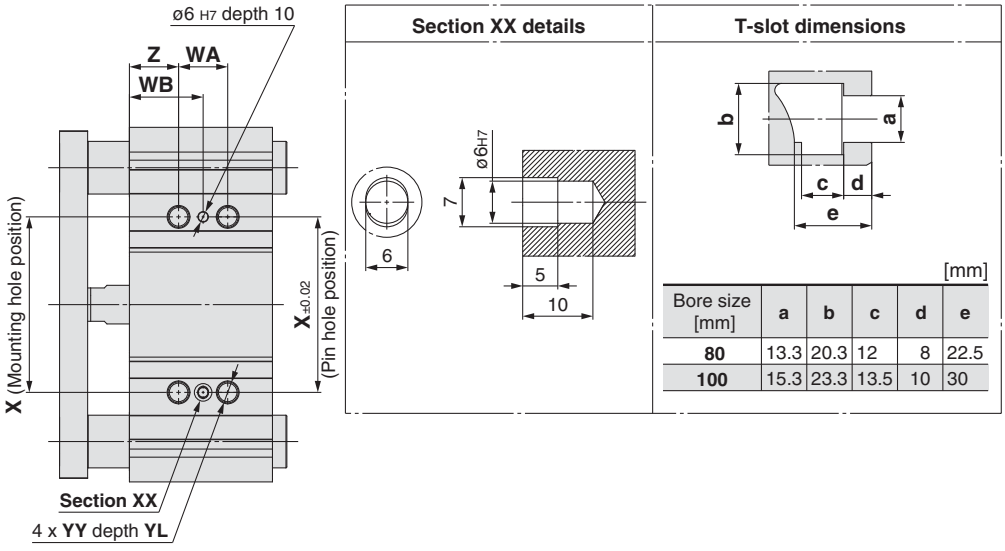
Bore size [mm]	A			DB	E		
	50 st or less	Over 50 st 200 st or less	Over 200 st		50 st or less	Over 50 st 200 st or less	Over 200 st
32	75	93.5	129.5	20	15.5	34	70
40	75	93.5	129.5	20	9	27.5	63.5
50	88.5	109.5	150.5	25	16.5	37.5	78.5
63	88.5	109.5	150.5	25	11.5	32.5	73.5

MGPL (Ball bushing)
MGPA (High precision ball bushing) A, DB, E Dimensions

[mm]

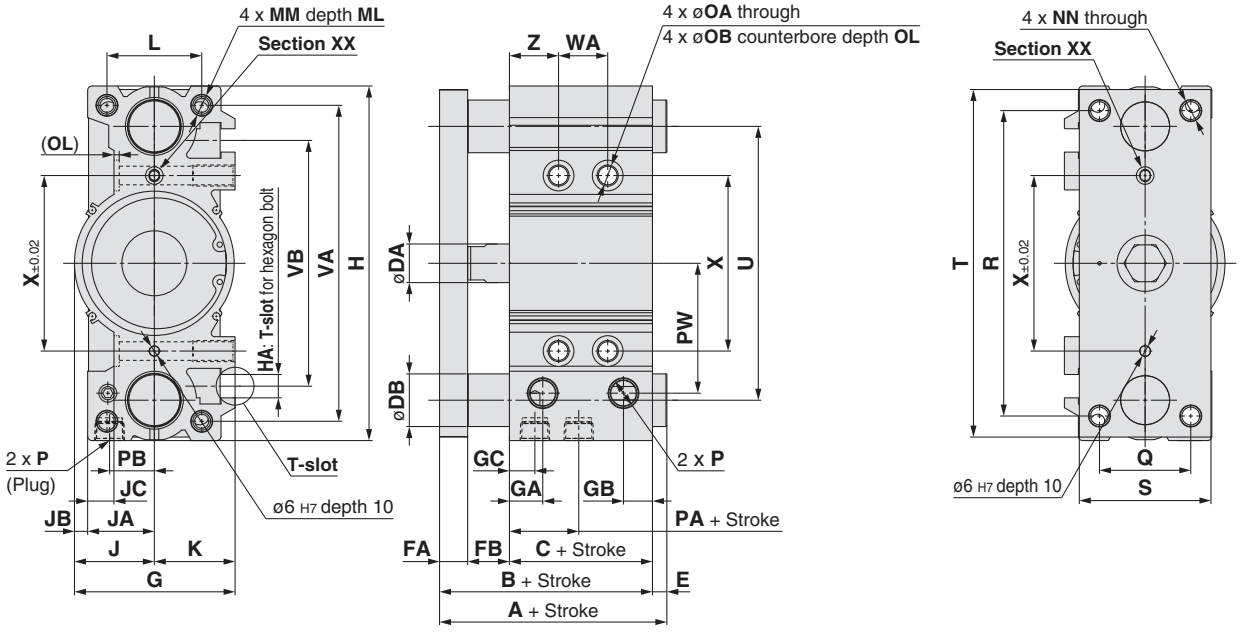
Bore size [mm]	A				DB	E			
	50 st or less	Over 50 st 100 st or less	Over 100 st 200 st or less	Over 200 st		50 st or less	Over 50 st 100 st or less	Over 100 st 200 st or less	Over 200 st
32	79.5	96.5	116.5	138.5	16	20	37	57	79
40	79.5	96.5	116.5	138.5	16	13.5	30.5	50.5	72.5
50	91.5	112.5	132.5	159.5	20	19.5	40.5	60.5	87.5
63	91.5	112.5	132.5	159.5	20	14.5	35.5	55.5	82.5

ø80, ø100/MGPM, MGPL, MGPA



[mm]

Bore size [mm]	a	b	c	d	e
80	13.3	20.3	12	8	22.5
100	15.3	23.3	13.5	10	30



∗ The use of a slot (width X6, length 7, depth 5) allows for a relaxed pin pitch tolerance, with the pin hole (ø6H7, depth 10) as the reference, without affecting mounting accuracy.
∗ For intermediate strokes other than standard strokes, refer to “Manufacture of Intermediate Strokes” on page 4.
∗ Rc port only.

MGPM, MGPL, MGPA Common Dimensions

[mm]

Bore size [mm]	Standard stroke [mm]	B	C	DA	FA	FB	G	GA	GB	GC	H	HA	J	JA	JB	JC	K	L	MM	ML	NN	OA	OB	OL	P		
																									—	TN	TF
80	25,50,75,100 125,150,175,200 250,300,350,400	96.5	56.5	22	16	24	91.5	19	16.5	14.5	202	M12	45.5	38	7.5	15	46	54	M12 x 1.75	25	M12 x 1.75	10.6	17.5	3	Rc3/8	NPT3/8	G3/8
100		116	66	26	19	31	111.5	22.5	20.5	18	240	M14	55.5	45	10.5	10	56	62	M14 x 2.0	31	M14 x 2.0	12.5	20	8	Rc3/8	NPT3/8	G3/8

Bore size [mm]	PA	PB	PW	Q	R	S	T	U	VA	VB	WA					WB					X	YY	YL	Z
											25 st or less	Over 25 st 100 st or less	Over 100 st 200 st or less	Over 200 st 300 st or less	Over 300 st	25 st or less	Over 25 st 100 st or less	Over 100 st 200 st or less	Over 200 st 300 st or less	Over 300 st				
80	14.5	25.5	74	52	174	75	198	156	180	140	28	52	128	200	300	42	54	92	128	178	100	M12 x 1.75	24	28
100	17.5	32.5	89	64	210	90	236	188	210	166	48	72	148	220	320	35	47	85	121	171	124	M14 x 2.0	28	11

MGPM (Slide bearing) A, DB, E Dimensions

[mm]

Bore size [mm]	A			DB	E		
	50 st or less	Over 50 st 200 st or less	Over 200 st		50 st or less	Over 50 st 200 st or less	Over 200 st
80	104.5	131.5	180.5	30	8	35	84
100	126.5	151.5	190.5	36	10.5	35.5	74.5

MGPL (Ball bushing)
MGPA (High precision ball bushing) A, DB, E Dimensions

[mm]

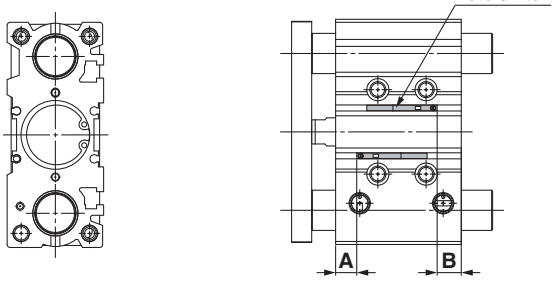
Bore size [mm]	A				DB	E			
	25 st or less	Over 25 st 50 st or less	Over 50 st 200 st or less	Over 200 st		25 st or less	Over 25 st 50 st or less	Over 50 st 200 st or less	Over 200 st
80	104.5	128.5	158.5	191.5	25	8	32	62	95
100	119.5	145.5	178.5	201.5	30	3.5	29.5	62.5	85.5

Auto Switch Mounting 1

Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

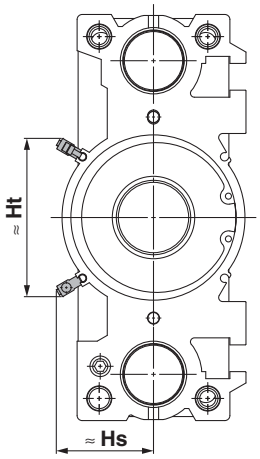
D-A9□
D-A9□V
D-M9□
D-M9□V
D-M9□W
D-M9□WV
D-M9□A
D-M9□AV

ø12 to ø100

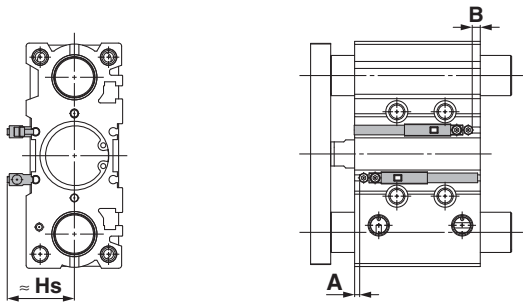


D-P3DW

ø80, ø100



ø32 to ø63



Auto Switch Proper Mounting Position
Applicable Cylinder Series: MGP

[mm]

Auto switch model / Bore size [mm]	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV		D-A9□ D-A9□V		D-P3DW	
	A	B	A	B	A	B
12	7.5	9.5	3.5	5.5	—	—
16	10.5	10.5	6.5	6.5	—	—
20	12.5	12.5	8.5	8.5	—	—
25	11.5	14	7.5	10	—	—
32	12.5	13	8.5	9	3	3.5
40	15.5	16.5	11.5	12.5	6	7
50	14.5	17	10.5	13	5.5	8
63	16.5	20	12.5	16	7	11
80	18	26	14	22	8.5	17
100	21.5	32.5	17.5	28.5	12	23

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

Auto Switch Mounting Height

[mm]

Auto switch model / Bore size [mm]	D-A9□V		D-M9□V D-M9□WV D-M9□AV		D-P3DW	
	Hs	Ht	Hs	Ht	Hs	Ht
12	17	—	19.5	—	—	—
16	19.5	—	22	—	—	—
20	22	—	24.5	—	—	—
25	24	—	26	—	—	—
32	26.5	—	29	—	33	—
40	30.5	—	33	—	37	—
50	36	—	38.5	—	42.5	—
63	43	—	45.5	—	49.5	—
80	43	71.5	45	74	48	78.5
100	53	83	55	85.5	58	90

Minimum Stroke for Auto Switch Mounting

[mm]

Auto switch model	No. of auto switches mounted	ø12	ø16	ø20	ø25	ø32	ø40	ø50	ø63	ø80	ø100
D-A9□	1 pc.	5 Note 1)		5							
	2 pcs.	10 Note 1)		10							
D-A9□V	1 pc.	5									
	2 pcs.	10									
D-M9□V	1 pc.	5									
	2 pcs.	5									
D-M9□	1 pc.	5 Note 1)				5					
	2 pcs.	10 Note 1)		10							
D-M9□W	1 pc.	5 Note 2)									
	2 pcs.	10 Note 2)		10							
D-M9□WV **D-M9□AV**	1 pc.	5 Note 2)									
	2 pcs.	10									
D-M9□A	1 pc.	5 Note 2)									
	2 pcs.	10 Note 2)									
D-P3DW	1 pc.	—				15					
	2 pcs.	—				15					

Note 1) Confirm that it is possible to secure the minimum bending radius of 10 mm of the auto switch lead wire before use.
Note 2) Confirm that it is possible to securely set the auto switch(es) within the range of indicator green light ON range before use.
For in-line entry type, please also consider Note 1) shown above.
Note 3) The D-P3DW can be mounted on bore sizes ø32 to ø100.
Note 4) Bore sizes available with end-lock are ø20 to ø100.

Operating Range

[mm]

Auto switch model	Bore size									
	12	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**
D-A9□/A9□V	7	9	9	9	9.5	9.5	9.5	11	10.5	10.5
D-M9□/M9□V **D-M9□W/M9□WV** **D-M9□A/M9□AV**	3.5	5	5	5	6	6	6	6.5	6	7

∗ Since the operating range is provided as a guideline including hysteresis, it cannot be guaranteed (assuming approximately ±30% dispersion). It may vary substantially depending on an ambient environment.
∗ Please consult SMC for magnetic field resistant auto switch D-P3DW.

Other than the applicable auto switches listed in "How to Order", the following auto switches are mountable.
Consult with SMC for detailed specifications.

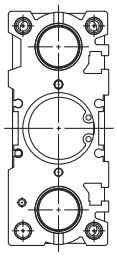
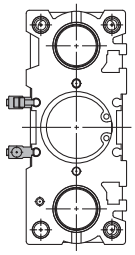
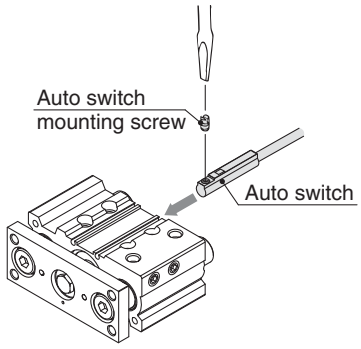
Type	Model	Electrical entry	Features
Solid state switch	D-P4DW□	Grommet (In-line)	Diagnostic indication (2-colour display) Bore size: ø32 to ø100

∗ With pre-wired connector is also available for solid state auto switches. For details, consult with SMC.
∗ Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H) are also available. For details, consult with SMC.
∗ When installing the D-P4DW□, use the BMG7-032 auto switch mounting bracket.

Auto Switch Mounting 2

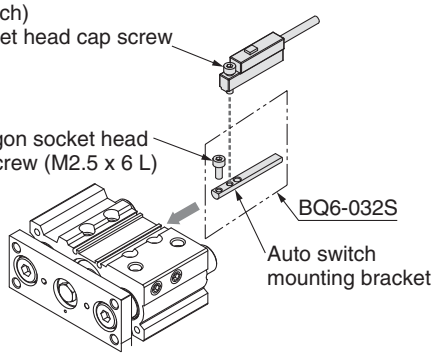
Auto Switch Mounting Brackets/Part No.

Applicable Cylinder Series: MGPM, MGPL

<table>
<tr><td>Applicable auto switches</td><td>D-M9□/M9□V
D-M9□W/M9□WV
D-M9□A/M9□AV
D-A9□/A9□V</td><td>D-P3DW</td></tr>
<tr><td>Bore size [mm]</td><td>ø12 to ø100</td><td>ø32 to ø100</td></tr>
<tr><td>Auto switch mounting bracket part no.</td><td>—</td><td>BQ6-032S</td></tr>
<tr><td>Auto switch mounting bracket fitting parts lineup/Weight</td><td>—</td><td>• Hexagon socket head cap screw (M2.5 x 6 L)
• Auto switch mounting bracket (nut)
Weight: 5 g</td></tr>
<tr><td rowspan="2">Auto switch mounting surfaces</td><td>Surfaces with auto switch mounting slot</td><td>Surfaces with auto switch mounting slot</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Mounting of auto switch</td><td> 

• When tightening the auto switch mounting screw, use a watchmakers' screwdriver with a handle 5 to 6 mm in diameter.

Tightening Torque for Auto Switch Mounting Screw [N·m]
<table>
<tr><th>Auto switch model</th><th>Tightening torque</th></tr>
<tr><td>D-M9□(V)
D-M9□W(V)
D-M9□A(V)</td><td>0.05 to 0.15</td></tr>
<tr><td>D-A9□(V)</td><td>0.10 to 0.20</td></tr>
</table></td><td>① Fix the auto switch and the auto switch mounting bracket temporarily by tightening the attached hexagon socket head cap screw (M2.5 x 9.5 L) 1 to 2 turns.
② Insert the temporarily tightened mounting bracket into the mating groove of the cylinder tube, and slide the auto switch onto the cylinder tube through the groove.
Insert the auto switch onto the cylinder/actuator through the groove with the back part of the auto switch (lead wire side) and the back part of the auto switch mounting bracket.
③ Check the detecting position of the auto switch and fix the auto switch firmly with the hexagon socket head cap screw (M2.5 x 6 L, M2.5 x 9.5 L).*
④ If the detecting position is changed, go back to step ②.
* The hexagon socket head cap screw (M2.5 x 6 L) is used to fix the mounting bracket and cylinder tube. This enables the replacement of the auto switch without adjusting the auto switch position.
Note 1) Ensure that the auto switch is covered with the mating groove to protect the auto switch.
Note 2) The tightening torque for the hexagon socket head cap screw (M2.5 x 6 L, M2.5 x 9.5 L) is 0.2 to 0.3 N·m.
Note 3) Tighten the hexagon socket head cap screws evenly.

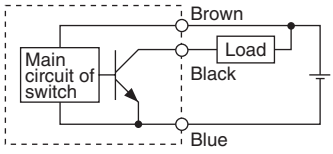
(with auto switch)
Hexagon socket head cap screw
(M2.5 x 9.5 L)
 
</td></tr>
</table>

Note) Auto switch mounting brackets and auto switches are enclosed with the cylinder for shipment.
For an environment that needs the water-resistant auto switch, select the D-M9□A(V) type.

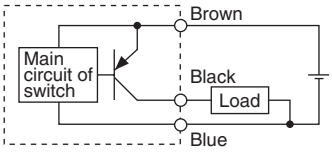
Prior to Use
Auto Switch Connection and Example

Basic Wiring

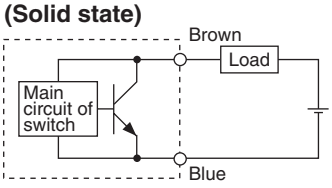
Solid state 3-wire, NPN



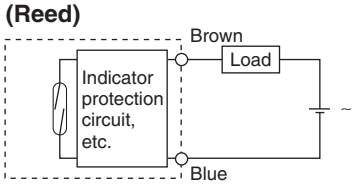
Solid state 3-wire, PNP



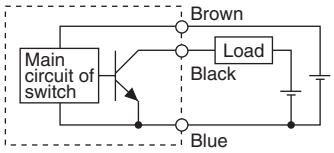
2-wire (Solid state)

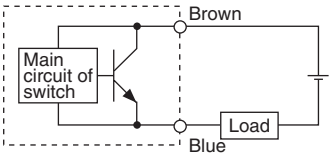


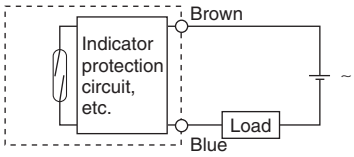
2-wire (Reed)



(Power supply for switch and load are separate.)

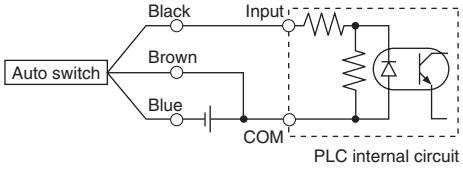




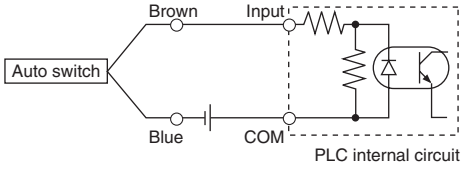


Example of Connection with PLC (Programmable Logic Controller)

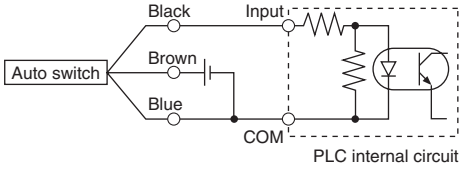
• Sink input specifications
3-wire, NPN



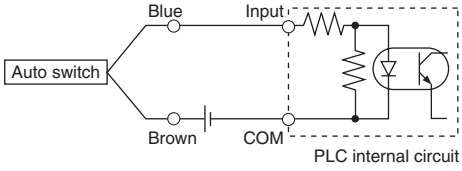
2-wire



• Source input specifications
3-wire, PNP



2-wire

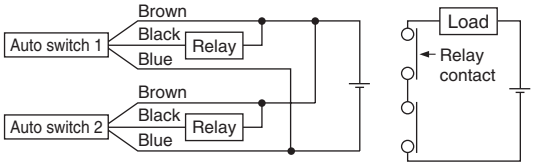


Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

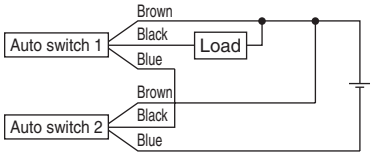
Example of AND (Series) and OR (Parallel) Connection

• 3-wire

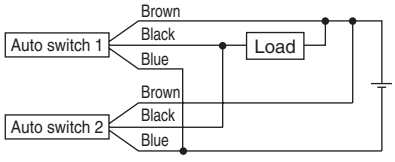
AND connection for NPN output (Using relays)



AND connection for NPN output (Performed with auto switches only)



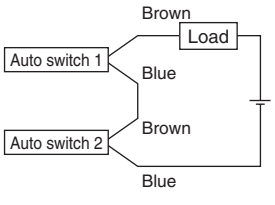
OR connection for NPN output



The indicator lights will light up when both of the auto switches are in the ON state.

• 2-wire

2-wire with 2-switch AND connection

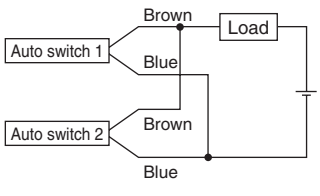


When two auto switches are connected in series, malfunction may occur because the load voltage will decrease in the ON state. The indicator lights will light up when both of the auto switches are in the ON state.

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

Example: Power supply voltage 24 VDC
Auto switch internal voltage drop 4 V

2-wire with 2-switch OR connection



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

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 3 kΩ
Auto switch leakage current 1 mA

(Reed)
Because there is no leakage current, the load voltage will not increase in the OFF state. 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.

Simple Specials

These changes are dealt with Simple Specials System. Consult with SMC.

Made to Order

1 Change of Guide Rod End Shape

Symbol **-XA1/6/17/21**

Applicable Series

Series		Model	Action	Symbol for change of rod end shape
MGP	Standard type	MGPM	Slide bearing	XA1,6,17,21
		MGPL	Ball bushing bearing	XA1,6
		MGPA	High precision ball bushing bearing	

⚠ Precautions

- Ensure that the cylinder's overall length should not exceed the allowable overall length. In the case of exceeding the allowable overall length, it will be available as specials.
- In fig. (1), (2) below, E´ dimension cannot make it into E dimension or less of the standard products. Confirm by referring to catalogue.
- SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
- ∗ dimension should be the guide rod diameter (D) – 2 mm. In the case that the preferred dimension is different, fill in that dimension.

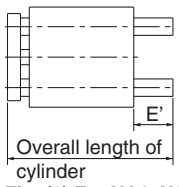


Fig. (1) For XA1, XA6

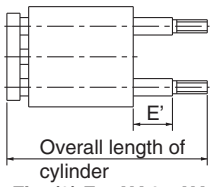


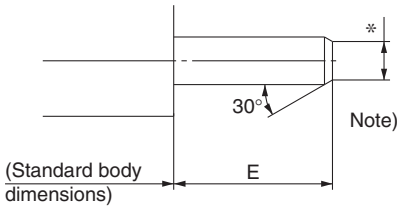
Fig. (2) For XA17, XA21

[mm]

Bore size [mm]	Allowable overall length of cylinder
12,16	345
20 to 32	540
40 to 63	561
80,100	603

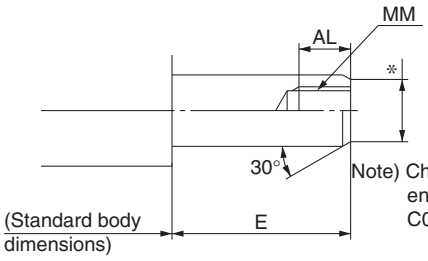
Guide Rod End Shape Pattern

-XA1



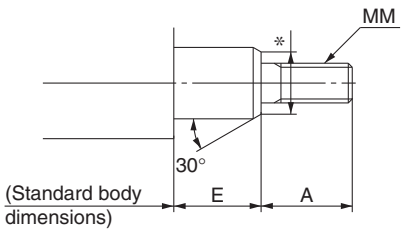
Note) Chamfer of the guide rod end shape for MGPL is C0.5, not 30°.

-XA6

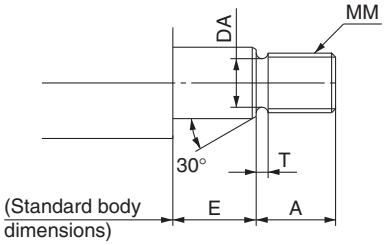


Note) Chamfer of the guide rod end shape for MGPL is C0.5, not 30°.

-XA17



-XA21



Simple Specials

These changes are dealt with Simple Specials System. Consult with SMC for details.

Made to Order

Symbol

2 Tapped Hole, Drilled Hole, Pinned Hole Machined Additionally -XC79

This simple special is meant for machining additionally tapped hole, drilled hole, and pinned hole, as requested from customer, on parts designed largely for mounting a workpiece, etc. in the combined air cylinders.

But, for each model, since they have the portions which are impossible to machine additionally, refer to the additional machining limitation.

Applicable Series

Series		Model	Action	Component parts applicable for additional machining
MGP	Standard type	MGPM	Slide bearing	Plate
		MGPL	Ball bushing bearing	
		MGPA	High precision ball bushing bearing	

⚠ Precautions

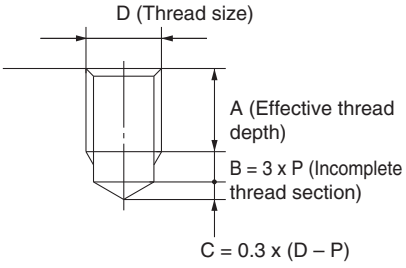
- We cannot take any responsibility as for the intensity of holes machined additionally and the effects of decreased intensity for the product itself.
- It will not be plated again for the machined part additionally.
- Be sure to fill in “through” for through-hole, and “effective depth” for blind hole.
- When using by machining through-hole additionally, ensure that the tip of the bolt, etc. for mounting workpiece should not stick into the cylinder side. It may result in an unexpected problem.
- Use caution not to interfere the existing mounting hole on the standard products with the hole to be machined additionally. But it is possible to drill additionally the larger size of hole at the same position as the existing hole.

Common Complementary Explanation/Holes which can be additionally machined are the following 3 types.

Tapped hole

Designated nominal diameter and tapped hole of a pitch are machined additionally. (Maximum nominal thread diameter M20)

Blind hole is deep into the bottom of prepared hole which sums up A to C in Fig. 1 in contrast to the effective depth of tapped hole. When there is a condition which does not allow through-hole, etc., leave sufficient thickness in the inner part of hole.



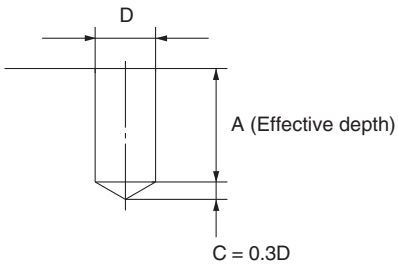
Note) P stands for thread pitch.

Drilled hole

Drilled hole of a designated internal diameter is machined.

(Maximum hole diameter 20 mm)

If you wish for blind hole, instruct us with effective depth. (Refer to Fig. 2.) Besides, dimensional accuracy for internal diameter will be 0.2 mm.

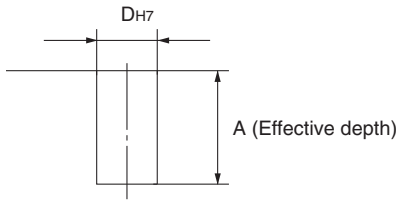


Pinned hole

Pinned hole of a designated diameter (reamer hole) is machined. (Maximum hole diameter 20 mm)

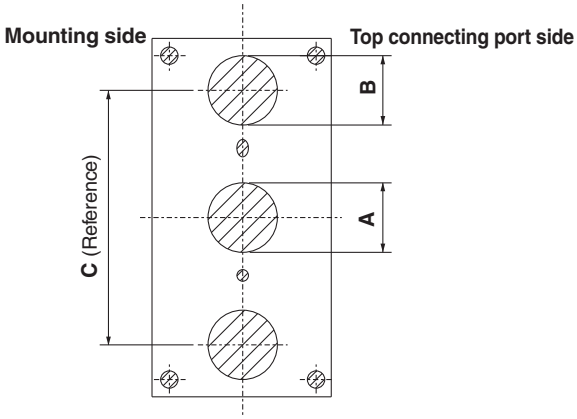
Internal dimension tolerates H7 tolerance to the designated hole diameter. (Refer to the table below.)

Hole dia.	3 or less	Over 3 to 6	Over 6 to 10	Over 10 to 18	Over 18 to 20
Tolerance	+0.01 0	+0.012 0	+0.015 0	+0.018 0	+0.021 0



Limitation for Machining Additionally/Since the slanted lines denote the restricted range for machining additionally, design the dimensions, referring to below.

Plate material: Steel



Dimensional Range Not Possible to Machine Additionally [mm]

Bore size [mm]	A	B	C
12	8	11	41
16	10	13	46
20	12	15	54
25	14	21	64
32	25	25	78
40	25	25	86
50	30	30	110
63	30	30	124
80	34	34	156
100	42	42	188

Made to Order Specification

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

Made to Order

3 Heat Resistant Cylinder (–10 to 150°C)

Symbol **-XB6**

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

How to Order

MGPM [**Standard model no.**] **–XB6**

Heat resistant cylinder

Specifications

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

Applicable Series

Series		Model	Action
MGP	Standard type	**MGPM**	Slide bearing

Note 1) Operate without lubrication from a pneumatic system lubricator.
Note 2) Please contact SMC for details on the maintenance intervals for this cylinder, which differ from those of the standard cylinder.
Note 3) In principle, it is impossible to make built-in magnet type and the one with auto switch. But, as for the one with auto switch, and the heat resistant cylinder with heat resistant auto switch, since it will be differed depending on the series, please contact SMC.
Note 4) Piston speed is ranged from 50 to 500 mm/s.
But, MGP□80, 100, it will be 50 to 400 mm/s.

⚠ Warning

Precautions

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

4 Intermediate Stroke (Using exclusive body)

Symbol **-XB10**

Cylinder which can reduce the mounting space by using an exclusive body which does not use a spacer to achieve that the full length dimension could be shortened when an intermediate stroke other than the standard stroke is required.

How to Order

MGP [M, L, A] [**Standard model no.**] **–XB10**

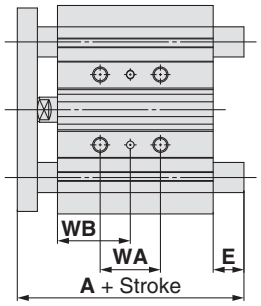
Intermediate stroke

Specifications: Same as standard type.

Applicable Series

Series		Model	Action
MGP	Standard type	**MGPM**	Slide bearing
		MGPL	Ball bushing bearing
		MGPA	High precision ball bushing bearing

Dimensions: Series MGP



Stroke Range

Bore size [mm]	Stroke range [mm]
12, 16	11 to 249
20, 25	21 to 399
32, 40, 50 63, 80, 100	26 to 399

∗ Specifications except the stroke range are the same as standard.
Note) Applicable stroke available by the 1 mm interval.

MGPM, MGPL, MGPA/WA, WB Dimensions

Bore size [mm]	Stroke range [mm]	WA				WB			
		11 to 39st	41 to 99st	101 to 199st	201 to 249st	11 to 39st	41 to 99st	101 to 199st	201 to 249st
12	11 to 249	20	40	110	200	15	25	60	105
16		24	44	110	200	17	27	60	105

Bore size [mm]	Stroke range [mm]	WA					WB				
		21 to 39st	41 to 124st	126 to 199st	201 to 299st	301 to 399st	21 to 39st	41 to 124st	126 to 199st	201 to 299st	301 to 399st
20	21 to 399	24	44	120	200	300	29	39	77	117	167
25		24	44	120	200	300	29	39	77	117	167

Bore size [mm]	Stroke range [mm]	WA					WB				
		26 to 49st	51 to 124st	126 to 199st	201 to 299st	301 to 399st	26 to 49st	51 to 124st	126 to 199st	201 to 299st	301 to 399st
32	26 to 399	24	48	124	200	300	33	45	83	121	171
40		24	48	124	200	300	34	46	84	122	172
50		24	48	124	200	300	36	48	86	124	174
63		28	52	128	200	300	38	50	88	124	174
80		28	52	128	200	300	42	54	92	128	178
100		48	72	148	220	320	35	47	85	121	171

MGPM/A,E Dimensions

Bore size [mm]	A			E		
	11 to 74st	76 to 99st	101 to 249st	11 to 74st	76 to 99st	101 to 249st
12	42	60.5	82.5	0	18.5	40.5
16	46	64.5	92.5	0	18.5	46.5

Bore size [mm]	A			E		
	21 to 74st	76 to 199st	201 to 399st	21 to 74st	76 to 199st	201 to 399st
20	53	77.5	110	0	24.5	57
25	53.5	77.5	109.5	0	24	56

Bore size [mm]	A			E		
	26 to 74st	76 to 199st	201 to 399st	26 to 74st	76 to 199st	201 to 399st
32	75	93.5	129.5	15.5	34	70
40	75	93.5	129.5	9	27.5	63.5
50	88.5	109.5	150.5	16.5	37.5	78.5
63	88.5	109.5	150.5	11.5	32.5	73.5
80	104.5	131.5	180.5	8	35	84
100	126.5	151.5	190.5	10.5	35.5	74.5

∗ Dimensions except mentioned above are the same as standard type.

MGPL, MGPA/A,E Dimensions

Bore size [mm]	A			E		
	11 to 39st	41 to 99st	101 to 249st	10 to 39st	41 to 99st	101 to 249st
12	43	55	84.5	1	13	42.5
16	49	65	94.5	3	19	48.5

Bore size [mm]	A				E			
	21 to 39st	41 to 124st	126 to 199st	201 to 399st	21 to 39st	41 to 124st	126 to 199st	201 to 399st
20	59	76	100	117.5	6	23	47	64.5
25	65.5	81.5	100.5	117.5	12	28	47	64

Bore size [mm]	A				E			
	26 to 74st	76 to 124st	126 to 199st	201 to 399st	26 to 74st	76 to 124st	126 to 199st	201 to 399st
32	79.5	96.5	116.5	138.5	20	37	57	79
40	79.5	96.5	116.5	138.5	13.5	30.5	50.5	72.5
50	91.5	112.5	132.5	159.5	19.5	40.5	60.5	87.5
63	91.5	112.5	132.5	159.5	14.5	35.5	55.5	82.5

Bore size [mm]	A				E			
	26 to 49st	51 to 74st	76 to 199st	201 to 399st	26 to 49st	51 to 74st	76 to 199st	201 to 399st
80	104.5	128.5	158.5	191.5	8	32	62	95
100	119.5	145.5	178.5	201.5	3.5	29.5	62.5	85.5

Made to Order Specification

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

Made to Order

Symbol

5 Low Speed Cylinder (5 to 50 mm/s) -XB13

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

Applicable Series

Series		Model	Action
MGP	Standard type	MGPM	Slide bearing
		MGPL	Ball bushing bearing

How to Order

MGP M/L **Standard model no.** **–XB13**

Low speed cylinder

Specifications

Piston speed	5 to 50 mm/s
Dimensions	Same as standard type
Additional specifications	Same as standard type

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

⚠ Warning

Operating Precautions

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

Symbol

6 Flourorubber Seals -XC22

Applicable Series

Series		Model	Action
MGP	Standard type	MGPM	Slide bearing

How to Order

MGPM **Standard model no.** **–XC22**

Fluororubber seals

Specifications

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

Note 1) Please confirm with SMC, as the type of chemical and the operating temperature may not allow the use of this product.
Note 2) Cylinders with auto switches can also be produced; however, auto switch related parts (auto switch units, mounting brackets, built-in magnets) are the same as standard products. Before using these, please contact SMC regarding their suitability for the operating environment.
Note 3) The MGP series are without a cushion. Confirm the kinetic energy.

Made to Order Specification

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

Made to Order

7 Bottom Mounting Style

Symbol **-XC82**

Since the guide rod does not protrude from the bottom at the retraction of the rod, relief holes for guide rods are not required.

How to Order

MGP M 32 – 50 Z – [ ] [ ] – XC82

- **Compact guide cylinder**
- **Bearing Type [mm]**

M	Slide bearing

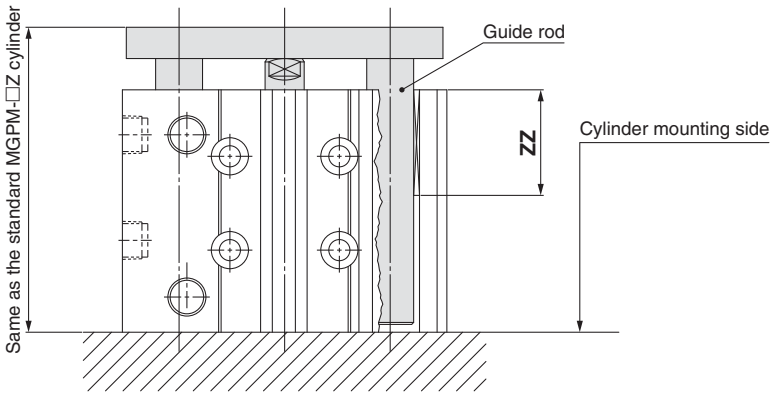
- **Bore size [mm]**

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

- **Cylinder stroke [mm]**

Bore size [mm]	Applicable stroke [mm]
12 to 25	75, 100
32 to 100	25, 50, 75, 100

- **Auto switch**
- **Suffix for auto switch**
- **Bottom mounting type**



Note) The total length (ZZ) of the guide rod bushing is shorter than the standard type.

Made to Order Specification

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

Made to Order

8 Symmetrical Port Position

Symbol **-X144**

Ports are mounted symmetrically.

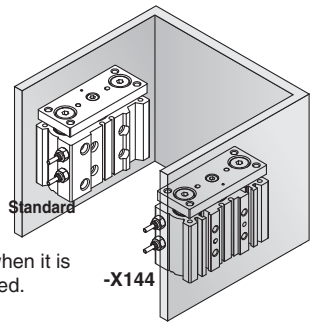
Applicable Series

Series		Model	Action
MGP	Standard type	**MGPM**	Slide bearing
		MGPL	Ball bushing bearing
		MGPA	High precision ball bushing bearing

How to Order

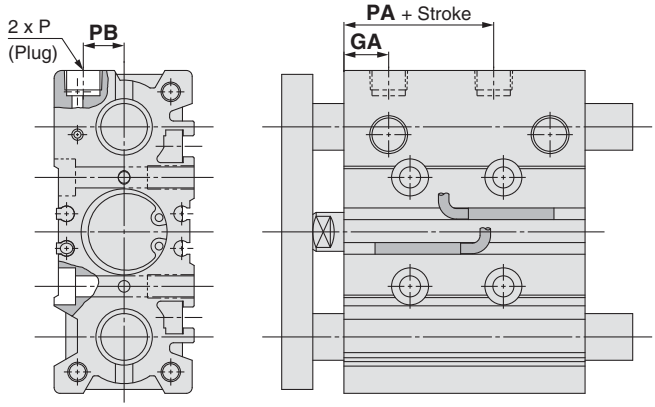
MGP M L A **Standard model no.** **–X144**

Symmetrical port position



This makes it easy to remove and rotate piping when it is mounted on a wall where mounting space is limited.

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



MGPM, MGPL Common Dimensions

Bore size [mm]	GA	PA	PB
12	11	13	8
16	11	15	10
20	10.5	12.5	10.5
25	11.5	12.5	13.5
32	12.5	7	15
40	14	13	18
50	14	9	21.5
63	16.5	14	28
80	14.5	14.5	25.5
100	18	17.5	32.5

9 Lateral Piping Type (Plug location changed)

Symbol **-X867**

This is the type with the port on the top plugged in order to use the piping port on the side.

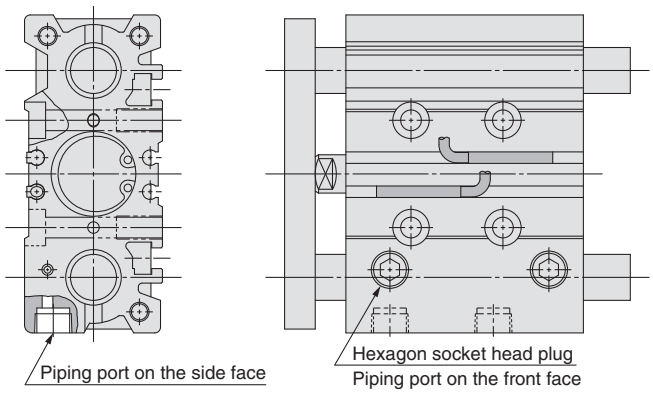
Applicable Series

Series		Model	Action
MGP	Standard type	**MGPM**	Slide bearing
		MGPL	Ball bushing bearing
		MGPA	High precision ball bushing bearing

How to Order

MGP M L A **Standard model no.** **–X867**

Lateral piping type (Plug location changed)



⚠ 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 catalogue 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 catalogue.
   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, wichever 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 catalogue 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.

⚠ Safety Instructions | Be sure to read "Handling Precautions for SMC Products" (M-E03-3) before using.

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1st printing QX printing QX 00 Printed in Spain