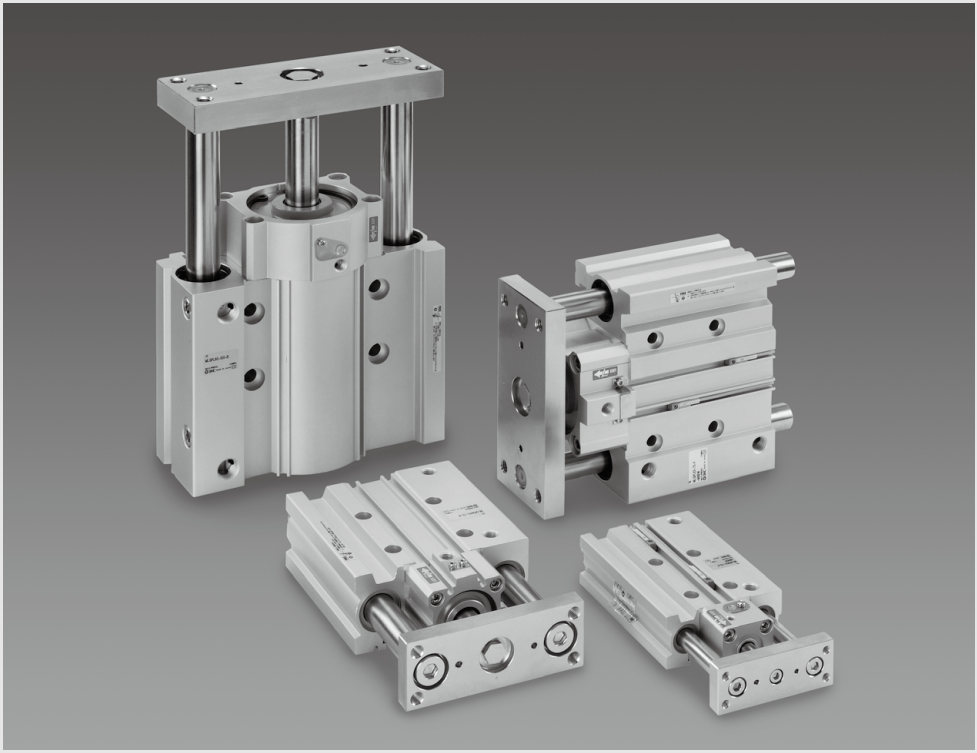
Compact Guide Cylinder with Lock

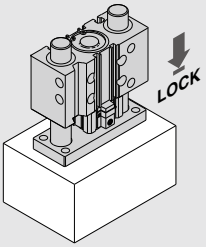
MLGP Series

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

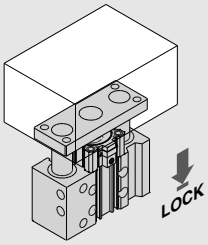


Drop prevention when the pressure of air source is decreased or the residual pressure is released.

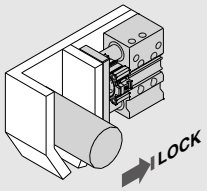
Drop prevention for press fitting jig



Drop prevention for lifter



Holding a clamped condition

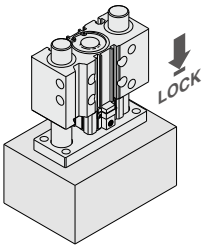


Drop prevention is possible

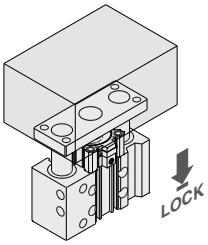
- Drop prevention for mid-stroke emergency stops
- Locking position can be changed in accordance with the external stopper position and thickness of clamped workpieces.

Extension locking | **Retraction locking**

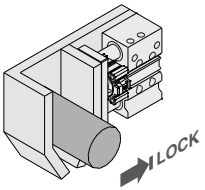
Drop prevention for press fitting jig



Drop prevention for lifter



Holding a clamped condition



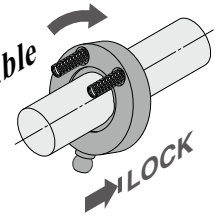
Compact Guide Cylinder with Lock

MLGP Series

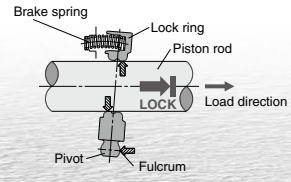
ø20,ø25,ø32,ø40,ø50,ø63,ø80,ø100

Simple construction

Simple and reliable locking type

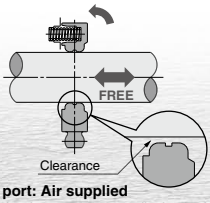


Locked | **Unlocked**



Unlocking port: Air exhausted

1. The lock ring is tilted by the spring force.
2. The tilting is increased by the load and the piston rod is securely locked.



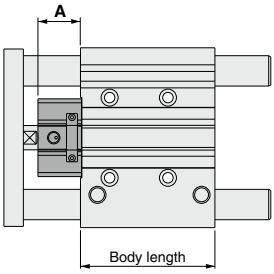
Unlocking port: Air supplied

1. The lock ring becomes perpendicular to the piston rod, creating clearance between the piston rod and lock ring, which allows the piston rod to move freely.

within the entire stroke at any position

Low profile with compact lock unit

Lock unit length: A/26.5 mm to 51.5 mm

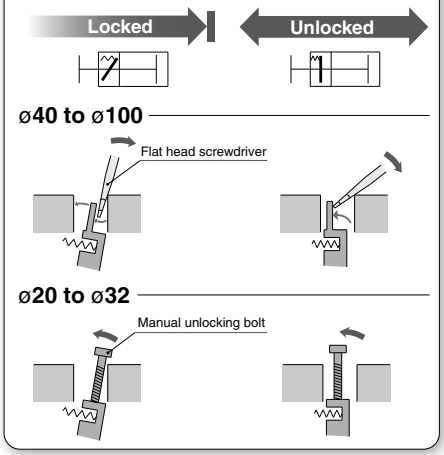


(mm)

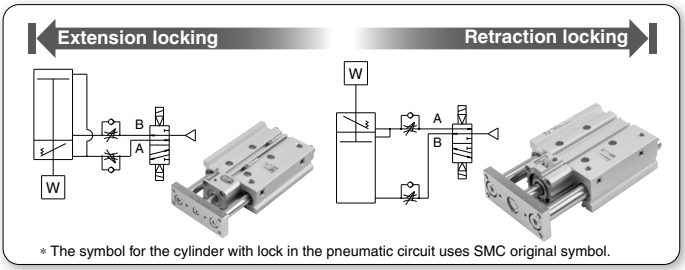
Bore size (mm)	A
20	26.5
25	30.5
32	31.5
40	34
50	35
63	38
80	43
100	51.5

Body length is the same as the standard MGP

Easy manual unlocking



Locking direction is selectable



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

Two types of guide rod bearing for different applications

Slide bearing	Ball bushing bearing
Excellent wear resistance allows use with high loads.	Provides high precision and smooth operation.

Four types of mounting

- Easy positioning
- Knock pin holes provided on each mounting surface.

Top mounting | Side mounting

T-slot side mounting

Bottom mounting

Wide Variations from ø20 to ø100

Series	Bearing	Locking direction	Bore size (mm)	Standard stroke (mm)													
				20	25	30	40	50	75	100	125	150	175	200	250	300	350
MLGP	Slide bearing / Ball bushing bearing	Extension Locking / Retraction Locking	20	●		●	●	●	●	●	●	●	●	●	●	●	●
			25	●		●	●	●	●	●	●	●	●	●	●	●	●
			32		●			●	●	●	●	●	●	●	●	●	●
			40		●			●	●	●	●	●	●	●	●	●	●
			50		●			●	●	●	●	●	●	●	●	●	●
			63		●			●	●	●	●	●	●	●	●	●	●
			80		●			●	●	●	●	●	●	●	●	●	●
			100					●	●	●	●	●	●	●	●	●	●

Model Selection

Precautions on Model Selection

⚠Caution

1. **In order that the originally selected maximum speed shall be not exceeded, be certain to use a speed controller to adjust the total movement distance of the load so that movement takes place in no less than the applicable movement time.**
2. **For an intermediate stroke product with spacers installed, select using the base model stroke.**

Step (1) Find the maximum load speed V.

Find the maximum load speed V [mm/s] with following formula (1) below.

The maximum load speed V [mm/s] is approximately equal to V_1 x 1.4 ····(1)

V_1: Average load speed [mm/s]
V_1 = st/t
st: Load transfer distance [mm]
t: Load transfer time [s]

Step (2) Find the bore size.

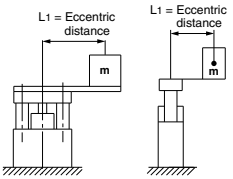
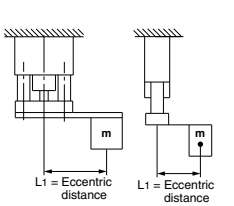
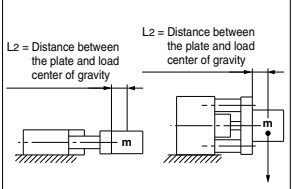
1. For vertical mounting

1) From Table 1, find applicable selection graphs based on the maximum load speed "V", mounting orientation, and bearing type.
2) From the graphs chosen in (1), select the appropriate graph based on the stroke, and then find the intersecting point of the load mass "m" and eccentric distance "L_1".
3) Compare the intersecting point with the line chart for the operating pressure "P". Select the bore size from the line chart above the intersecting point.

2. For horizontal mounting

1) From Table 1, find applicable selection graphs based on the maximum load speed "V" and bearing type.
2) From the graphs chosen in (1), select the appropriate graph based on the distance "L_2" between the plate and load center of gravity, then find the intersecting point of the load mass "m" and stroke.
3) Compare the intersecting point with the line chart. Select the bore size from the line chart above the intersecting point.

Selection Conditions/Table (1)

Mounting orientation	Vertical				Horizontal	
	Upward facing		Downward facing			
						
Maximum load speed V	50 to 200 mm/s	201 to 400 mm/s	50 to 200 mm/s	201 to 400 mm/s	50 to 200 mm/s	201 to 400 mm/s
Graph (Slide bearing type)	**(1), (2)**	**(3), (4)**	**(13), (14)**	**(15), (16)**	**(25), (26)**	**(27), (28)**
Graph (Ball bushing bearing type)	**(5) to (8)**	**(9) to (12)**	**(17) to (20)**	**(21) to (24)**	**(29), (30)**	**(31), (32)**

· When the maximum speed exceeds 200 mm/s, the allowable load mass 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
Coefficient	1.7	1

Selection Example 1 (Vertical Upward Mounting)

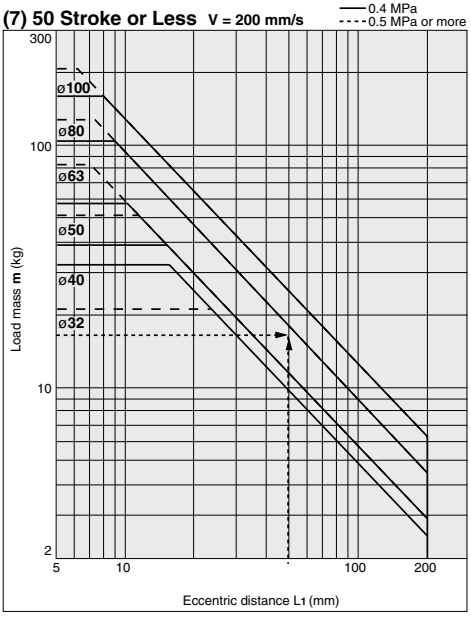
Selection conditions

Mounting: Vertical upward facing
Bearing type: Ball bushing
Stroke: 50 mm
Load transfer time **t**: 0.5 s
Load mass **m**: 15 kg
Eccentric distance L_1: 50 mm
Operating pressure **P**: 0.5 MPa

Step 1: Find the maximum load speed "V" from formula (1). Based on the stroke (load transfer distance) of 50 mm and load transfer time of 0.5 s, the maximum load speed is approximately equal to 50/0.5 x 1.4, which is approximately 140 mm/s.

Step 2: Based on the maximum load speed found in Step 1, mounting orientation, and guide type, graphs (5) to (8) are selected. Then, based on the 50 mm stroke, graph (7) is selected from the group. Find the intersecting point of the load mass of 15 kg and the eccentric distance of 50 mm. Since the operating pressure is 0.5 MPa, the bore size of ø80 mm, model MLGPL80-50-B, is selected.

(7) 50 Stroke or Less **V = 200 mm/s**



Selection Example 2 (Horizontal Mounting)

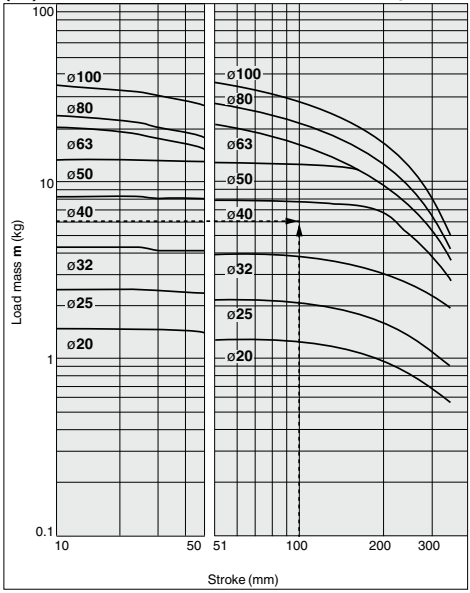
Selection conditions

Mounting: Horizontal
Bearing type: Slide bearing
Stroke: 100 mm
Load transfer time **t**: 0.35 s
Load mass **m**: 6 kg
Eccentric distance between the plate and load center of gravity L_2: 50 mm
Operating pressure **P**: 0.4 MPa

Step 1: Find the maximum load speed "V" from formula (1). Based on the stroke (load transfer distance) of 100 mm and load transfer time of 0.35 s, the maximum load speed is approximately equal to 100/0.5 x 1.4, which is approximately 400 mm/s.

Step 2: Based on the maximum load speed found in Step 1, mounting orientation, and guide type, graphs (27) and (28) are selected. Then, based on the distance of 50 mm between the plate and load center of gravity, graph (27) is selected from the two graphs. Find the intersecting point of the load mass of 6 kg and the 100 mm stroke. The bore size of ø40 mm, model MLGPM40-50-□, is selected.

(27) L_2 = 50 mm **V = 400 mm/s Horizontal Mounting**

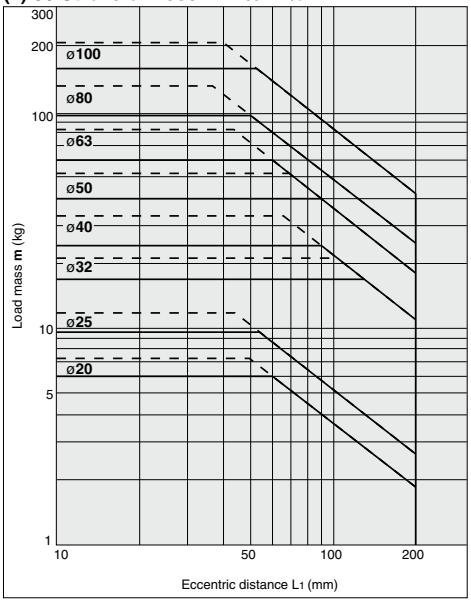


Vertical Upward Mounting (Slide Bearing)

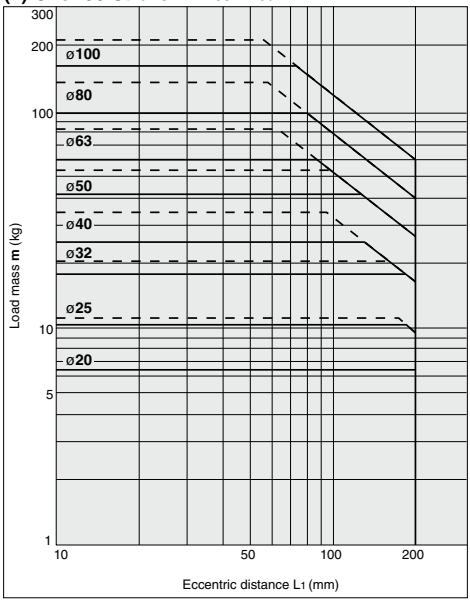
——— Operating pressure 0.4 MPa
- - - - - Operating pressure 0.5 MPa or more

MLGPM20 to 100

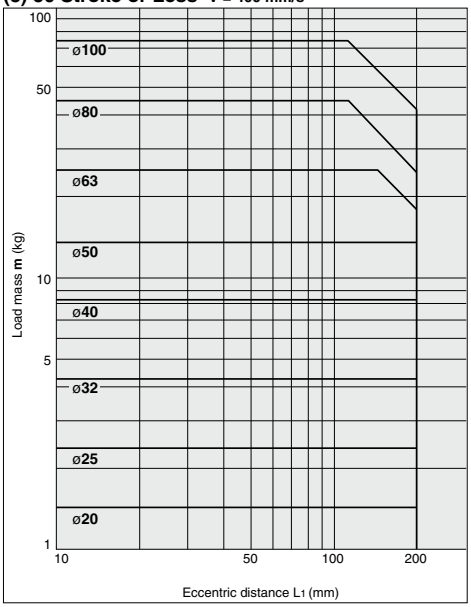
(1) 50 Stroke or Less V = 200 mm/s



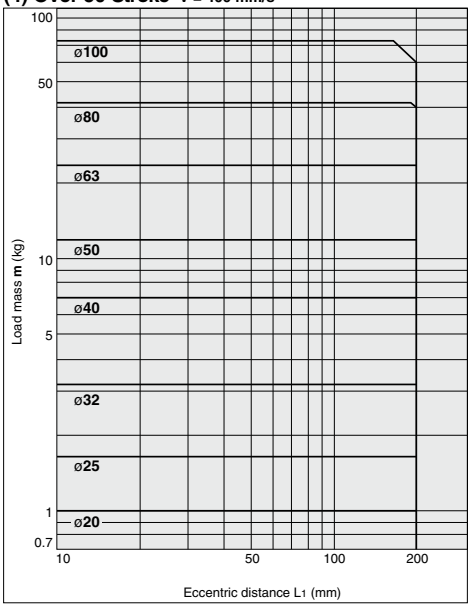
(2) Over 50 Stroke V = 200 mm/s



(3) 50 Stroke or Less V = 400 mm/s



(4) Over 50 Stroke V = 400 mm/s

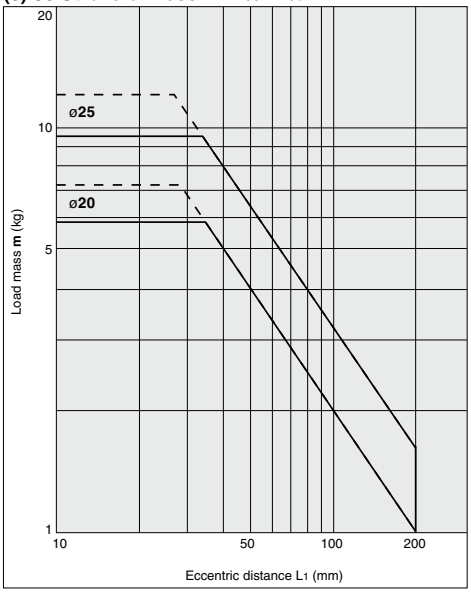


Vertical Upward Mounting (Ball Bushing Bearing)

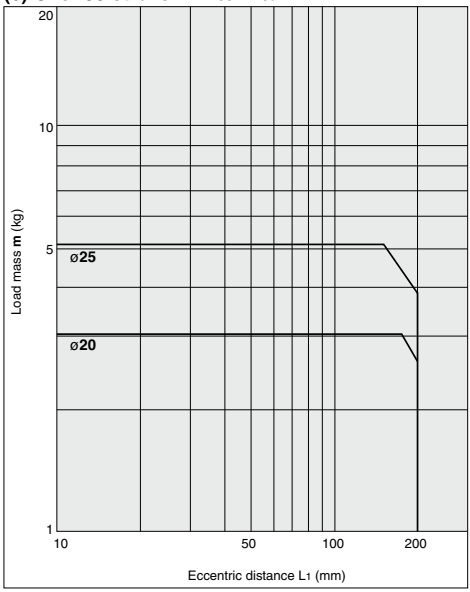
——— Operating pressure 0.4 MPa
- - - - - Operating pressure 0.5 MPa or more

MLGPL20, 25

(5) 30 Stroke or Less V = 200 mm/s

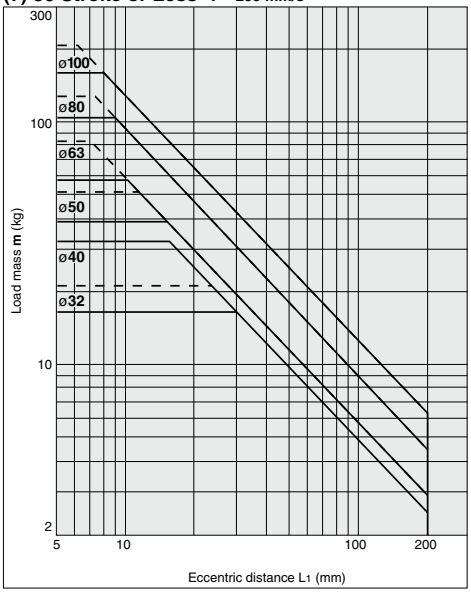


(6) Over 30 stroke V = 200 mm/s

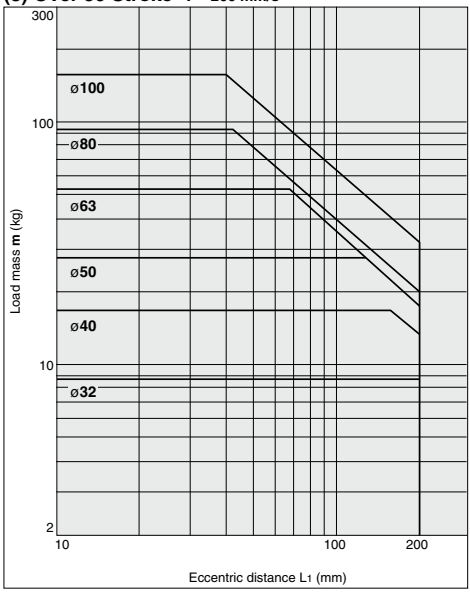


MLGPL32 to 100

(7) 50 Stroke or Less V = 200 mm/s



(8) Over 50 Stroke V = 200 mm/s

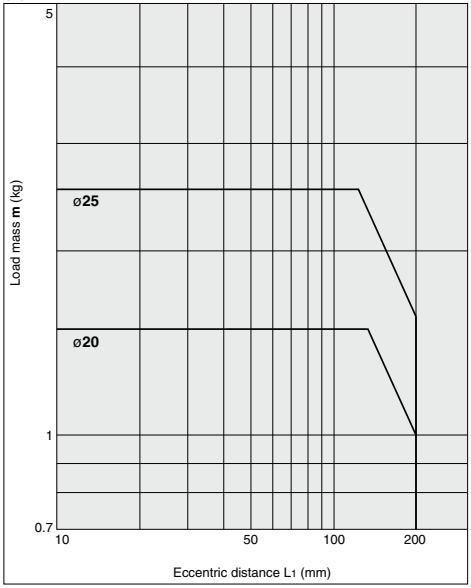


Vertical Upward Mounting (Ball Bushing Bearing)

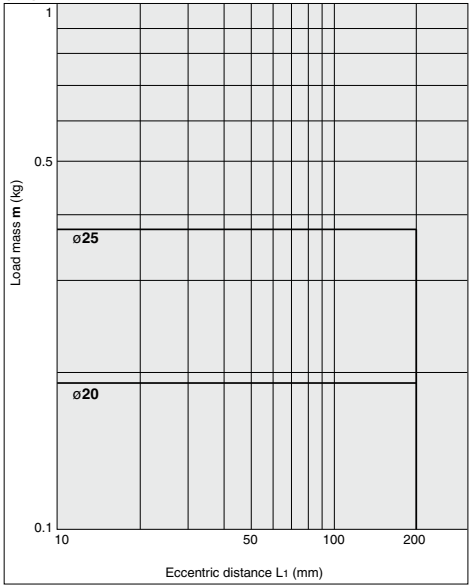
Operating pressure: 0.4 MPa

MLGPL20, 25

(9) 30 Stroke or Less V = 400 mm/s

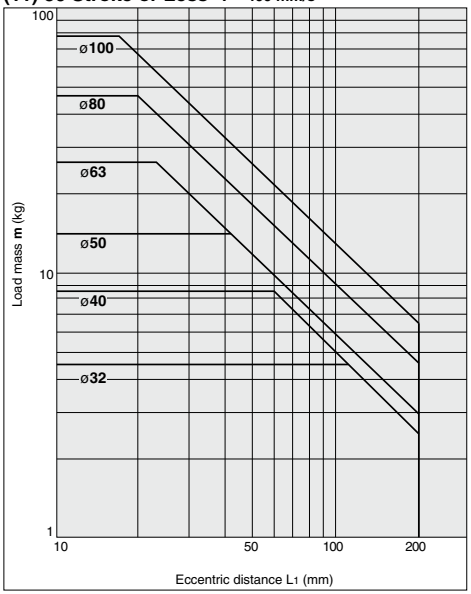


(10) Over 30 Stroke V = 400 mm/s

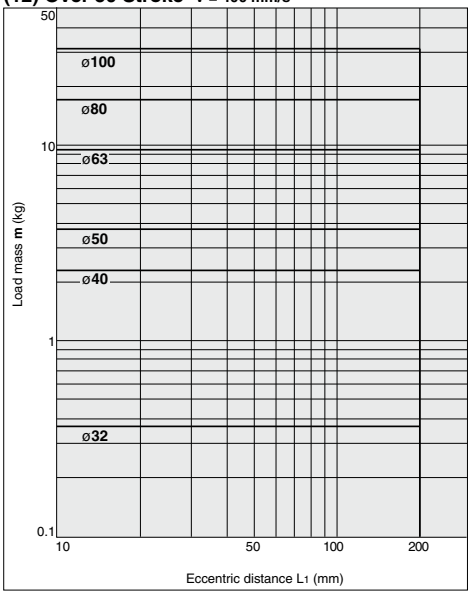


MLGPL32 to 100

(11) 50 Stroke or Less V = 400 mm/s



(12) Over 50 Stroke V = 400 mm/s

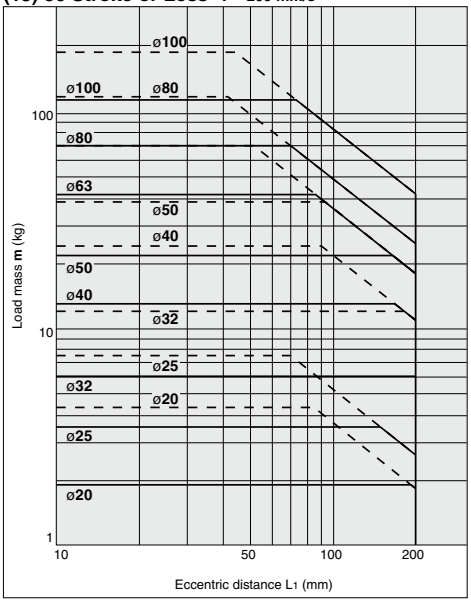


Vertical Downward Mounting (Slide Bearing)

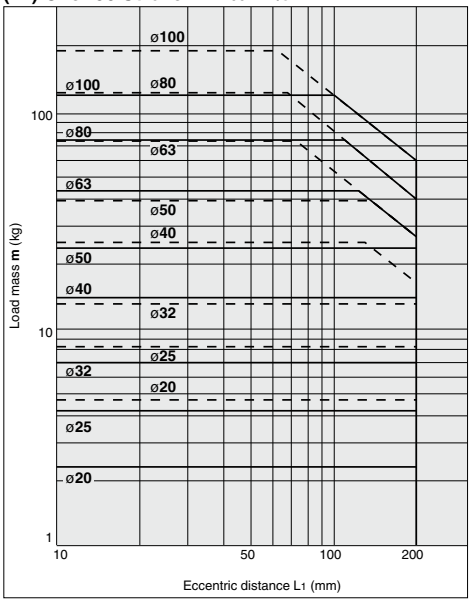
——— Operating pressure 0.4 MPa
- - - - - Operating pressure 0.5 MPa or more

MLGPM20 to 100

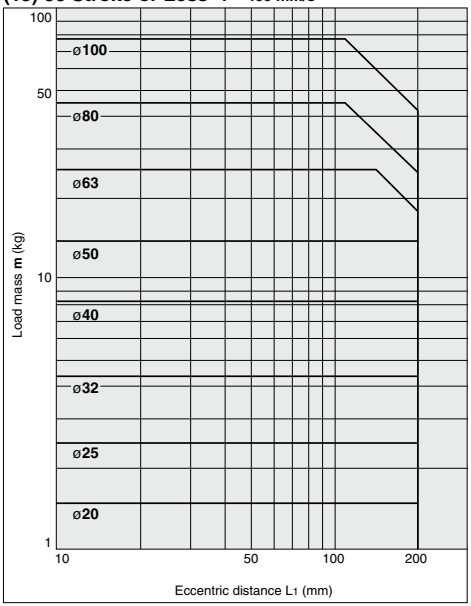
(13) 50 Stroke or Less V = 200 mm/s



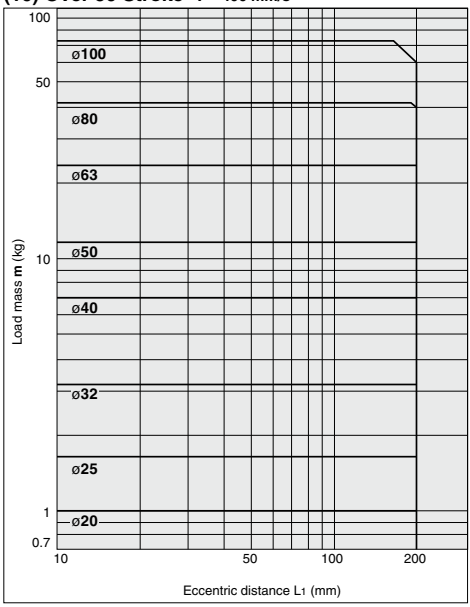
(14) Over 50 Stroke V = 200 mm/s



(15) 50 Stroke or Less V = 400 mm/s



(16) Over 50 Stroke V = 400 mm/s

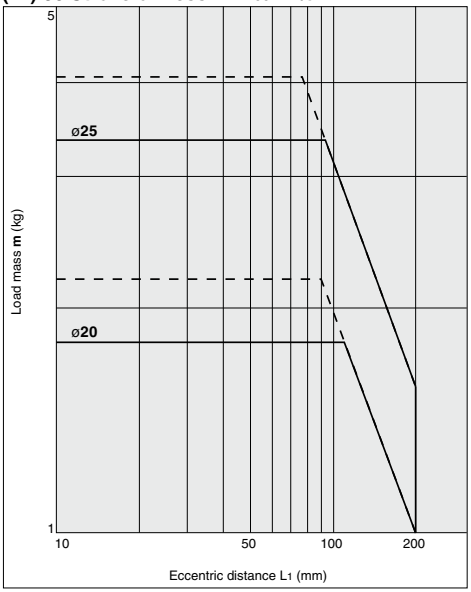


Vertical Downward Mounting (Ball Bushing Bearing)

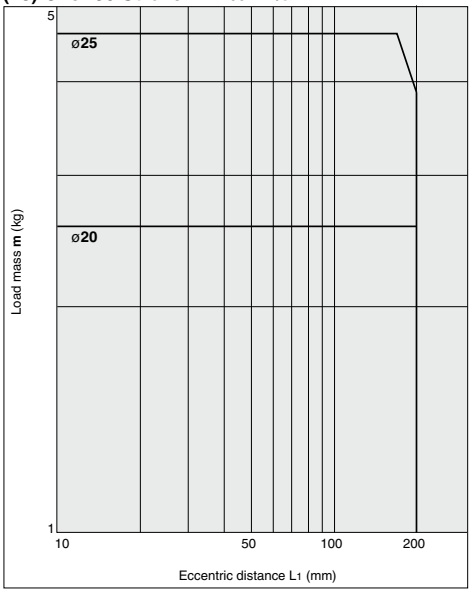
——— Operating pressure 0.4 MPa
- - - - - Operating pressure 0.5 MPa or more

MLGPL20, 25

(17) 30 Stroke or Less V = 200 mm/s

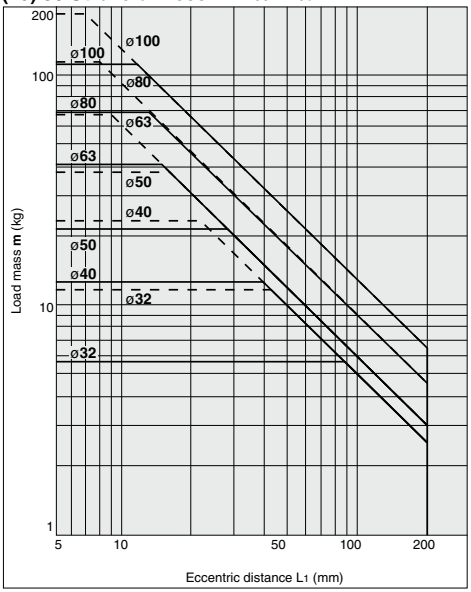


(18) Over 30 Stroke V = 200 mm/s

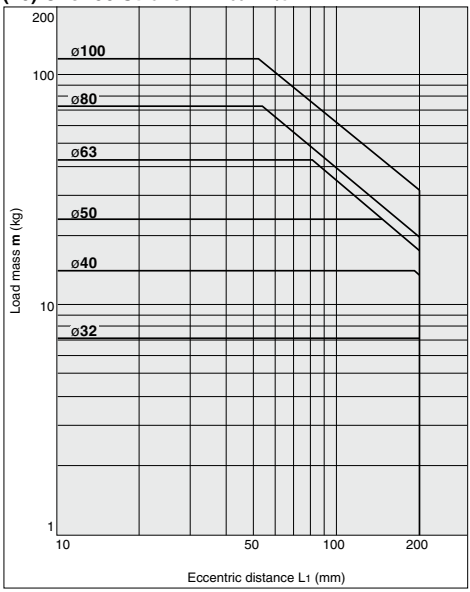


MLGPL32 to 100

(19) 50 Stroke or Less V = 200 mm/s



(20) Over 50 Stroke V = 200 mm/s

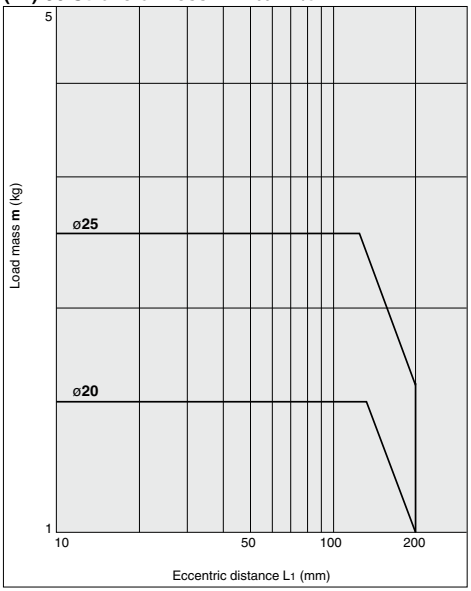


Vertical Downward Mounting (Ball Bushing Bearing)

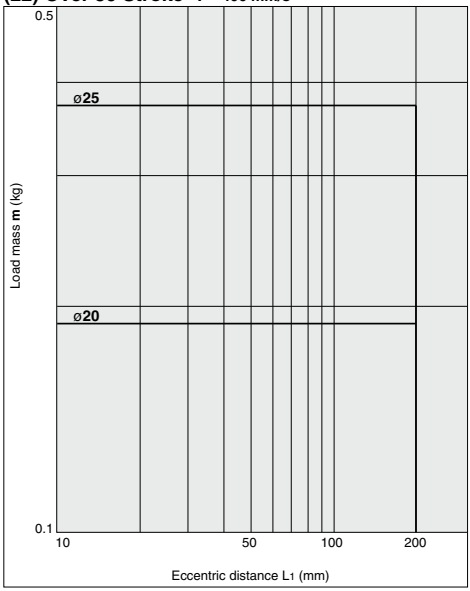
Operating pressure: 0.4 MPa

MLGPL20, 25

(21) 30 Stroke or Less V = 400 mm/s

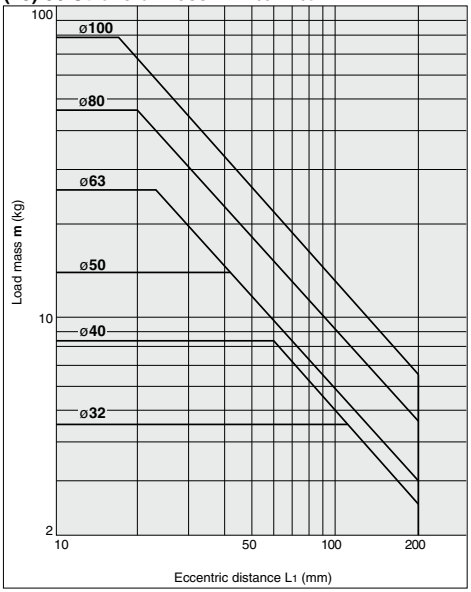


(22) Over 30 Stroke V = 400 mm/s

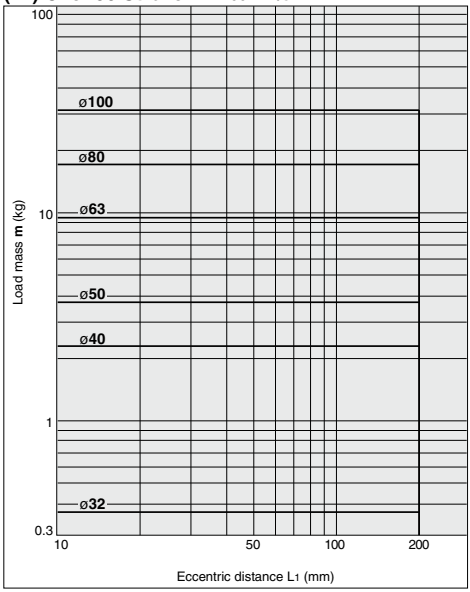


MLGPL32 to 100

(23) 50 Stroke or Less V = 400 mm/s



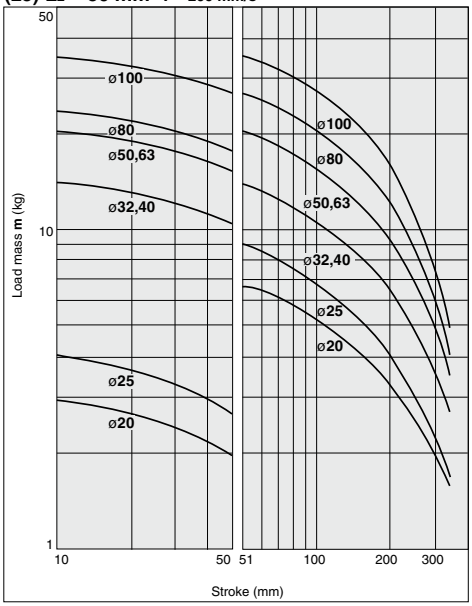
(24) Over 50 Stroke V = 400 mm/s



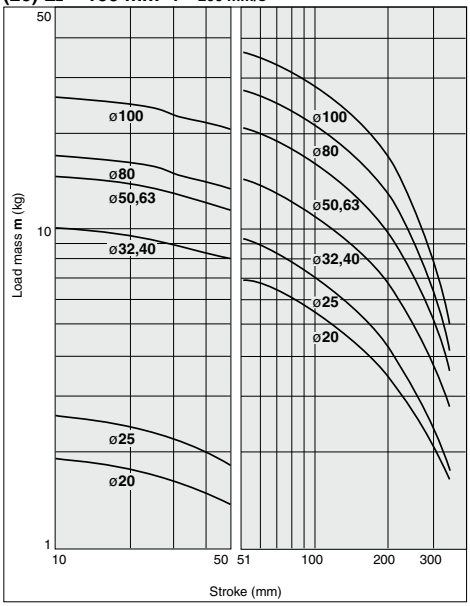
Horizontal Mounting (Slide Bearing)

MLGPM20 to 100

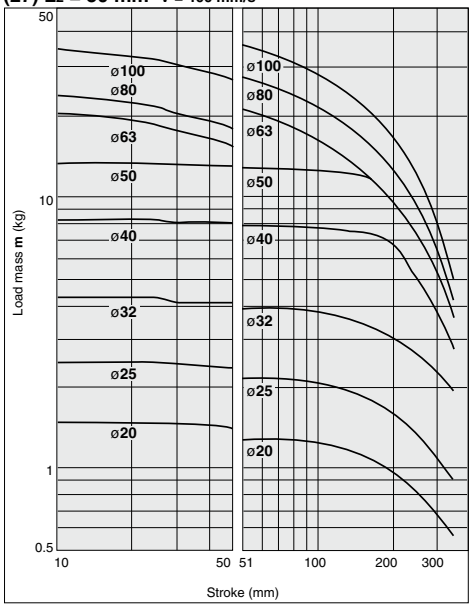
(25) L_2 = 50 mm V = 200 mm/s



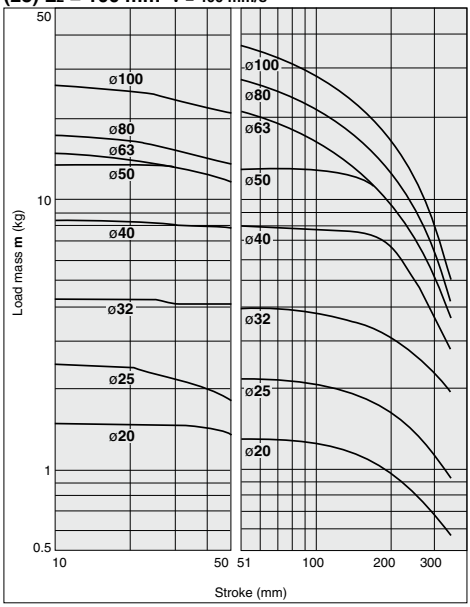
(26) L_2 = 100 mm V = 200 mm/s



(27) L_2 = 50 mm V = 400 mm/s



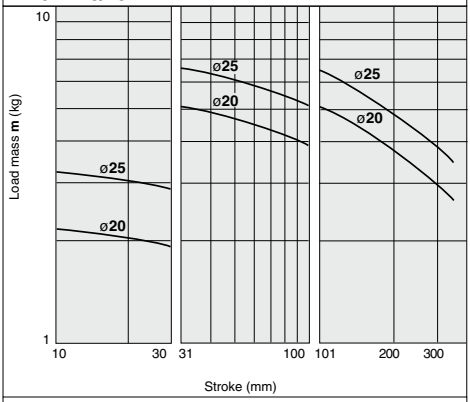
(28) L_2 = 100 mm V = 400 mm/s



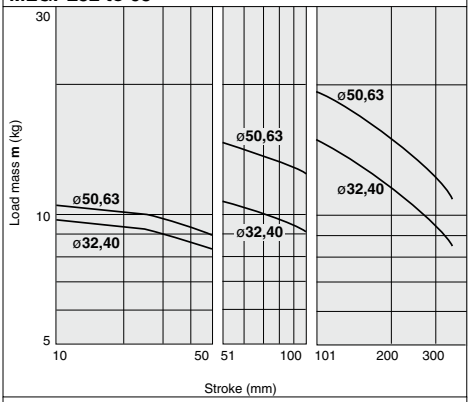
Horizontal Mounting (Ball Bushing Bearing)

(29) L_2 = 50 mm V = 200 mm/s

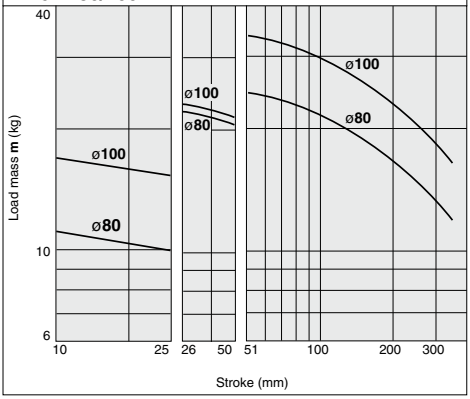
MLGPL20/25



MLGPL32 to 63

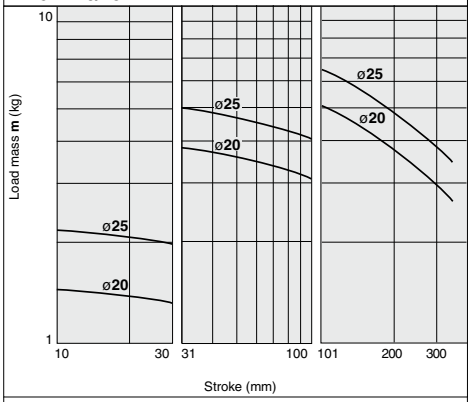


MLGPL80/100

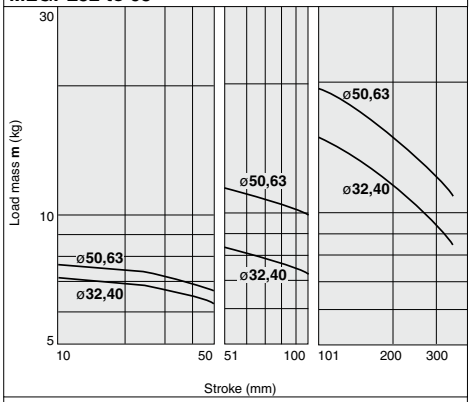


(30) L_2 = 100 mm V = 200 mm/s

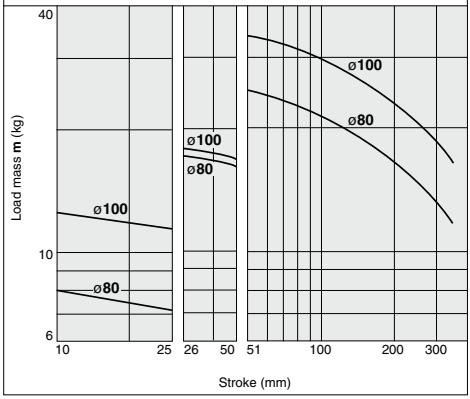
MLGPL20/25



MLGPL32 to 63



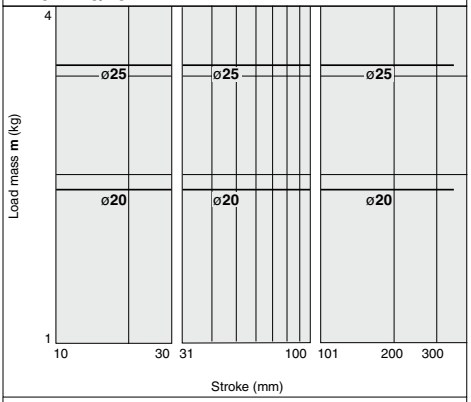
MLGPL80/100



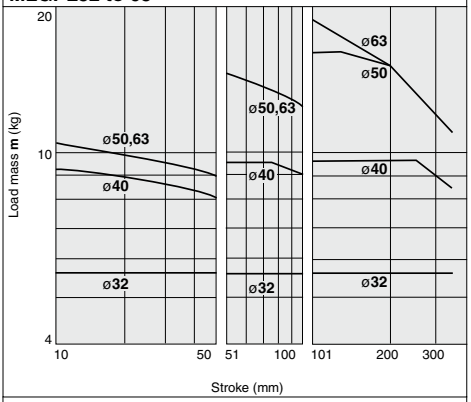
Horizontal Mounting (Ball Bushing Bearing)

(31) L_2 = 50 mm V = 400 mm/s

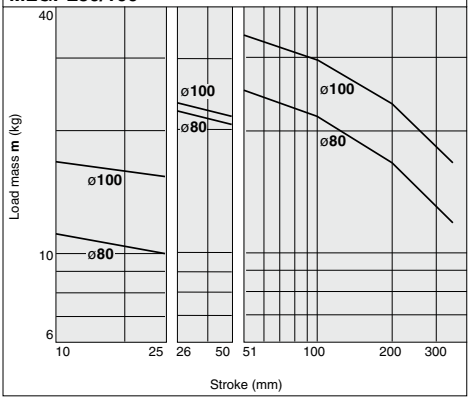
MLGPL20/25



MLGPL32 to 63

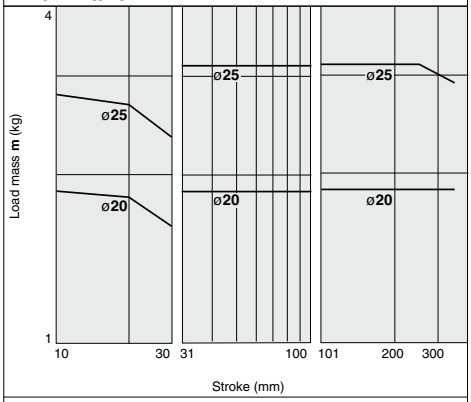


MLGPL80/100

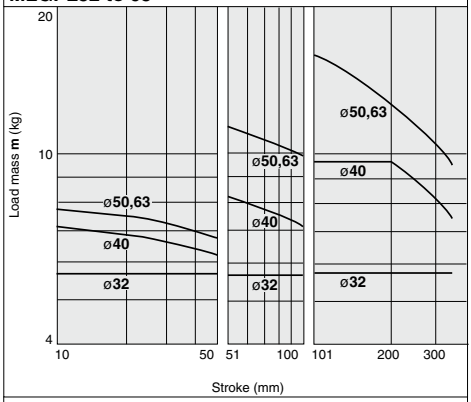


(32) L_2 = 100 mm V = 400 mm/s

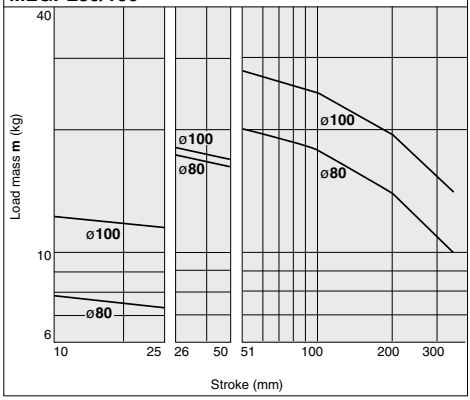
MLGPL20/25



MLGPL32 to 63



MLGPL80/100



Operating Range when Used as Stopper

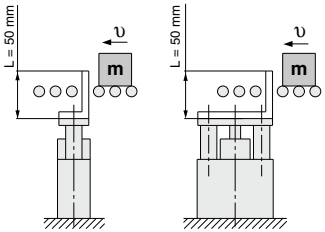
⚠ Warning

1. When using the cylinder as a stopper, do not allow workpieces to collide in the locked condition. If workpieces collide in the locked condition, the lock may disengage due to the shock, or the lock mechanism and piston rod may be damaged, causing a dramatic decrease of the product life and/ or further damage.
2. Model MLGPL (Ball bushing bearing) cannot be used as a stopper.
When MLGPL (Ball bushing bearing) is used as a stopper, the impact will cause damage to the bearing unit and guide rod.
3. Adopt the pneumatic circuit on page 1101 when it's used as a stopper, so that workpiece does not collide in a lock state.

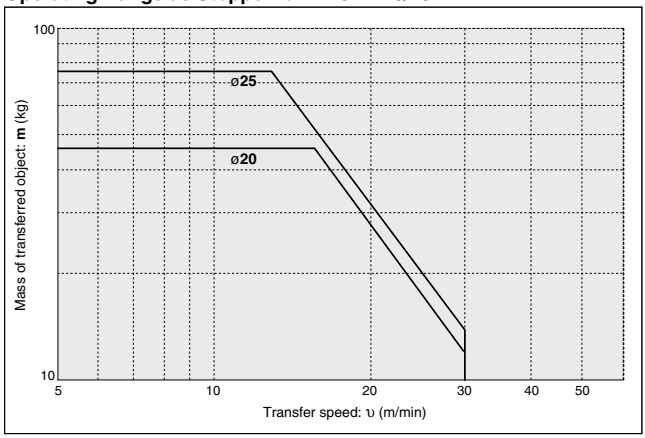
⚠ Caution

1. When using as a stopper, select a model with 30 stroke or less for bore sizes ø20 and ø25, and 50 stroke or less for bore sizes ø32 to ø100.
2. When selecting a model with a longer L dimension, be sure to choose a bore size which is sufficiently large.

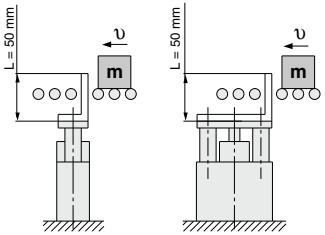
Bore size ø20, ø25/MLGPM20/25 (Slide bearing)



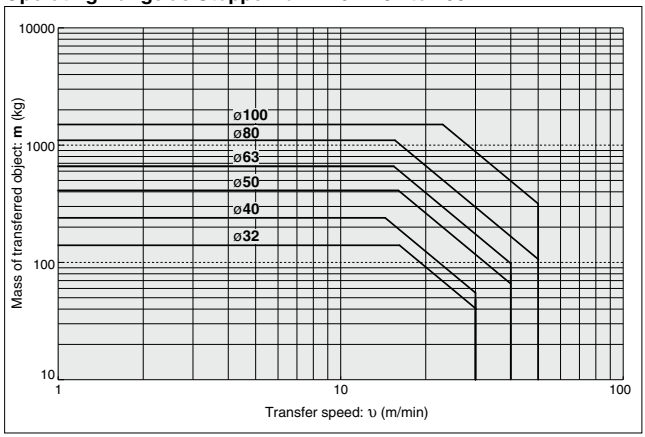
Operating Range as Stopper for MLGPM20/25



Bore size ø32 to ø100/MLGPM32 to 100 (Slide bearing)



Operating Range as Stopper for MLGPM32 to 100



Compact Guide Cylinder with Lock

MLGP Series

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

The MLGP series has been remodeled. When selecting a product, please consider using the new **MLGP** series.

How to Order

MLGP M 32 □ – 50 – F – M9BW □ – □

Compact guide cylinder with lock

Bearing type

M	Slide bearing
L	Ball bushing bearing

Bore size

20	20 mm	**50**	50 mm
25	25 mm	**63**	63 mm
32	32 mm	**80**	80 mm
40	40 mm	**100**	100 mm

Port type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 1091.

Locking direction

F	Extension locking
B	Retraction locking

Auto switch

Nil	Without auto switch (Built-in magnet)

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

Number of auto switches

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

Made to Order
For details, refer to page 1091.

Applicable Auto Switches/Refer to pages 1119 to 1245 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V,12 V	—	**M9NV**	**M9N**	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9PV**	**M9P**	●	●	●	○	○		
				2-wire		12 V		**M9BV**	**M9B**	●	●	●	○	○	—	
	Diagnostic indication (2-color indicator)			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-color indicator)			3-wire (NPN)		5 V,12 V		**M9NAV**∗1	**M9NA**∗1	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PAV**∗1	**M9PA**∗1	○	○	●	○	○		
				2-wire		12 V		**M9BAV**∗1	**M9BA**∗1	○	○	●	○	○		
	Magnetic field resistant (2-color indicator)			2-wire (Non-polar)		—		—	**P3DWA**∗∗	●	—	●	●	○	—	
								—	**P4DW**	—	—	●	●	○		
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96V**	**A96**	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100V	**A93V**∗2	**A93**	●	●	●	●	—	—	Relay, PLC
							100V or less	**A90V**	**A90**	●	—	●	—	—	IC circuit	

∗1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

∗2 1 m type lead wire is only applicable to D-A93.

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

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

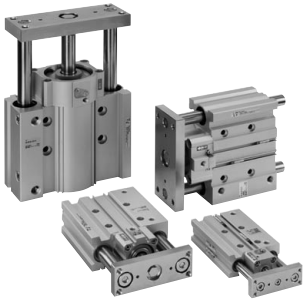
∗ D-P4DW can be mounted on the bore sizes ø32 to ø100.

∗∗ D-P3DWA□ can be mounted on the bore sizes ø25 to ø100.

∗ Since there are other applicable auto switches than listed, refer to page 1099 for details.

∗ For details about auto switches with pre-wired connector, refer to pages 1192 and 1193.

∗ Auto switches are shipped together (not assembled).



Cylinder Specifications

Bore size (mm)	20	25	32	40	50	63	80	100
Action	Double acting							
Fluid	Air							
Proof pressure	1.5 MPa							
Maximum operating pressure	1.0 MPa							
Minimum operating pressure	0.2 MPa Note)							
Ambient and fluid temperature	–10 to 60°C (No freezing)							
Piston speed	50 to 400 mm/s							
Cushion	Rubber bumper on both ends							
Lubrication	Not required (Non-lube)							
Stroke length tolerance	$^{+1.5}_{0}$ mm							
Port size (Rc, NPT, G)	1/8				1/4		3/8	

Note) When the unlocking air and cylinder operating air are not common, the minimum operating pressure is 0.15 MPa. (The minimum operating pressure for the cylinder alone is 0.15 MPa.)

Lock Specifications

Bore size (mm)	20	25	32	40	50	63	80	100
Lock operation	Spring locking (Exhaust locking)							
Unlocking pressure	0.2 MPa or more							
Lock starting pressure	0.05 MPa or less							
Locking direction	One direction (Extension locking, Retraction locking)							
Maximum operating pressure	1.0 MPa							
Unlocking port size (Rc, NPT, G)	M5 x 0.8		1/8					1/4
Holding force (Maximum static load) (N) Note)	157	245	402	629	982	1559	2513	3927

Note) The holding force (max. static load) shows the maximum capability and does not show the normal holding capability. So, select an appropriate cylinder while referring to page 1100.

Standard Stroke

Bore size (mm)	Standard stroke (mm)
20,25	20, 30, 40, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350
32 to 80	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350
100	50, 75, 100, 125, 150, 175, 200, 250, 300, 350

Manufacture of Intermediate Stroke

Description	Spacer installation type Spacers are installed in the standard stroke cylinders. ø20 to 32: Stroke can be modified in 1 mm increments. ø40 to 100: Stroke can be modified in 5 mm increments.	
Part no.	Refer to "How to Order" for the standard model numbers.	
Applicable stroke (mm)	ø20, ø25, ø32	1 to 349
	ø40 to ø80	5 to 345
	ø100	25 to 345
Example	Part no.: MLGPM20-39-F A 1 mm spacer is installed in MLGPM20-40-F. Dimension C is 77 mm.	

Made to Order

Made to Order

Click here for details

Symbol	Specifications
-XC87	Heavy duty (ø40 to ø100 only)

Refer to pages 1098 and 1099 for cylinders with auto switches.

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

Theoretical Output

OUT IN

(N)

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa) 0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
20	10	OUT	314	63	94	126	157	188	220	251	283	314
		IN	236	47	71	94	118	142	165	189	212	236
25	12	OUT	491	98	147	196	246	295	344	393	442	491
		IN	378	76	113	151	189	227	265	302	340	378
32	16	OUT	804	161	241	322	402	482	563	643	724	804
		IN	603	121	181	241	302	362	422	482	543	603
40	16	OUT	1257	251	377	503	629	754	880	1006	1131	1257
		IN	1056	211	317	422	528	634	739	845	950	1056
50	20	OUT	1963	393	589	785	982	1178	1374	1570	1767	1963
		IN	1649	330	495	660	825	990	1154	1319	1484	1649
63	20	OUT	3117	623	935	1247	1559	1870	2182	2494	2805	3117
		IN	2803	561	841	1121	1402	1682	1962	2242	2523	2803
80	25	OUT	5027	1005	1508	2011	2514	3016	3519	4022	4524	5027
		IN	4536	907	1361	1814	2268	2722	3175	3629	4082	4536
100	30	OUT	7854	1571	2356	3142	3927	4712	5498	6283	7069	7854
		IN	7147	1429	2144	2859	3574	4288	5003	5718	6432	7147

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

Weight

Slide Bearing: MLGPM20 to 100

(kg)

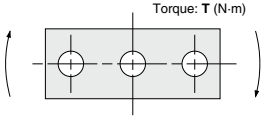
Bore size (mm)	Standard stroke (mm)													
	20	25	30	40	50	75	100	125	150	175	200	250	300	350
20	0.84	—	0.92	1.00	1.08	1.34	1.54	1.74	1.93	2.13	2.33	2.80	3.20	3.59
25	1.22	—	1.32	1.43	1.54	1.92	2.19	2.46	2.74	3.01	3.28	3.94	4.48	5.03
32	—	2.09	—	—	2.47	2.87	3.25	3.64	4.02	4.40	4.78	5.73	6.49	7.26
40	—	2.44	—	—	2.86	3.32	3.74	4.17	4.59	5.02	5.44	6.48	7.34	8.19
50	—	4.13	—	—	4.77	5.50	6.14	6.78	7.42	8.06	8.70	10.4	11.6	12.9
63	—	5.23	—	—	5.99	6.83	7.59	8.34	9.10	9.85	10.7	12.5	14.0	15.5
80	—	8.50	—	—	9.44	10.7	11.7	12.6	13.6	14.5	15.5	17.9	19.8	21.6
100	—	—	—	—	15.3	17.0	18.3	19.7	21.0	22.3	23.6	27.0	29.6	32.3

Ball Bushing Bearing: MLGPL20 to 100

(kg)

Bore size (mm)	Standard stroke (mm)													
	20	25	30	40	50	75	100	125	150	175	200	250	300	350
20	0.86	—	0.93	1.05	1.13	1.30	1.47	1.68	1.85	2.03	2.20	2.58	2.93	3.28
25	1.22	—	1.31	1.49	1.58	1.81	2.05	2.32	2.55	2.78	3.01	3.51	3.98	4.44
32	—	1.89	—	—	2.20	2.65	2.97	3.34	3.66	3.97	4.29	4.98	5.61	6.24
40	—	2.16	—	—	2.58	3.07	3.43	3.85	4.21	4.57	4.93	5.71	6.43	7.15
50	—	3.69	—	—	4.33	5.08	5.63	6.27	6.82	7.37	7.92	9.15	10.3	11.4
63	—	4.77	—	—	5.53	6.40	7.06	7.82	8.48	9.15	9.81	11.3	12.7	14.0
80	—	8.11	—	—	9.25	10.6	11.4	12.2	13.0	13.9	14.7	16.6	18.2	19.9
100	—	—	—	—	14.7	16.5	17.6	18.8	20.0	21.2	22.4	25.0	27.3	29.7

Allowable Rotational Torque of Plate

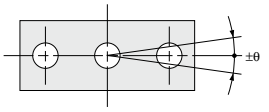


T (N·m)

Bore size (mm)	Bearing type	Stroke													
		20	25	30	40	50	75	100	125	150	175	200	250	300	350
20	**MLGPM**	0.77	—	0.70	0.64	0.59	1.62	1.42	1.27	1.15	1.05	0.97	0.83	0.73	0.65
	MLGPL	0.75	—	0.68	1.49	1.41	1.24	1.11	1.29	1.18	1.08	1.00	0.86	0.76	0.67
25	**MLGPM**	1.24	—	1.13	1.04	0.97	2.49	2.20	1.98	1.79	1.64	1.51	1.30	1.15	1.02
	MLGPL	1.23	—	1.14	2.26	2.14	1.90	1.71	1.96	1.79	1.65	1.53	1.33	1.17	1.04
32	**MLGPM**	—	4.89	—	—	4.13	4.82	4.29	3.87	3.53	3.24	2.99	2.60	2.30	2.06
	MLGPL	—	4.22	—	—	3.64	4.07	3.67	5.37	4.97	4.62	4.31	3.80	3.39	3.06
40	**MLGPM**	—	5.29	—	—	4.49	5.25	4.68	4.23	3.86	3.54	3.28	2.85	2.52	2.26
	MLGPL	—	4.53	—	—	3.93	4.41	3.98	5.84	5.41	5.03	4.70	4.15	3.70	3.34
50	**MLGPM**	—	10.06	—	—	8.66	10.13	9.12	8.29	7.60	7.01	6.51	5.70	5.06	4.56
	MLGPL	—	6.40	—	—	5.57	7.76	7.04	9.75	9.05	8.43	7.88	6.96	6.22	5.60
63	**MLGPM**	—	11.13	—	—	9.60	11.27	10.15	9.24	8.48	7.83	7.28	6.37	5.67	5.11
	MLGPL	—	6.91	—	—	6.02	8.48	7.69	10.73	9.95	9.27	8.67	7.65	6.83	6.14
80	**MLGPM**	—	16.70	—	—	14.67	19.10	17.41	15.99	14.79	13.75	12.85	11.36	10.18	9.23
	MLGPL	—	9.44	—	—	16.88	17.92	16.51	15.28	14.20	13.24	12.37	10.89	9.66	8.62
100	**MLGPM**	—	—	—	—	26.17	30.70	28.23	26.12	24.31	22.73	21.35	19.03	17.17	15.64
	MLGPL	—	—	—	—	21.11	29.10	26.98	25.10	23.43	21.93	20.57	18.21	16.22	14.53

Note) Do not apply rotational force in a locked condition, as this will cause damage to the lock mechanism or decrease of the product life.

Non-rotating Accuracy of Plate

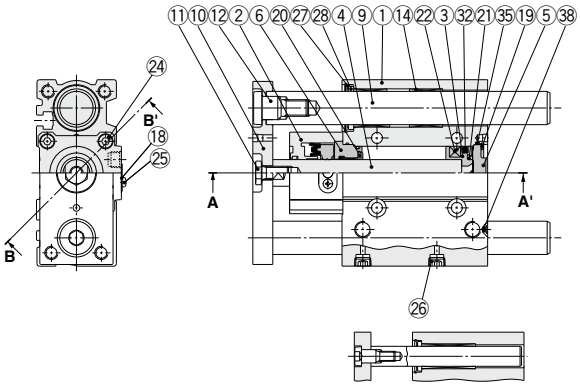


Note) For non-rotating accuracy θ without load, use a value no more than the values in the table as a guide.

Bore size (mm)	Non-rotating accuracy θ	
	MLGPM	**MLGPL**
20	±0.07°	±0.09°
25		
32	±0.06°	±0.08°
40		
50	±0.05°	±0.06°
63		
80	±0.04°	±0.05°
100		

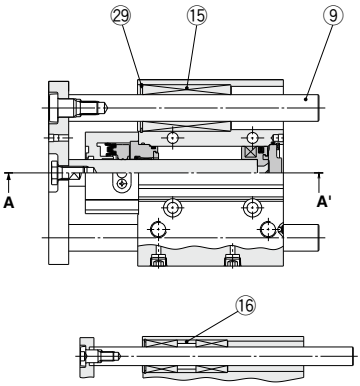
Construction: ø20, ø25, ø32

MLGPM series



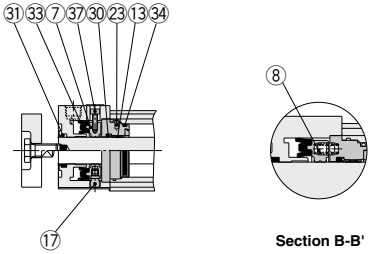
ø20, ø25: 50 stroke or less

MLGPL series



Over 100 stroke

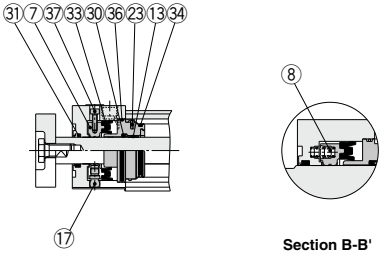
Type F (Extension locking)



Section A-A'

Section B-B'

Type B (Retraction locking)



Section A-A'

Section B-B'

∗ Above figures show the unlocked state.

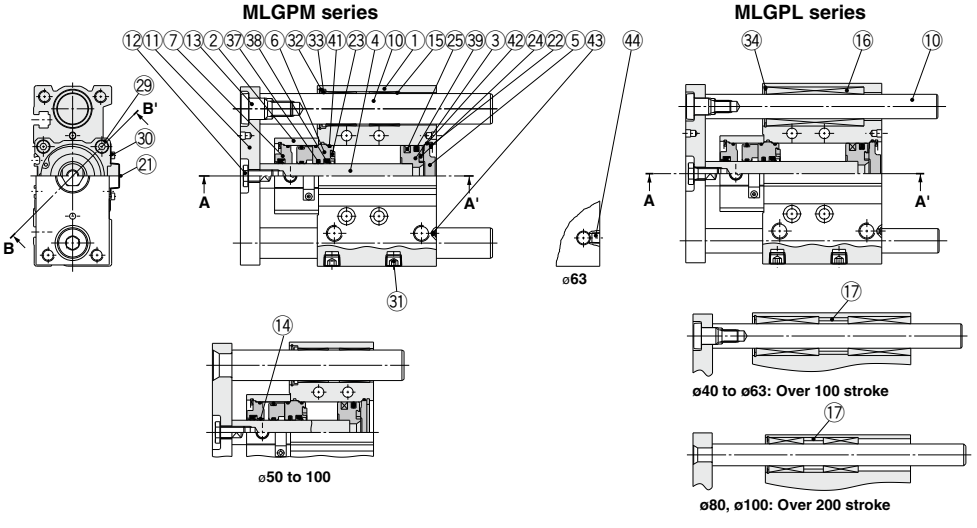
Component Parts

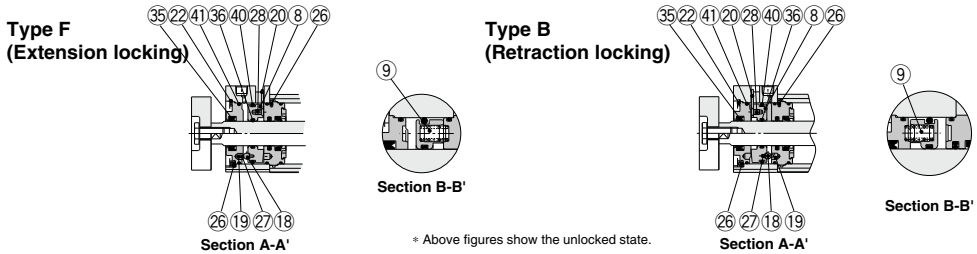
No.	Description		Material	Note
1	Body		Aluminum alloy	Hard anodized
2	Lock body		Aluminum alloy	Hard anodized
3	Piston		Aluminum alloy	Chromated
4	Piston rod	ø20, 25	Stainless steel	Hard chrome plated
		ø32	Carbon steel	
5	Head cover		Aluminum alloy	Chromated
6	Intermediate collar		Aluminum alloy	Chromated
7	Lock ring		Carbon steel	Heat treated
8	Brake spring		Steel wire	Zinc chromated
9	Guide rod	Type M	Carbon steel	Hard chromium electroplated
		Type L	High carbon chrome bearing steel	Hard chromium electroplated
10	Plate		Rolled steel	Nickel plated
11	Plate mounting bolt		Chromium molybdenum steel	Nickel plated
12	Guide bolt		Chromium molybdenum steel	Nickel plated
13	Bushing		Bearing alloy	
14	Bushing		Bearing alloy	Type MLGPM
15	Ball bushing		—	Type MLGPL
16	Spacer		Aluminum alloy	Chromated (Type MLGPL only)
17	Pivot		Chromium molybdenum steel	Heat treated/Hard chrome plated
18	Dust cover		Stainless steel	

Component Parts

No.	Description	Material	Note
19	Type C retaining ring for hole	Carbon tool steel	Phosphate coated
20	Bumper A	Urethane	
21	Bumper B	Urethane	
22	Magnet	—	
23	Parallel pin	Stainless steel	
24	Hexagon socket head cap screw	Chromium molybdenum steel	
25	Dust cover holding bolt	Carbon steel	
26	Hexagon socket head plug	Carbon steel	
27	Holder	Resin	Type MLGPM only
28	Felt	Felt	Type MLGPM only
29	Type C retaining ring for hole	Carbon tool steel	Phosphate coated (Type MLGPL only)
30	Rod seal	NBR	
31	Scraper	NBR	
32	Piston seal	NBR	
33	Lock ring seal	NBR	
34	Gasket A	NBR	
35	Gasket B	NBR	
36	Lock body gasket	NBR	
37	Unlocking bolt	Chromium molybdenum steel	
38	Steel ball	High carbon chrome bearing steel	

Construction: ø40 to ø100





∗ Above figures show the unlocked state.

Component Parts

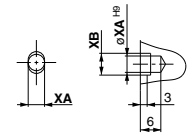
No.	Description		Material	Note
1	**Body**		Aluminum alloy	Hard anodized
2	**Lock body**		Aluminum alloy	Hard anodized
3	**Piston**		Aluminum alloy	Chromated
4	**Piston rod**		Carbon steel	Hard chrome plated
5	**Head cover**	ø40 to 63	Aluminum alloy	Chromated
		ø80, 100	Aluminum alloy casted	Chromated/Painted
6	**Intermediate collar**		Aluminum alloy	Chromated
7	**Collar**	ø40	Aluminum alloy	Hard anodized
		ø50 to 100	Aluminum alloy casted	Chromated/Painted
8	**Lock ring**		Carbon steel	Heat treated
9	**Brake spring**		Steel wire	Zinc chromated
10	**Guide rod**	Type M	Carbon steel	Hard chrome plated
		Type L	High carbon chrome bearing steel	Hard chrome plated
11	**Plate**		Rolled steel	Nickel plated
12	**Plate mounting bolt**		Chromium molybdenum steel	Nickel plated
13	**Guide bolt**		Chromium molybdenum steel	ø40, Nickel plated
14	**Bushing**		Bearing alloy	ø50 to 100
15	**Bushing**		Bearing alloy	Type MLGPM
16	**Ball bushing**		—	Type MLGPL
17	**Spacer**		Aluminum alloy	Chromated (Type MLGPL only)
18	**Pivot pin**		Carbon steel	Heat treated/Zinc chromated
19	**Pivot key**		Carbon steel	Heat treated/Zinc chromated
20	**Lever**		Stainless steel	
21	**Dust cover**	ø40	Rolled steel	
		ø50 to 100	Stainless steel	

Component Parts

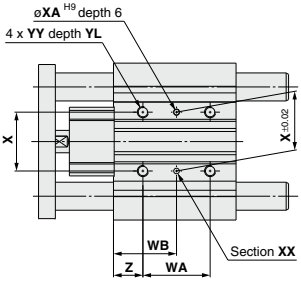
No.	Description		Material	Note
22	**Type C retaining ring for hole**		Carbon tool steel	Phosphate coated
23	**Bumper A**		Urethane	
24	**Bumper B**		Urethane	
25	**Magnet**		—	
26	**Parallel pin**		Stainless steel	
27	**Spring pin**		Carbon steel	
28	**Hexagon socket countersunk head screw**		Chromium molybdenum steel	
29	**Hexagon socket head cap screw**		Chromium molybdenum steel	
30	**Dust cover holding bolt**	ø40 to 63	Chromium molybdenum steel	
		ø80, 100	Carbon steel	
31	**Hexagon socket head plug**		Carbon steel	
32	**Holder**		Resin	Type MLGPM only
33	**Felt**		Felt	Type MLGPM only
34	**Type C retaining ring for hole**		Carbon tool steel	Phosphate coated (Type MLGPL only)
35	**Rod seal A**		NBR	
36	**Rod seal B**		NBR	
37	**Rod seal C**		NBR	
38	**Scraper**		NBR	
39	**Piston seal**		NBR	
40	**Brake piston seal**		NBR	
41	**Gasket A**		NBR	
42	**Gasket B**		NBR	
43	**Steel ball**		High carbon chrome bearing steel	ø40, ø50
44	**Plug**		Carbon steel	ø63 to 100

Dimensions: ø20, ø25, ø32

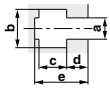
MLGPM/MLGPL



Detailed figure of XX section



Bottom view

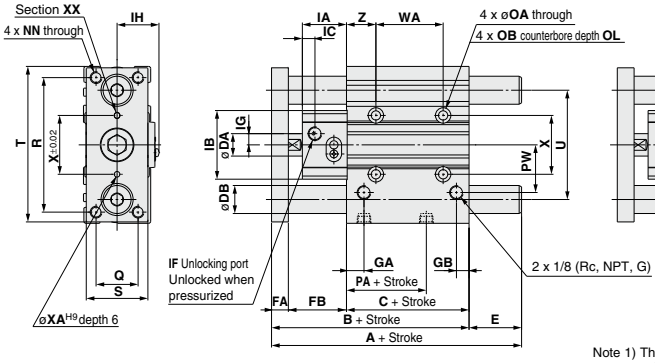


T-slot dimensions

Bore size (mm)	a	b	c	d	e
20	5.4	8.4	4.5	2.8	7.8
25	5.4	8.4	4.5	3	8.2
32	6.5	10.5	5.5	3.5	9.5

Extension locking

Retraction locking



Note 1) The intermediate strokes other than the standard strokes at left are manufactured by means of installing a spacer. Intermediate strokes for ø20 to ø32 are available in 1 mm increments.

Note 2) For intermediate strokes, dimensions A, B, C, E, PA, WA, and WB will be the same as the standard stroke with a longer one.

Common Dimensions: MLGPM/MLGPL

(mm)

Bore size (mm)	Standard stroke (mm)	B	C	DA	FA	FB	G	GA	GB	H	HA	IA	IB	IC				ID	IE	IF	
														Extension locking		Retraction locking					
														Rc, NPT	G	Rc, NPT	G			Rc, NPT	G
20	20, 30, 40, 50, 75, 100, 125	79.5	37	10	10	32.5	36	10.5	8.5	83	M5	26.5	36	9.5	9.5	6	6	—	—	M5 x 0.8	M5 x 0.8
25	150, 175, 200, 250, 300, 350	84	37.5	12	10	36.5	42	11.5	9	93	M5	30.5	40	10	10	7.5	7.5	—	—	M5 x 0.8	M5 x 0.8
32	25, 50, 75, 100, 125,1 50, 175, 200, 250, 300, 350	91	37.5	16	12	41.5	48	12.5	9	112	M6	31.5	49	9	8	9	4	32	3	1/8	M5 x 0.8

Bore size (mm)	IG	IH	J	K	L	MM	ML	NN	OA	OB	OL	PA	PB	PW	Q	R	S	T	U	VA	VB
20	6.5	21.2	18	18	24	M5 x 0.8	13	M5 x 0.8	5.4	9.5	5.5	12.5	10.5	25	18	70	30	81	54	72	44
25	7	23.2	21	21	30	M6 x 1.0	15	M6 x 1.0	5.4	9.5	5.5	12.5	13.5	30	26	78	38	91	64	82	50
32	8	30.2	24	24	34	M8 x 1.25	20	M8 x 1.25	6.6	11	7.5	7	15	35.5	30	96	44	110	78	98	63

Bore size (mm)	WA							WB							X	XA	XB	YY	YL	Z
	st ≤ 25	st ≤ 30	25 < st ≤ 100	30 < st ≤ 100	100 < st ≤ 200	200 < st ≤ 300	300 < st ≤ 350	st ≤ 25	st ≤ 30	25 < st ≤ 100	30 < st ≤ 100	100 < st ≤ 200	200 < st ≤ 300	300 < st ≤ 350						
20	—	24	—	44	120	200	300	—	29	—	39	77	117	167	28	3	3.5	M6 x 1.0	12	17
25	—	24	—	44	120	200	300	—	29	—	39	77	117	167	34	4	4.5	M6 x 1.0	12	17
32	24	—	48	—	124	200	300	33	—	45	—	83	121	171	42	4	4.5	M8 x 1.25	16	21

A, DB, E Dimensions: MLGPM (Slide bearing) (mm)

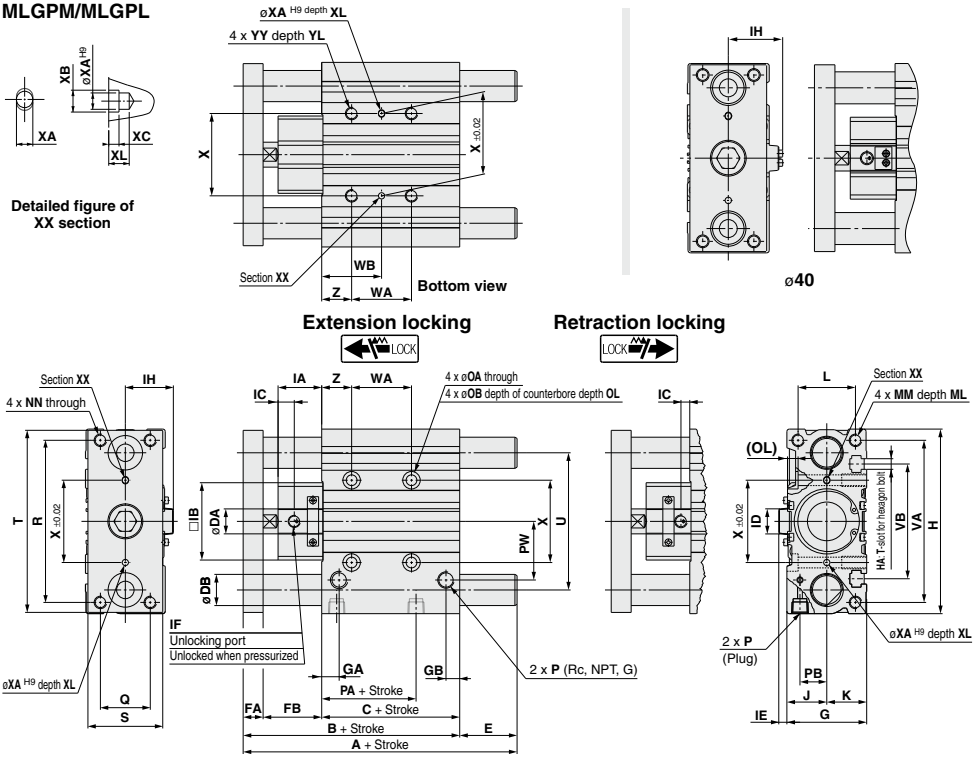
Bore size (mm)	A			DB	E		
	st ≤ 50	50 < st ≤ 200	200 < st		st ≤ 50	50 < st ≤ 200	200 < st
20	79.5	111	148.5	12	0	31.5	69
25	84	115.5	152.5	16	0	31.5	68.5
32	128.5	133.5	171.5	20	37.5	42.5	80.5

A, DB, E Dimensions: MLGPL (Ball bushing bearing) (mm)

Bore size (mm)	A							DB	E					
	st ≤ 30	st ≤ 50	30 < st ≤ 100	50 < st ≤ 100	100 < st ≤ 200	200 < st ≤ 350			st ≤ 30	st ≤ 50	30 < st ≤ 100	50 < st ≤ 100	100 < st ≤ 200	200 < st ≤ 350
20	89.5	—	106.5	—	130.5	148.5		10	10	—	27	—	51	69
25	100	—	116	—	135	152.5		13	16	—	32	—	51	68.5
32	—	112.5	—	129.5	149.5	171.5		16	—	21.5	—	38.5	58.5	80.5

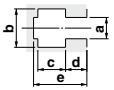
Dimensions: ø40, ø50, ø63

MLGPM/MLGPL



Note 1) The intermediate strokes other than the standard strokes at left are manufactured by means of installing a spacer.
Intermediate strokes for ø40 to ø63 are available in 5 mm increments.
Note 2) For intermediate strokes, dimensions A, B, C, E, PA, WA, and WB will be the same as the standard stroke with a longer one.

T-slot dimensions



Bore size (mm)	a	b	c	d	e
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

Common Dimensions: MLGPM/MLGPL

(mm)

Bore size (mm)	Standard stroke (mm)	B	C	DA	FA	FB	G	GA	GB	H	HA	IA	IB	IC				ID	IE	IF	
														Extension locking		Retraction locking					
														Rc, NPT	G	Rc, NPT	G			Rc,NPT	G
40	25, 50, 75, 100, 125, 150 175, 200, 250, 300, 350	100	44	16	12	44	54	14	10	120	M6	34	52	11	13.8	6.5	4.5	14	4	1/8	M5 x 0.8
50		107	44	20	16	47	64	14	11	148	M8	35	62	13	15	6.8	4.8	19	6.5	1/8	M5 x 0.8
63		115	49	20	16	50	78	16.5	13.5	162	M10	38	79	16.5	16.2	7.5	6.5	19	6.5	1/8	1/8

Bore size (mm)	IH	J	K	L	MM	ML	NN	OA	OB	OL	P	PA	PB	PW	Q	R	S	T	U	VA	VB
40	34.5	27	27	40	M8 x 1.25	20	M8 x 1.25	6.6	11	7.5	1/8	13	18	39.5	30	104	44	118	86	106	72
50	38.5	32	32	46	M10 x 1.5	22	M10 x 1.5	8.6	14	9	1/4	9	21.5	47	40	130	60	146	110	130	92
63	46	39	39	58	M10 x 1.5	22	M10 x 1.5	8.6	14	9	1/4	14	28	58	50	130	70	158	124	142	110

Bore size (mm)	WA					WB					X	XA	XB	XC	XL	YY	YL	Z
	st ≤ 25	25 < st ≤ 100	100 < st ≤ 200	200 < st ≤ 300	300 < st ≤ 350	st ≤ 25	25 < st ≤ 100	100 < st ≤ 200	200 < st ≤ 300	300 < st ≤ 350								
40	24	48	124	200	300	34	46	84	122	172	50	4	4.5	3	6	M8 x 1.25	16	22
50	24	48	124	200	300	36	48	86	124	174	66	5	6	4	8	M10 x 1.5	20	24
63	28	52	128	200	300	38	50	88	124	174	80	5	6	4	8	M10 x 1.5	20	24

Dimensions A, DB, E: MLGPM (Slide bearing) (mm)

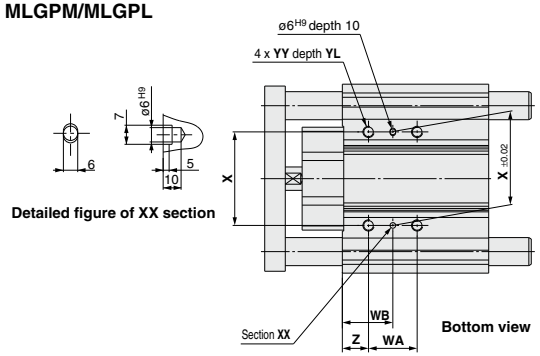
Bore size (mm)	A			DB	E		
	st ≤ 50	50 < st ≤ 200	200 < st ≤ 350		st ≤ 50	50 < st ≤ 200	200 < st ≤ 350
40	131	136	174	20	31	36	74
50	141.5	153	196	25	34.5	46	89
63	144.5	156	199	25	29.5	41	84

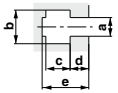
Dimensions A, DB, E: MLGPL (Ball bushing bearing) (mm)

Bore size (mm)	A				DB	E			
	st ≤ 50	50 < st ≤ 100	100 < st ≤ 200	200 < st ≤ 350		st ≤ 50	50 < st ≤ 100	100 < st ≤ 200	200 < st ≤ 350
40	115	132	152	174	16	15	32	52	74
50	128	149	169	196	20	21	42	62	89
63	131	152	172	199	20	16	37	57	84

Dimensions: ø80, ø100

MLGPM/MLGPL





T-slot dimensions

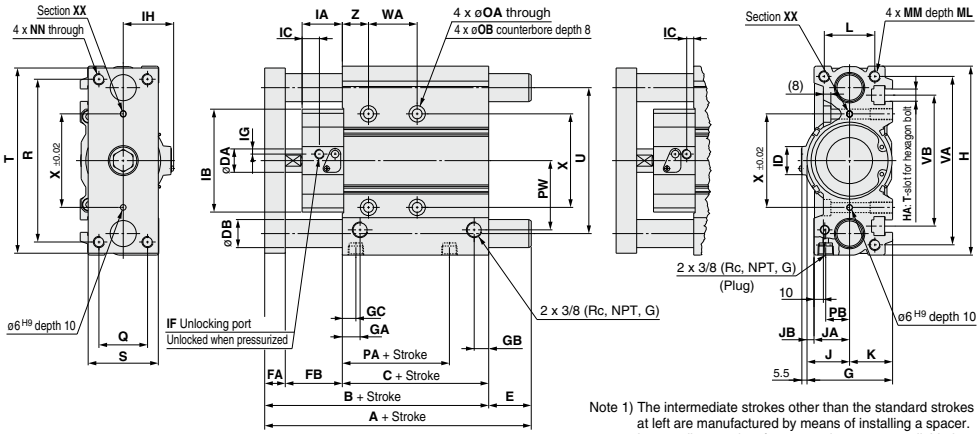
Bore size (mm)	a	b	c	d	e
80	13.3	20.3	12	8	22.5
100	15.3	23.3	13.5	10	30

Extension locking

LOCK

Retraction locking

LOCK



Note 1) The intermediate strokes other than the standard strokes at left are manufactured by means of installing a spacer. Intermediate strokes for ø80 and ø100 are available in 5 mm increments.

Note 2) For intermediate strokes, dimensions A, B, C, E, PA, WA, and WB will be the same as the standard stroke with a longer one.

Common Dimensions: MLGPM/MLGPL

(mm)

Bore size (mm)	Standard stroke (mm)	B	C	DA	FA	FB	G	GA	GB	GC	H	HA	IA	IB	IC				ID	IE	IF	
															Extension locking		Retraction locking					
															RC,NPT	G	RC,NPT	G			Rc,NPT	G
80	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350	139.5	56.5	25	22	61	91.5	19	15.5	14.5	202	M12	43	110	18.5	18.5	6.5	6.5	30	5.5	1/8	1/8
100	50, 75, 100, 125, 150, 175, 200, 250, 300, 350	167.5	66	30	25	76.5	111.5	23	19	18	240	M14	51.5	137	23	23	11	7	50	5.5	1/4	1/8

Bore size (mm)	IG	IH	J	JA	JB	K	L	MM	ML	NN	OA	OB	PA	PB	PW	Q	R	S	T	U	VA	VB
80	7	54.2	45.5	38	7.5	46	54	M12 x 1.75	25	M12 x 1.75	10.6	17.5	14.5	25.5	74	52	174	75	198	156	180	140
100	15	64.2	55.5	45	10.5	56	62	M14 x 2.0	31	M14 x 2.0	12.5	20	17.5	32.5	89	64	210	90	236	188	210	166

Bore size (mm)	WA							WB							X	YY	YL	Z
	st ≤ 25	st ≤ 50	25 < st ≤ 100	50 < st ≤ 100	100 < st ≤ 200	200 < st ≤ 300	300 < st ≤ 350	st ≤ 25	st ≤ 50	25 < st ≤ 100	50 < st ≤ 100	100 < st ≤ 200	200 < st ≤ 300	300 < st ≤ 350				
80	28	—	52	—	128	200	300	42	—	54	—	92	128	178	100	M12 x 1.75	24	28
100	—	50	—	72	124	200	300	—	60	—	71	97	135	185	124	M14 x 2.0	28	35

Dimensions A, DB, E: MLGPM (Slide bearing) (mm)

Bore size (mm)	A				DB	E		
	st ≤ 50	50 < st ≤ 200	200 < st ≤ 350			st ≤ 50	50 < st ≤ 200	200 < st ≤ 350
80	158	185	236		30	18.5	45.5	96.5
100	188.5	213.5	254.5		36	21	46	87

Dimensions A, DB, E: MLGPL (Ball bushing bearing) (mm)

Bore size (mm)	A				DB	E			
	st ≤ 25	25 < st ≤ 50	50 < st ≤ 200	200 < st ≤ 350		st ≤ 25	25 < st ≤ 50	50 < st ≤ 200	200 < st ≤ 350
80	152.5	173	203	236	25	13	33.5	63.5	96.5
100	—	198.5	231.5	254.5	30	—	31	64	87

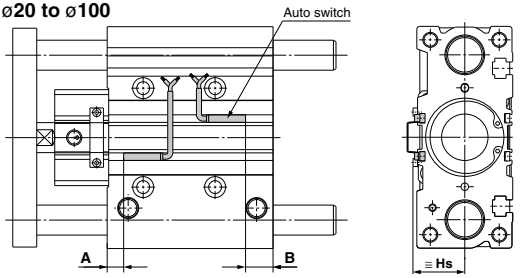
Auto Switch Mounting

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

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

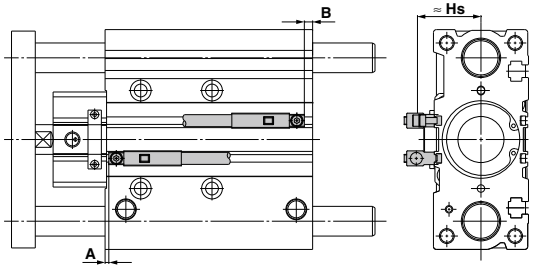
D-Z7□
D-Z80
D-Y59□
D-Y69□
D-Y7P
D-Y7PV
D-Y7□W
D-Y7□WV
D-Y7BA

ø20 to ø100

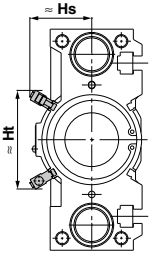


D-P3DWA (∗ Cannot be mounted on bore size ø20.)

ø25 to ø63

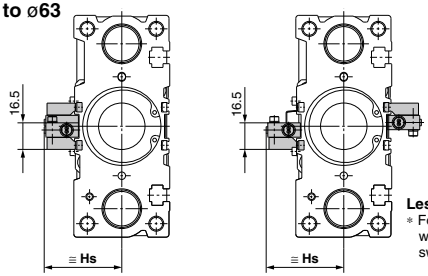


ø80, ø100



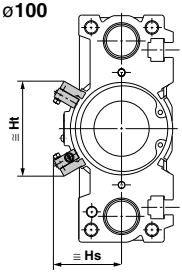
D-P4DW (∗ Cannot be mounted on bore size ø25 or less.)

ø32 to ø63



Less than 25 to 75 strokes
∗ For bore sizes ø32 through 63 with two auto switches, one switch is mounted on each side.

ø80, ø100



Auto Switch Proper Mounting Position

(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-Z7□ Z80 D-Y59□ Y7P D-Y69□ Y7PV D-Y7□W D-Y7□WV D-Y7BA		D-P3DWA Note 2)		D-P4DW	
	A	B	A	B	A	B	A	B	A	B
20	9.5	12.5	5.5	8.5	4.5	7.5	—	—	—	—
25	9.5	13	5.5	9	4.5	8	6	8.5	—	—
32	10.5	12	6.5	8	5.5	7	6	7.5	5	6.5
40	14.5	14.5	10.5	10.5	9.5	9.5	10	10	9	9
50	12.5	16.5	8.5	12.5	7.5	11.5	8	12	7	11
63	15	19	11	15	10	14	10.5	14.5	9.5	13.5
80	18	23.5	14	19.5	13	18.5	13.5	19	12.5	18
100	22.5	28.5	18.5	24.5	17.5	23.5	18	24	17	23

Auto Switch Mounting Height

(mm)

Auto switch model / Bore size (mm)	M9□ D-M9□W D-M9□A D-A9□ D-Z7□ Z80 D-Y59□ Y7P D-Y7□W D-Y7BA	D-A9□V		D-M9□V D-M9□WV D-M9□AV		D-Y69□ D-Y7PV D-Y7□WV		D-P3DWA		D-P4DW	
	Hs	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
20	18.5	22	—	24.5	—	20	—	—	—	—	—
25	20.5	24	—	26	—	21.5	—	32	—	—	—
32	23	26.5	—	29	—	24.5	—	35	—	41.5	—
40	27	30.5	—	33	—	28.5	—	39	—	44.5	—
50	32.5	36	—	38.5	—	34	—	44.5	—	50	—
63	39.5	43	—	45.5	—	41	—	51.5	—	57	—
80	40	43	71.5	45	74	41	70	49.5	78.5	61	84.5
100	50	53	83	55	85.5	51	81.5	60	90	71	96.5

Note 1) Adjust the auto switch after confirming the operating conditions in the actual setting.
Note 2) The auto switch mounting bracket BMG2-012 is used.

Minimum Auto Switch Mounting Stroke

(mm)

Auto switch model	No. of auto switch mounted	ø20	ø25	ø32	ø40	ø50	ø63	ø80	ø100
D-M9□ D-M9□V D-A9□ D-A9□V	1 pc.	5							
	2 pcs.	10							
D-M9□W 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-Z7□ D-Z80 D-Y59□ D-Y7P	1 pc.	5 Note 1)		5					
	2 pcs.	10							
D-Y69□	1 pc.	5							
D-Y7PV	2 pcs.	5							
D-Y7□W D-Y7□WV D-Y7BA	1 pc.	5 Note 2)							
	2 pcs.	10 Note 2)							
D-P3DWA	1 pc.	—	15						
	2 pcs.	—	15						
D-P4DW	1 pc.	—		5 Note 2) Note 4)					
	2 pcs., Different surfaces	—		10 Note 2) Note 4)					
	2 pcs., Same surface	—		75				10	

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-P3DWA□ can be mounted on bore sizes ø25 to ø100.
Note 4) The minimum bending radius of the D-P4DW is 25 mm.
Note 5) The D-P4DW can be mounted on bore sizes ø32 to ø100.

Operating Range

(mm)

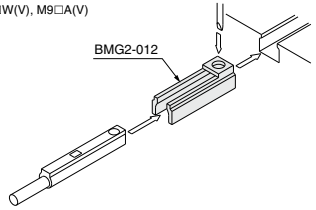
Auto switch model	Bore size (mm)							
	20	**25**	**32**	**40**	**50**	**63**	**80**	**100**
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	5.5	5	6	5.5	6	6.5	6	7
D-A9□/A9□V	9	9	9	9.5	9.5	11	10.5	10.5
D-Z7□/Z80	10	10	10.5	10.5	10.5	11.5	11.5	12
D-Y5□/Y6□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BA	7.5	7	6.5	6	7	8	9.5	10
D-P3DWA	—	5.5	6	6.5	6	6.5	6.5	6.5
D-P4DW	—	—	5	4	4	5	4	4

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

Auto Switch Mounting Bracket: Part No.

Auto switch model	Bore size (mm)		
	ø20	**ø25**	**ø32 to ø100**
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV D-A9□/A9□V	BMG2-012		
D-P3DWA	—	BMG2-012	
D-P4DW	—		BMG1-040

· D-A9□(V), M9□(V), M9□W(V), M9□A(V)



Other than the applicable auto switches listed in "How to Order", the following auto switches can be mounted. For detailed specifications, refer to pages 1119 to 1245.

Auto switch model	Model	Electrical entry (Fetching direction)	Features
Reed	D-Z73, Z76	Grommet (In-line)	—
	D-Z80		Without indicator light
Solid state	D-Y69A, Y69B, Y7PV	Grommet (Perpendicular)	—
	D-Y7NWV, Y7PWV, Y7BWV		Diagnostic indication (2-color indicator)
	D-Y59A, Y59B, Y7P	Grommet (In-line)	—
	D-Y7NW, Y7PW, Y7BW		Diagnostic indication (2-color indicator)
	D-Y7BA		Water resistant (2-color indicator)
	D-P5DW		Magnetic field resistant (2-color indicator)

∗ For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1192 and 1193.
∗ Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H/Y7G/Y7H types) are also available. Refer to pages 1137 and 1139 for details.

MLGP Series
Specific Product Precautions 1

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 12 for Actuator and Auto Switch Precautions.

Selection

⚠ Warning

1. **The holding force (max. static load) indicates the maximum capability to hold a static load without vibration and impact. Therefore, the maximum load (workpiece mass) should not exceed 50% of the holding force (max. static load). Select the load mass when unlocked in accordance with 6 below.**
2. **Do not use for intermediate stops while the cylinder is operating.**
   This cylinder is designed for locking against inadvertent movement from a stationary condition. Do not perform intermediate stops while the cylinder is operating, as this may cause unlocking malfunction, damage or shorten the service life.
3. **Select the correct locking direction, as this cylinder does not generate holding force opposite to the locking direction.**
   The extension locking does not generate holding force in the cylinder's retracting direction, and the retraction locking does not generate holding force in the cylinder's extension direction.
4. **Even when locked, there may be a stroke movement of approximately 1 mm in the locking direction due to external forces, such as the workpiece mass.**
   Even when locked, if air pressure drops, a stroke movement of approximately 1 mm may be generated in the locking direction of the lock mechanism due to external forces such as the workpiece mass.
5. **When in the locked state, do not apply a load accompanied by an impact shock, strong vibration or turning force, etc.**
   This may damage the locking mechanism, shorten the service life or cause unlocking malfunction.
6. **Operate so that load mass, cylinder speed and eccentric distance are within the limiting ranges in the specifications and model selection graphs.**
   If the products are used beyond the limiting range, it may lead to a reduced service life or cause damage to the machinery. (Refer to pages 1091 and 1092 for specifications and pages 1078 to 1089 for the Model Selection.)

Pneumatic Circuit

⚠ Warning

• Drop prevention circuit

1. **Do not use 3 position valves with circuit example 1.**
   The lock may be released due to inflow of the unlocking pressure.
2. **Install speed controllers for meter-out control. (Circuit example 1)**
   When they are not installed or they are used under meter-in control, it may cause malfunction.
3. **Branch off the compressed air piping for the lock unit between the cylinder and the speed controller. (Circuit example 1)**
   Note that branching off in another section can cause a reduction in service life.
4. **Perform piping so that the side going from the piping junction to the lock unit is short. (Circuit example 1)**
   If the lock release port side is longer than another side from the piping junction, this may cause unlocking malfunction or shorten the service life.

Pneumatic Circuit

⚠ Warning

5. **Be aware of reverse exhaust pressure flow from common exhaust type valve manifolds. (Circuit example 1)**
   Since the lock may be released due to reverse exhaust pressure flow, use an individual exhaust type manifold or single type valve.
6. **Be sure to release the lock before operating the cylinder. (Circuit example 2)**
   When the lock release delays, a cylinder may eject at high speed, which is extremely dangerous. It may also damage the cylinder, greatly shorten the service life or cause locking malfunction. Even when a cylinder moves freely, be sure to release the lock and operate the cylinder.
7. **Be aware that the locking action may be delayed due to the piping length or the timing of exhaust. (Circuit example 2)**
   The locking action may be delayed due to the piping length or the timing of exhaust, which also makes the stroke movement toward the lock larger. Install the solenoid valve for locking closer to the cylinder than the cylinder drive solenoid valve.

• Emergency stop circuit

1. **Perform emergency stops with the pneumatic circuit. (Circuit examples 3 and 4)**
   This cylinder is designed for locking against inadvertent movement from a stationary condition. Do not perform intermediate stops while the cylinder is operating, as this may cause unlocking malfunction or shorten the service life. Emergency stops must be performed with the pneumatic circuit, and workpieces must be held with the locking mechanism after the cylinder fully stops.
2. **When restarting the cylinder from the locked state, remove the workpiece and exhaust the residual pressure in the cylinder. (Circuit examples 3 and 4)**
   A cylinder may eject at high speed, which is extremely dangerous. It may also damage the cylinder, greatly shorten the service life or cause locking malfunction.
3. **Be sure to release the lock before operating the cylinder. (Circuit example 4)**
   When the lock release delays, the cylinder may eject at high speed, which is extremely dangerous. It may also damage the cylinder, greatly shorten the service life or cause locking malfunction. Even when the cylinder moves freely, be sure to release the lock and operate the cylinder.

• Drop prevention circuit, Emergency stop circuit

1. **If installing a solenoid valve for a lock unit, be aware that repeated supply and exhaustion of air may cause condensation. (Circuit examples 2 and 4)**
   The lock unit operating stroke is very small and so the pipe is long. If supplying and exhausting air repeatedly, condensation, which occurs by adiabatic expansion, accumulates in the lock unit. This may then cause air leakage and an unlocking malfunction due to corrosion of internal parts.

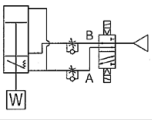
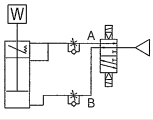
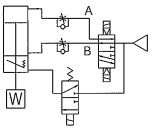
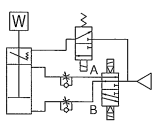
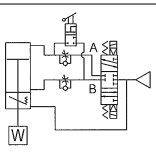
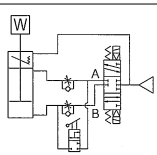
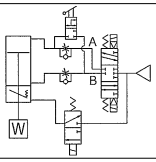
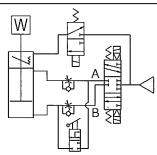
Specific Product Precautions 2

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 12 for Actuator and Auto Switch Precautions.

Pneumatic Circuit

⚠ Warning

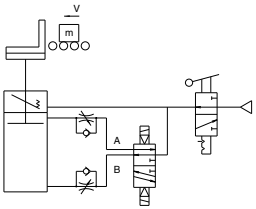
Circuit examples

		Extension locking **F**	Retraction locking **B**
Drop prevention	1		
	2		
Emergency stop	3		
	4		

· Stopper Circuit

1. When used as a stopper, be careful that the workpiece does not collide with the cylinder in a locked condition. Use the guide cylinder with the circuit below.

If the workpiece were bumped into the cylinder in the locked state, it could be unlocked by shock or the locking mechanism and the piston rod could be damaged, that could shorten its service life substantially or result in breakage.



MLGPM-□-B: When used as stopper

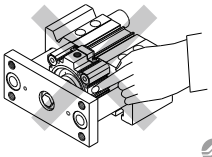
∗ The symbol for the cylinder with lock in the basic circuit uses SMC original symbol.

Mounting

⚠ Warning

1. Take precautions to prevent your fingers or hands from getting caught between the plate and the cylinder body or the lock body.

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



Mounting

⚠ Caution

1. Be sure to connect the load to the plate section with the lock in an unlocked condition.

If this is done in the locked state, it may cause damage to the lock mechanism.
Sizes ø20 through ø32 have a built-in holding function for the unlocked state, allowing the unlocked condition to be maintained even without an air supply. For ø40 through ø100, simply connect piping to the unlocking port and supply air pressure of 0.2 MPa or more.

2. When performing mounting adjustment, supply air pressure only to the unlocking port.

3. 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.

4. 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.

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

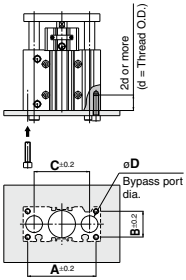
The flatness of the mounting surface may not be maintained, which would cause an increase in sliding resistance.

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

If the flatness of the workpieces and brackets mounted on the plate is not appropriate, sliding resistance may increase.

7. Cylinder bottom

Since the guide rods project from the bottom of the cylinder at the end of the retraction stoke, provide bypass ports in the mounting surface, as well as holes for the hexagon socket head mounting screws, when the cylinder is mounted from the bottom. Furthermore, when subjected to impact in use as a stopper, etc., screw the mounting bolts in to a depth of 2d or more.



Bore size (mm)	A (mm)	B (mm)	C (mm)	D		Hexagon socket head cap screw
				MLGPM	MLGPL	
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

MLGP Series
Specific Product Precautions 3

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 12 for Actuator and Auto Switch Precautions.

Piping

⚠ Caution

Depending on the operating condition, change the position of plugs for the piping port.

1. For M5

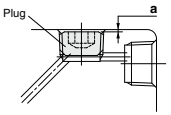
After tightening by hand, tighten additional 1/6 to 1/4 rotation with a tightening tool.

2. For taper thread

Tighten with proper tightening torques below. Also, use pipe tape on the plug. With regard to the sunk dimension of a plug (dimension "a" in the figure), use the stipulated figures as a guide and confirm the air leakage before operation.

∗ If plugs on the top mounting port are tightened with more than the proper tightening torque, they will be screwed too deeply and the air passage will be constricted, resulting in limited cylinder speed.

Connection thread (plug) size	Applicable tightening torgue (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



Preparing for Operation

⚠ Warning

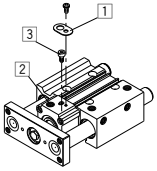
1. Before starting operation from the locked position, be sure to restore air pressure to the B port in the pneumatic circuit.

When pressure is not applied to the B port, the load may drop or the cylinder may eject at high speed, which is extremely dangerous. It may also damage the cylinder, greatly shorten the service life or cause unlocking malfunction. When applying pressure to the B port, be sure to confirm whether the environment is safe, since workpieces may move.

2. Since size ø20 through ø32 are shipped in an unlocked condition maintained by the unlocking bolt, be sure to remove the unlocking bolt following the steps below.

If the cylinder is used without removing the unlocking bolt, the lock mechanism will not function.

For ø20 through ø32 only



1) Confirm that there is no air pressure inside the cylinder, and remove the dust cover 1.
2) Supply air pressure of 0.2 MPa or more to unlocking port 2 shown in the drawing on the left.
3) Remove the unlocking bolt 3 with a hexagon wrench (width across flats 2.5).

Since a holding function for the unlocked state is not available for sizes ø40 through ø100, they can be used as shipped.

Manually Unlocking

⚠ Warning

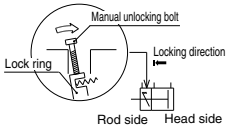
1. Do not perform unlocking while an external force such as a load or spring force is being applied.

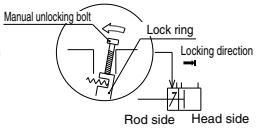
This is very dangerous because the cylinder will move suddenly. Release the lock after preventing cylinder movement with a lifting device such as a jack.

2. After confirming safety, operate the manual release following the steps shown below.

Carefully confirm that personnel are not inside the load movement range, etc., and that there is no danger even if the load moves suddenly.

Manually unlocking
For ø20 to ø32





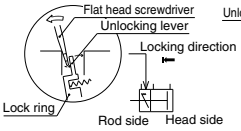
Extension locking

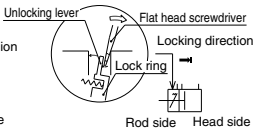
1) Remove the dust cover.
2) Screw a manual unlocking bolt (a bolt of M3 x 0.5 x 15 L or more commercially available) into the lock ring threads as shown above, and lightly push the bolt in the direction of the arrow (head side) to unlock.

Retraction locking

1) Remove the dust cover.
2) Screw a manual unlocking bolt (a bolt of M3 x 0.5 x 15 L or more commercially available) into the lock ring threads as shown above, and lightly push the bolt in the direction of the arrow (rod side) to unlock.

For ø40 to ø100





Extension locking

1) Remove the dust cover.
2) Insert a flat head screwdriver on the rod side of the manual unlocking lever as shown in the figure above, and lightly push the screwdriver in the direction of the arrow (rod side) to unlock.

Retraction locking

1) Remove the dust cover.
2) Insert a flat head screwdriver on the head side of the manual unlocking lever as shown in the figure above, and lightly push the screwdriver in the direction of the arrow (head side) to unlock.

MLGP Series
Specific Product Precautions 4

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 12 for Actuator and Auto Switch Precautions.

Holding the Unlocked State (ø20 to ø32)

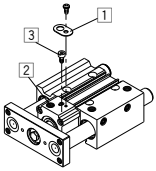
⚠ Caution

1. In order to hold the locked state, be sure to follow the steps below after confirming safety.

1) Remove the dust cover 1.
2) Supply air pressure of 0.2 MPa or more to the unlocking port 2 shown below and unlock.
3) Screw the attached hexagon socket head cap bolt 3 (ø20, ø25: M3 x 0.5 x 5 L, ø32: M3 x 0.5 x 10 L), into the lock ring to hold the unlocked condition.

2. To use the lock mechanism again, be sure to remove the unlocking bolt.

When the unlocking bolt is screwed in, the lock mechanism does not function. Remove the unlocking bolt according to the steps prescribed in the section of "Preparing for Operation".



Maintenance

⚠ Caution

1. In order to maintain good performance, operate with clean unlubricated air.

If lubricated air, compressor oil or drainage, etc., enter the cylinder, there is a danger of sharply reducing the locking performance.

2. Do not apply grease to the piston rod.

There is a danger of sharply reducing the locking performance.

3. ø20 to ø32, a ø12 silver seal is labeled on the one surface of the lock body (on the surface opposite from the unlocking port). The seal is meant for dust prevention, but even if it is peeled off, there would be no problem functionally.

4. Never disassemble the lock unit.

It contains a heavy duty spring which is dangerous and there is also a danger of reducing the locking performance.