

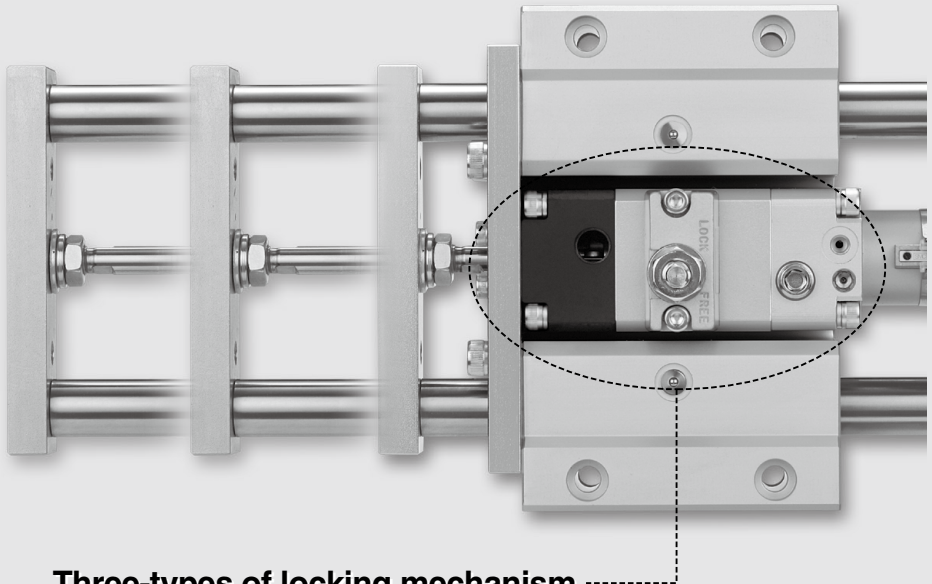
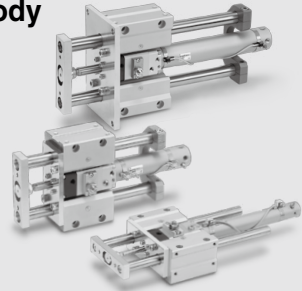
# Guide Cylinder

## MLGC Series

### Built-in Fine Lock Cylinder Compact Type

## Compact integration of guide rods and a fine lock cylinder with a built-in locking mechanism

- **9% weight reduction using a new guide body**  
(In comparison with MLGCLB20-100)
- **Locking in both directions is possible.**  
Locking in either side of cylinder stroke is possible, too.
- **Maximum piston speed: 500 mm/s**  
It can be used at 50 to 500 mm/s provided that it is within the allowable kinetic energy range.
- **Air cushion is standard.**  
Enables the impact to be absorbed at the stroke end when the cylinder is operated at high speeds.
- **Cylinder position can be detected.**  
Built-in magnet for auto switches is provided in all models.



### Three-types of locking mechanism

Locking method	Spring locking	Pneumatic locking	Spring and pneumatic locking
Features	<ul style="list-style-type: none"> <li>● Discharging the unlocking air causes the lock to operate.</li> </ul>	<ul style="list-style-type: none"> <li>● Supplying a pressure to the pressurized locking port enables the change of holding force as desired.</li> </ul>	<ul style="list-style-type: none"> <li>● Supplying a pressure to the pressurized locking port enables the change of holding force as desired.</li> <li>● Discharging the unlocking air causes the lock to operate.</li> </ul>

CLJ2
CLM2
CLG1
CL1
<b>MLGC</b>
CNG
MNB
CNA2
CNS
CLS
CLQ
RLQ
MLU
MLGP
ML1C

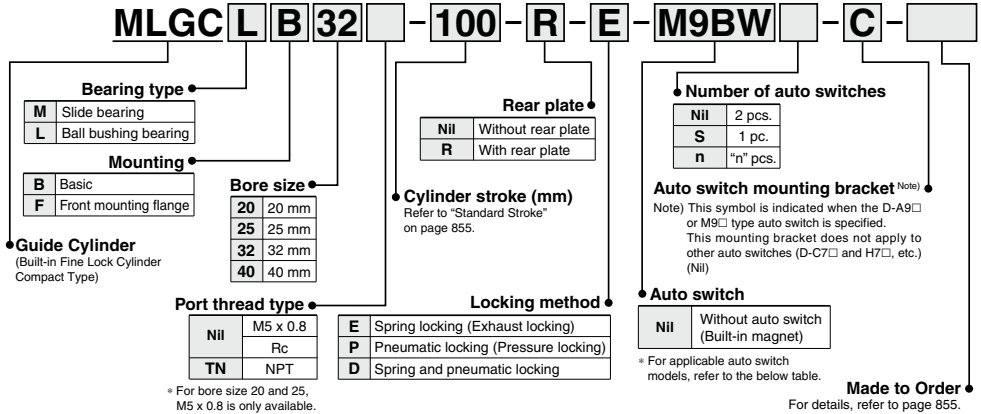
D- <input type="checkbox"/>
-X <input type="checkbox"/>

# Guide Cylinder/Built-in Fine Lock Cylinder Compact Type

# MLGC Series

ø20, ø25, ø32, ø40

## How to Order



## 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		Auto switch model				Lead wire length (m)					Pre-wired connector	Applicable load
					DC	AC	Perpendicular ø20 to ø40		In-line ø32 ø40		0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)		
							ø20, ø25	ø32	ø40	●	○	●	○	●	○		
Solid state auto switch	—	Grommet	—	3-wire (NPN)	5V, 12V	—	M9NV	M9N	●	—	●	○	—	○	IC circuit	Relay, PLC	
				3-wire (PNP)			M9PV	M9P	●	—	●	○	—	○			
		Connector	—	2-wire	12V	—	M9BV	M9B	●	—	●	○	—	○	—		
				—			H7C	●	—	●	○	—	○	—			
	Diagnostic indication (2-color indicator)	Grommet	Yes	3-wire (NPN)	24V	5V, 12V	—	M9NWX	M9NWX	●	●	●	○	—	○		IC circuit
				3-wire (PNP)				M9PWX	M9PW	●	●	●	○	—	○		
		Grommet	—	2-wire	12V	—	M9BWX	M9BW	●	●	●	○	—	○	—		
				3-wire (NPN)			M9NAV*1	M9NA*1	○	○	○	○	—	○	IC circuit		
		Water resistant (2-color indicator)	Grommet	—	3-wire (PNP)	5V, 12V	—	M9PAV*1	M9PA*1	○	○	●	○	—	○		—
					2-wire			M9BAV*1	M9BA*1	○	○	●	○	—	○		—
With diagnostic output (2-color indicator)	Grommet	—	4-wire (NPN)	5V, 12V	—	H7NF	●	—	●	○	—	○	IC circuit				
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	24V	5V	A96V	A96	●	—	●	—	—	—	IC circuit		
				100V			A93V*2	A93	●	●	●	—	—	—			
				100V or less			A90V	A90	●	—	●	—	—	—	IC circuit		
				100V, 200V			—	(B54)	B54	●	—	●	●	—	—		
				200V or less			—	(B64)	B64	●	—	●	●	—	—		
		Connector	None/Yes/None/Yes/None	—	2-wire	24V	—	—	C73C	●	—	●	●	—	—	—	
								—	C80C	●	—	●	●	—	—	IC circuit	
								24V or less	—	(B59W)	B59W	●	—	●	—	—	—
								—	—	—	—	—	—	—	—	—	—
								—	—	—	—	—	—	—	—	—	—

\*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) M9NV  
 1 m ..... M (Example) M9NWM  
 3 m ..... L (Example) M9NWL  
 5 m ..... Z (Example) M9NWX  
 None ..... N (Example) H7CN

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

\* Since there are other applicable auto switches than listed, refer to page 861 for details.

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

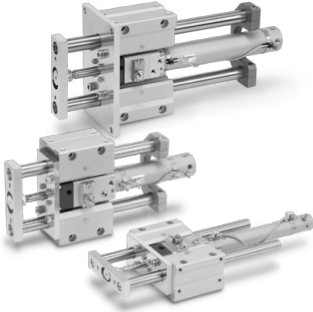
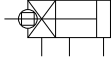
\* The D-A9□(V)/M9□(V)/M9□(V)/M9□(V) are shipped together, (but not assembled). (Only switch mounting bracket is assembled at the time of shipment.)

### Caution

When using auto switches shown inside ( ), stroke end detection may not be possible depending on the One-touch fitting or speed controller model. Please contact SMC in this case.

# Guide Cylinder Built-in Fine Lock Cylinder Compact Type **MLGC Series**

## Symbol



**Made to Order**  
[Click here for details](#)

Symbol	Specifications
-XC79	Tapped hole, drilled hole, pin hole machined additionally

## Model/Specifications

### Model/Stroke

Model (Bearing type)	Bore size (mm)	Standard stroke (mm)	Long stroke (mm)
MLGCM (Slide bearing)	20	75, 100, 125, 150, 200	250, 300, 350, 400
	25		350, 400, 450, 500
	32	75, 100, 125, 150	350, 400, 450, 500, 600
MLGCL (Ball bushing bearing)	40	200, 250, 300	350, 400, 450, 500, 600, 700, 800

\* Intermediate strokes and short strokes other than the above are produced upon receipt of order.

### Specifications

Model	MLGC□□20	MLGC□□25	MLGC□□32	MLGC□□40
Base cylinder	CDLG1BA	Bore size	Thread type	Stroke
Bore size (mm)	20	25	32	40
Action	Double acting			
Fluid	Air			
Proof pressure	1.5 MPa			
Maximum operating pressure	1.0 MPa			
Minimum operating pressure	0.2 MPa (Horizontal, No load)			
Ambient and fluid temperature	-10 to 60°C			
Piston speed <sup>1</sup>	50 to 500 mm/s			
Cushion	Air cushion			
Base cylinder lubrication	Non-lube			
Stroke length tolerance	+1.9 +0.2 mm			
Non-rotating accuracy <sup>2</sup>	Slide bearing	±0.06°	±0.05°	±0.05°
	Ball bushing bearing	±0.04°	±0.04°	±0.04°
Piping port size <sup>3</sup>	Cylinder port	M5 x 0.8		1/8
(Rc, NPT)	Lock port	1/8		
Locking method	<input type="checkbox"/> Spring locking (Exhaust locking) <input type="checkbox"/> Pneumatic locking (Pressure locking) <input type="checkbox"/> Spring and pneumatic locking			

\*1 Constraints associated with the allowable kinetic energy are imposed on the speeds at which the piston can be locked. The maximum speed of 750 mm/s can be accommodated if the piston is to be locked in the stationary state for the purpose of drop prevention.

\*2 When the cylinder is retracted (initial value), the non-rotating accuracy without loads or deflection of the guide rods will be below the values shown in the above table as a guideline.

\*3 For bore size 20 and 25, M5 x 0.8 is only available.

## Fine Lock Specifications

Locking method	Spring locking (Exhaust locking)	Spring and pneumatic locking	Pneumatic locking (Pressure locking)
Fluid	Air		
Maximum operating pressure	0.5 MPa		
Unlocking pressure	0.3 MPa or more		0.1 MPa or more
Lock starting pressure	0.25 MPa or less		0.05 MPa or less
Locking direction	Both directions		

## Theoretical Output



Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm <sup>2</sup> )	Operating pressure (MPa)								
				0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
20	8	OUT	314	62.8	94.2	126	157	188	220	251	283	314
		IN	264	52.8	79.2	106	132	158	185	211	238	264
25	10	OUT	491	98.2	147	196	246	295	344	393	442	491
		IN	412	82.4	124	165	206	247	288	330	371	412
32	12	OUT	804	161	241	322	402	482	563	643	724	804
		IN	691	138	207	276	346	415	484	553	622	691
40	16	OUT	1260	252	378	504	630	756	882	1010	1130	1260
		IN	1060	212	318	424	530	636	742	848	954	1060

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm<sup>2</sup>)

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA2

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

# MLGC Series

## Weight

	(kg)			
Bore size (mm)	20	25	32	40
<b>LB type (Ball bushing bearing/Basic)</b>	2.52	3.92	4.04	7.16
<b>LF type (Ball bushing bearing/Front mounting flange)</b>	3.24	4.89	5.01	8.65
<b>MB type (Slide bearing/Basic)</b>	2.48	3.86	3.98	7.06
<b>MF type (Slide bearing/Front mounting flange)</b>	3.2	4.83	4.95	8.56
<b>Additional weight with rear plate</b>	0.32	0.53	0.53	0.88
<b>Additional weight per each 50 mm of stroke</b>	0.21	0.32	0.34	0.54
<b>Additional weight for long stroke</b>	0.01	0.01	0.02	0.03

Calculation: (Example)

### MLGCLB32-500-R-D

(Ball bushing bearing/Basic, ø32/500 st., with rear plate)

- Basic weight..... 4.04 (LB type)
  - Additional weight with rear plate..... 0.53
  - Additional stroke weight..... 0.34/50 st
  - Stroke..... 500 st
  - Additional weight for long stroke..... 0.02
- 4.04 + 0.53 + 0.34 x 500/50 + 0.02 = 7.99 kg

## Allowable Kinetic Energy when Locking

Bore size (mm)	20	25	32	40
Allowable kinetic energy (J)	0.26	0.42	0.67	1.19

In terms of specific load conditions, the allowable kinetic energy indicated in the table above is equivalent to a 50% load ratio at 0.5 MPa, and a piston speed of 300 mm/sec. Therefore, if the operating conditions are below these values, calculations are unnecessary.

- Apply the following formula to obtain the kinetic energy of the load.

Ek: Kinetic energy of load (J)

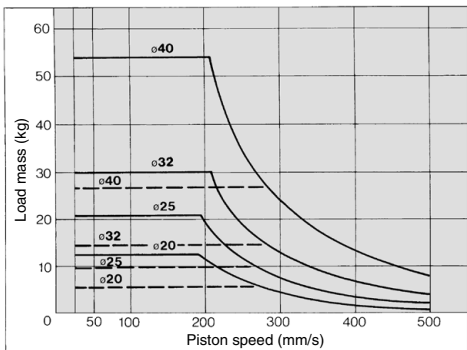
$$E_k = \frac{1}{2} m v^2$$

m: Load mass (kg)

(Load mass + Moving parts weight)

v: Piston speed (m/s) (Average speed x 1.4)

- The piston speed will exceed the average speed immediately before locking. To determine the piston speed for the purpose of obtaining the kinetic energy of load, use 1.4 times the average speed as a guide.
- The relation between the speed and the load of the respective tube bores is indicated in the diagram below. Use the cylinder in the range below the line.
- In order to insure the proper braking force, even within a given allowable kinetic energy level, there is an upper limit to the size of the load. Thus, a horizontally mounted cylinder must be operated below the solid line, and a vertically mounted cylinder must be operated below the dotted line.



## Holding Force of Spring Locking (Max. static load)

Bore size (mm)	20	25	32	40
Holding force (N)	196	313	443	784

Note) Holding force at piston rod extended side decreases approximately 15%.

## Moving Parts Weight

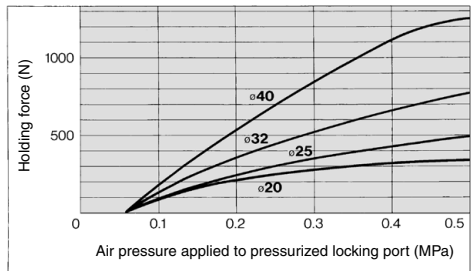
	(kg)			
Bore size (mm)	20	25	32	40
<b>Moving parts basic weight</b>	0.57	1.0	1.03	1.97
<b>Additional weight with rear plate</b>	0.32	0.53	0.53	0.88
<b>Additional weight per each 50 mm of stroke</b>	0.18	0.28	0.29	0.46

Calculation: (Example)

### MLGCLB32-500-R-D

- Moving parts basic weight..... 1.03
  - Additional weight with rear plate..... 0.53
  - Additional stroke weight..... 0.29/50 st
  - Stroke..... 500 st
- 1.03 + 0.53 + 0.29 x 500/50 = 4.46 kg

## Holding Force of Pneumatic Locking (Max. static load)



- The holding force is the lock's ability to hold a static load that does not involve vibrations or shocks, after it is locked without a load. Therefore, to use the cylinder near the upper limit of the constant holding force, be aware of the following:
  - If the piston rod slips because the lock's holding force has been exceeded, the brake shoe could become damaged, resulting in a reduced holding force or shortened life.
  - To use the lock for drop prevention purposes, the load to be attached to the cylinder must be within 35% of the cylinder's holding force.
  - Do not use the cylinder in the locked state to sustain a load that involves impact.

## Stopping Accuracy (Not including tolerance of control system)

Locking method	Piston speed (mm/s)			
	50	100	300	500
<b>Spring locking (Exhaust locking)</b>	±0.4	±0.5	±1.0	±2.0
<b>Pneumatic locking (Pressure locking)</b>	±0.2	±0.3	±0.5	±1.5
<b>Spring and pneumatic locking</b>	±0.2	±0.3	±0.5	±1.5

Condition/ Load: 25% of thrust force at 0.5 MPa

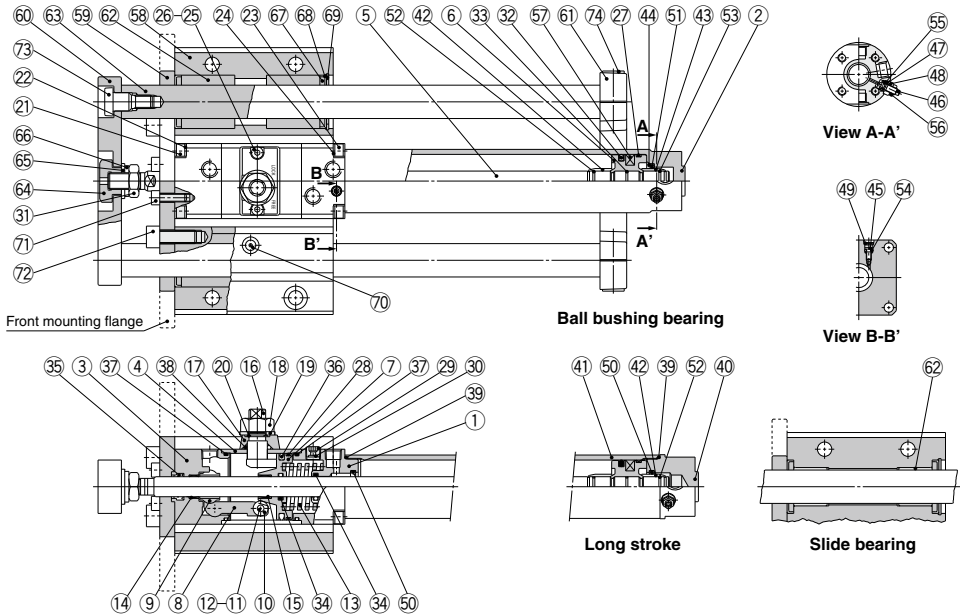
Solenoid valve: mounted to the lock port

## ⚠ Caution

### Recommended Pneumatic Circuit/Caution on Handling

For detailed specifications about the fine lock cylinder CLG1 series, refer to pages 786 to 789.

**Construction: With Rear Plate**



**Component Parts**

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Clear hard anodized
2	Tube cover	Aluminum alloy	Hard anodized
3	Cover	Carbon steel	Nitrided
4	Intermediate cover	Aluminum alloy	Clear hard anodized
5	Piston rod	Carbon steel	Hard chrome plated (ø20, ø25 are stainless steel)
6	Piston	Aluminum alloy	Chromated
7	Brake piston	Carbon steel	Nitrided
8	Brake arm	Carbon steel	Nitrided
9	Brake shoe	Special friction material	
10	Roller	Carbon steel	Nitrided
11	Pin	Carbon steel	Heat treated
12	Retaining ring	Stainless steel	
13	Brake spring	Spring steel wire	Dacrodized For spring locking, spring/pneumatic locking
14	Bushing	Bearing alloy	
15	Bushing	Bearing alloy	
16	Manual lock release cam	Chromium molybdenum steel	Nitrided, Nickel plated
17	Cam guide	Carbon steel	Nitrided, painted
18	Lock nut	Roller steel	Nickel plated
19	Flat washer	Roller steel	Nickel plated
20	Retaining ring	Stainless steel	
21	Hexagon socket head bolt	Chromium molybdenum steel	Nickel plated
22	Spring washer	Steel wire	Nickel plated
23	Hexagon socket head bolt	Chromium molybdenum steel	Nickel plated
24	Spring washer	Steel wire	Nickel plated
25	Hexagon socket head bolt	Chromium molybdenum steel	Nickel plated
26	Spring washer	Steel wire	Nickel plated
27	Wear ring	Resin	
28	Wear ring	Resin	
29	Hexagon socket head plug	Carbon steel	Nickel plated
30	Element	Bronze	Type E only
31	Rod end nut	Roller steel	Nickel plated
32	Piston seal	NBR	
33	Piston gasket	NBR	
34	Rod seal A	NBR	
35	Rod seal B	NBR	
36	Brake piston seal	NBR	
37	Intermediate cover gasket	NBR	
38	Cam gasket	NBR	

Note) ⑥, ⑦ are not required for without rear plate.

**Component Parts**

No.	Description	Material	Note
39	Cylinder tube gasket	NBR	
40	Head cover	Aluminum alloy	Clear hard anodized
41	Cylinder tube	Aluminum alloy	Hard anodized
42	Cushion ring A	Aluminum alloy	Anodized
43	Cushion ring B	Aluminum alloy	Anodized
44	Seal retainer	Roller steel	Zinc chromated
45	Cushion valve A	Chromium molybdenum steel	Electroless nickel plated
46	Cushion valve B	Roller steel	Electroless nickel plated
47	Valve retainer	Roller steel	Electroless nickel plated
48	Lock nut	Roller steel	Nickel plated
49	Retaining ring	Stainless steel	
50	Cushion seal A	Urethane	
51	Cushion seal B	Urethane	
52	Cushion ring gasket A	NBR	
53	Cushion ring gasket B	NBR	
54	Valve seal A	NBR	
55	Valve seal B	NBR	
56	Valve retainer gasket	NBR	
57	Magnet	—	
58	Guide body	Aluminum alloy	Clear anodized
59	Small flange	Roller steel	Nickel plated For basic
59	Large flange	Roller steel	Nickel plated For front mounting flange
60	Front plate	Roller steel	Nickel plated
61	Rear plate	Cast iron	Platinum silver
62	Slide bearing	Bearing alloy	For slide bearing
62	Ball bushing bearing	—	For ball bushing bearing
63	Guide rod	Carbon steel High carbon chrome bearing steel	Hard chrome plated Quenched, Hard chrome plated For ball bushing bearing
64	End bracket	Carbon steel	Nickel plated
65	Washer	Roller steel	Nickel plated
66	Spring washer	Steel wire	Nickel plated
67	Felt	Felt	
68	Holder	Stainless steel	
69	Type C retaining ring for hole	Carbon tool steel	Phosphate coated
70	Grease nipple	—	Nickel plated
71	Hexagon socket head bolt	Chromium molybdenum steel	Nickel plated For cylinder mounting
72	Hexagon socket head bolt	Chromium molybdenum steel	Nickel plated For large/small flange mounting
73	Guide bolt	Chromium molybdenum steel	Nickel plated For front plate mounting
74	Hexagon socket head bolt	Chromium molybdenum steel	Nickel plated For rear plate mounting

- CLJ2
- CLM2
- CLG1
- CL1
- MLGC**
- CNG
- MNB
- CNA2
- CNS
- CLS
- CLQ
- RLQ
- MLU
- MLGP
- ML1C

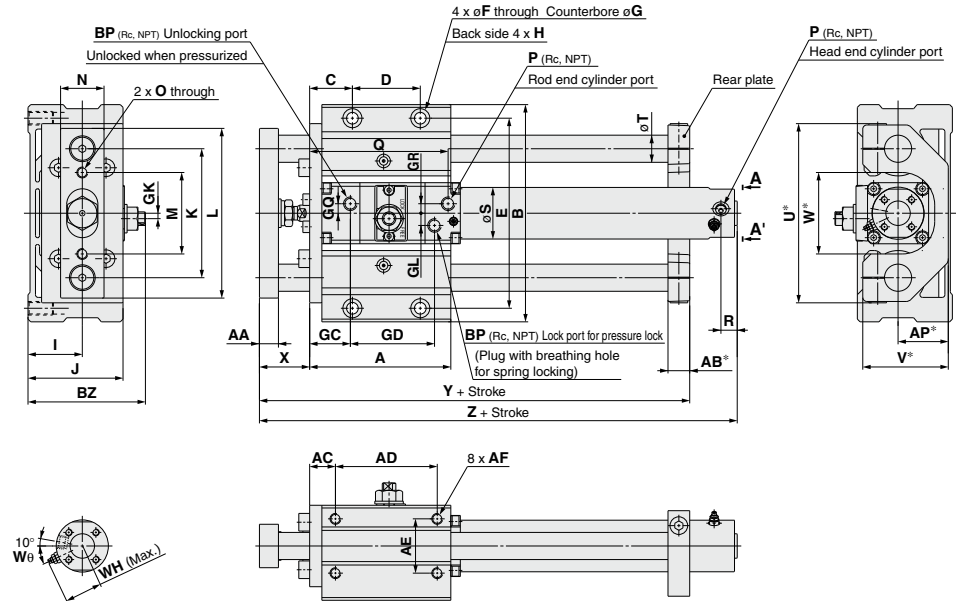
- D-□
- X□

# MLGC Series

## Dimensions

### Basic: With rear plate

MLGC□B□□-□-R-□



View A-A'

### Standard Stroke

Bore size (mm)	Stroke range (mm)	A	AA	AB*	AC	AD	AE	AF	AP*	B	B <sup>①</sup> (Min.3)	BZ	C	D	E	F	G	GC
20	75, 100, 125, 150, 200	94	11	13	16.5	70	35	M6 x 1 depth 12	32	135	1/8	73.5	26.5	50	118	6.8	11 depth 8	28
25	75, 100, 125	104	14	16	19	75	40	M8 x 1.25 depth 16	37	160	1/8	86.5	31.5	50	140	8.6	14 depth 10	29
32	150, 200, 250	104	14	16	19	75	40	M8 x 1.25 depth 16	37	160	1/8	86.5	31.5	50	140	8.6	14 depth 10	30
40	300	142	17	19	22	110	45	M10 x 1.5 depth 20	42	194	1/8	95	37	80	170	10.5	17 depth 12	35

Bore size (mm)	GD	GK	GL	GQ	GR	H	I	J	K	L	M	N	O	P <sup>②</sup> Note 2)	Q	R	S
20	54	3.5	5.5	4	4	M6 x 1.25 depth 14	35	60	80	105	50	25	M6 x 1	M5 x 0.8	94	12	26
25	62	4	9	7	7	M10 x 1.5 depth 18	40	70	95	125	60	32	M8 x 1.25	M5 x 0.8	104	12	31
32	62	4	9	7	7	M10 x 1.5 depth 18	40	70	95	125	60	32	M8 x 1.25	1/8	104	12	38
40	67	4	11	8	7	M12 x 1.75 depth 21	45	82.5	115	150	75	38	M8 x 1.25	1/8	115	12	47

Bore size (mm)	T	U*	V*	W*	WH	Wθ	X	Y	Z
20	16	112	53	50	23	30°	30	146	182
25	20	132	63	60	25	30°	37	167	199
32	20	132	63	60	28.5	25°	37	167	202
40	25	162	73	70	33	20°	44	210	227

### Without Rear Plate

Bore size (mm)	Y
20	129
25	146
32	146
40	191

### Long Stroke

Bore size (mm)	Stroke range (mm)	R	Z
20	250 to 400	14	190
25	350 to 500	14	207
32	350 to 600	14	210
40	350 to 800	15	236

Note 1) Dimensions marked with "\*" are not required for without rear plate.

Note 2) For bore size 20 and 25, M5 x 0.8 is only available.

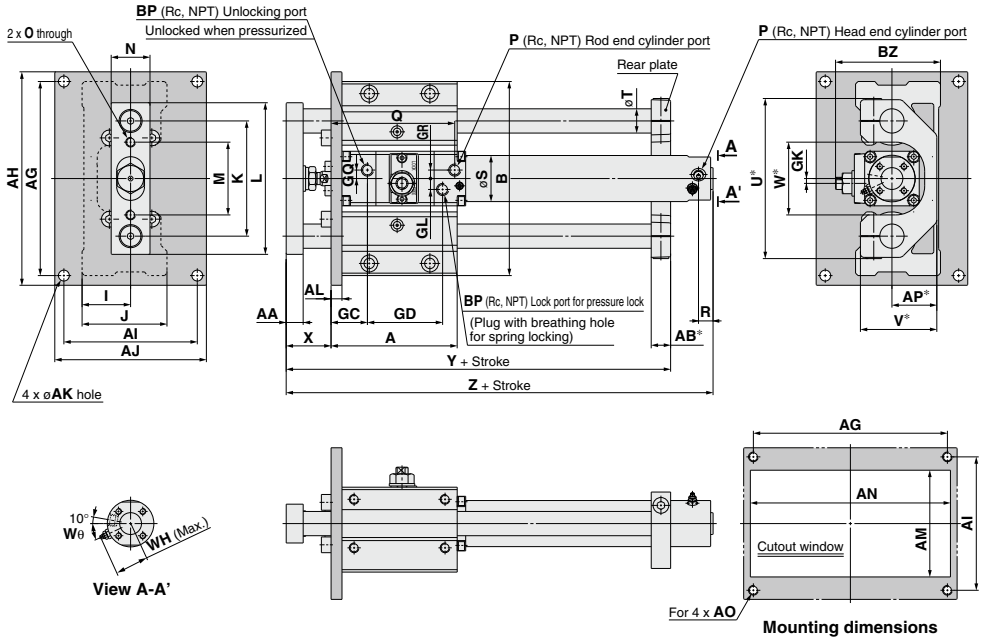
Rc, NPT port are available for bore size 32 or greater.

Note 3) Rc, NPT port are available.

## Dimensions

### Front mounting flange: With rear plate

MLGC□F□□-□-R-□



- CLJ2
- CLM2
- CLG1
- CL1
- MLGC**
- CNG
- MNB
- CNA2
- CNS
- CLS
- CLQ
- RLQ
- MLU
- MLGP
- ML1C

### Standard Stroke

Bore size (mm)		Stroke range (mm)																			(mm)			
20	25	32	40	A	AA	AB <sup>1)</sup>	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP <sup>1)</sup>	B	BP <sup>Note 3)</sup>	BZ	GC	GD	GK		
75, 100, 125, 150, 200				94	11	13	134	150	92	108	9	9	75	140	M8	32	135	1/8	73.5	28	54	3.5		
	75, 100, 125			104	14	16	160	176	110	125	9	9	88	165	M8	37	160	1/8	86.5	29	62	4		
	150, 200, 250			104	14	16	160	176	110	125	9	9	88	165	M8	37	160	1/8	86.5	30	62	4		
	300			142	17	19	190	210	115	135	11	12	96	200	M10	42	194	1/8	95	35	67	4		

Bore size (mm)	GL	GQ	GR	I	J	K	L	M	N	O	P <sup>Note 2)</sup>	Q	R	S	T	U <sup>*</sup>	V <sup>*</sup>	W <sup>*</sup>
20	5.5	4	4	35	60	80	105	50	25	M6 x 1	M5 x 0.8	94	12	26	16	112	53	50
25	9	7	7	40	70	95	125	60	32	M8 x 1.25	M5 x 0.8	104	12	31	20	132	63	60
32	9	7	7	40	70	95	125	60	32	M8 x 1.25	1/8	104	12	38	20	132	63	60
40	11	8	7	45	82.5	115	150	75	38	M8 x 1.25	1/8	115	12	47	25	162	73	70

Bore size (mm)	WH	W <sub>θ</sub>	X	Y	Z
20	23	30°	30	146	182
25	25	30°	37	167	199
32	28.5	25°	37	167	202
40	33	20°	44	210	227

### Without Rear Plate

Bore size (mm)	Y
20	129
25	146
32	146
40	191

### Long Stroke

Bore size (mm)	Stroke range (mm)	R	Z
20	250 to 400	14	190
25	350 to 500	14	207
32	350 to 600	14	210
40	350 to 800	15	236

Note 1) Dimensions marked with "\*" are not required for without rear plate.

Note 2) For bore size 20 and 25, M5 x 0.8 is only available.

Rc, NPT port are available for bore size 32 or greater.

Note 3) Rc, NPT port are available.

- D-□
- X□

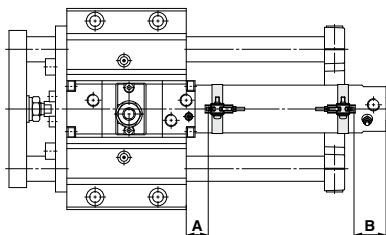
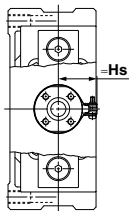
# Auto Switch Mounting

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

D-M9□/M9□W

D-M9□A

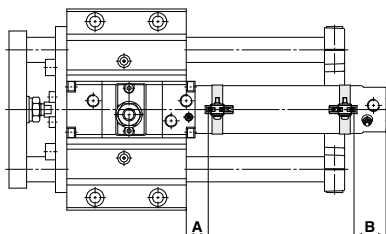
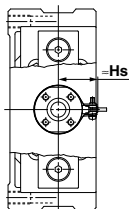
D-A9□



D-M9□V/M9□WV

D-M9□AV

D-A9□V

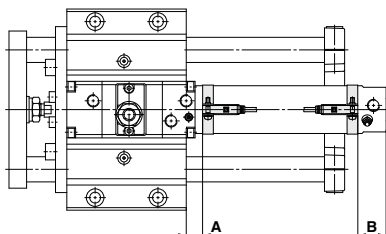
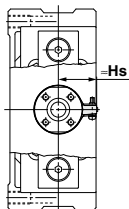


D-H7□/H7□W

D-H7NF/H7BA

D-H7C

D-B5/B6/B59W



D-G5/K5/G5□W/G5BA

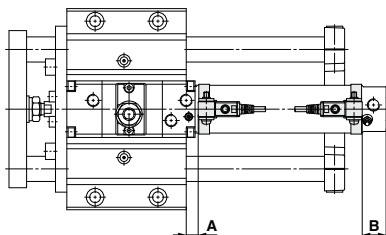
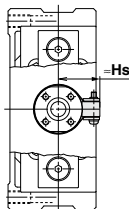
D-K59W

D-G59F

D-G5NT

D-C7/C8

D-C73C/C80C



### Auto Switch Proper Mounting Position

Auto switch model	D-M9□(V) D-M9□W(V) D-M9□A(V)		D-A9□(V)		D-C7/C8 D-C73C D-C80C		D-B5 D-B6		D-B59W		D-H7□ D-H7C D-H7□W D-H7BA D-H7NF		D-G5□W D-K59W D-G59F D-G5 D-K5 D-G5NT D-G5BA	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
<b>20</b>	10.5	27 (35)	6.5	23 (31)	7	23.5 (31.5)	1	17.5 (25.5)	4	20.5 (28.5)	6	22.5 (30.5)	2.5	19 (27)
<b>25</b>	10.5	27 (35)	6.5	23 (31)	7	23.5 (31.5)	1	17.5 (25.5)	4	20.5 (28.5)	6	22.5 (30.5)	2.5	19 (27)
<b>32</b>	10.5	29 (37)	6.5	25 (33)	7	25.5 (33.5)	1	19.5 (27.5)	4	22.5 (30.5)	6	24.5 (32.5)	2.5	21 (29)
<b>40</b>	13.5	32 (41)	9.5	28 (37)	10	28.5 (37.5)	4	22.5 (31.5)	7	25.5 (34.5)	9	27.5 (36.5)	5.5	24 (33)

### Auto Switch Mounting Height

Auto switch model	D-M9□(V) D-M9□W(V) D-M9□A(V) D-A9□(V)		D-C7/C8 D-H7□ D-H7□W D-H7NF D-H7BA		D-C73C D-C80C		D-B5/B6 D-B59W D-G5/K5 D-G5□W D-G59W D-K59W	
	Hs	Hs	Hs	Hs	Hs	Hs		
<b>20</b>	25	24.5	27	27.5				
<b>25</b>	27.5	27	29.5	30				
<b>32</b>	31	30.5	33	33.5				
<b>40</b>	35.5	35	37.5	38				

\* ( ) : Values for long stroke

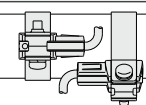
Note) Adjust the auto switch after confirming the operating conditions in the actual setting.



## Minimum Stroke for Auto Switch Mounting

Auto switch model	n: Number of auto switches (mm)		Number of auto switches mounted	
	1 pc.	2 pcs.		"n" pcs.
		Same surface	Same surface	
D-M9□/M9□W/A9□	10	45	45 + 45 (n - 2) (n = 2, 3, 4, 5...)	
D-C7□/C80	10	50	50 + 45 (n - 2) (n = 2, 3, 4, 5...)	
D-H7□/H7□W/H7BA/H7NF	10	60	60 + 45 (n - 2) (n = 2, 3, 4, 5...)	
D-C73C/C80C/H7C	10	65	65 + 50 (n - 2) (n = 2, 3, 4, 5...)	
D-B5□/B64/G5□/K59□	10	75	75 + 55 (n - 2) (n = 2, 3, 4, 5...)	
D-B59W	15	75	75 + 55 (n - 2) (n = 2, 3, 4, 5...)	

Note) Mounting of auto switches

Auto switch model	With 2 auto switches	
	Same surface	
		The auto switch is mounted by slightly displacing it in a direction (cylinder tube circumferential exterior) so that the auto switch and lead wire do not interfere with each other.
D-M9□/M9□W	Less than 45 to 55 strokes	
D-A93	Less than 45 to 50 strokes	

## Operating Range

Auto switch model	Bore size (mm)			
	20	25	32	40
D-M9□/M9□W	5	5.5	5	5.5
D-A9□	7	6	8	8
D-C7□/C80	8	10	9	10
D-C73C/C80C	8	10	9	10
D-B5□/B64	8	10	9	10
D-B59W	13	13	14	14
D-H7BA	4	4	4.5	5
D-H7□/H7□W	4	4	4.5	5
D-H7NF	4	4	4.5	5
D-H7C	7	8.5	9	10
D-G5□/K59	4	4	4.5	5
D-G5□W/K59W	4	4	4.5	5
D-G5NT/G5BA	4	4	4.5	5
D-G59F	5	5	5.5	6

\* 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 the ambient environment.

## Auto Switch Mounting Bracket/Part No.

Auto switch model	Bore size (mm)			
	20	25	32	40
D-M9□(V)/M9□W(V) D-A9□(V)	Note 1) BMA3-020 (A set of a, b, c, d)	Note 1) BMA3-025 (A set of a, b, c, d)	Note 1) BMA3-032 (A set of a, b, c, d)	Note 1) BMA3-040 (A set of a, b, c, d)
D-M9□A(V) Note 2)	BMA3-020S (A set of b, c, e, f)	BMA3-025S (A set of b, c, e, f)	BMA3-032S (A set of b, c, e, f)	BMA3-040S (A set of b, c, e, f)
D-H7□/D-H7□W/D-H7NF D-C7□/C80 D-C73C/C80C	BMA2-020A (A set of c and d)	BMA2-025A (A set of c and d)	BMA2-032A (A set of c and d)	BMA2-040A (A set of c and d)
D-H7BA	BMA2-020AS (A set of c and f)	BMA2-025AS (A set of c and f)	BMA2-032AS (A set of c and f)	BMA2-040AS (A set of c and f)
D-B5□/B64/D-B59W D-G5□/K59/D-G5□W/K59W D-G5BA/G59F/D-G5NT	BA-01 (A set of c and d)	BA-02 (A set of c and d)	BA-32 (A set of c and d)	BA-04 (A set of c and d)

Note 1) Since the switch bracket (made from nylon) are affected in an environment where alcohol, chloroform, methylamines, hydrochloric acid or sulfuric acid is splashed over, so it cannot be used. Please consult SMC regarding other chemicals.

Note 2) When mounting a D-M9□A(V) type auto switch, if the switch bracket is mounted on the indicator light, it may damage the auto switch. Therefore, be sure to avoid mounting the switch bracket on the indicator light.

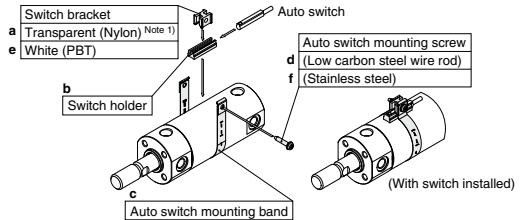
### [Mounting screws set made of stainless steel]

The following set of mounting screws made of stainless steel is also available. Use it in accordance with the operating environment. (Please order the auto switch mounting bracket separately, since it is not included.)

BBA3: For D-B5/B6/G5/K5 types  
BBA4: For D-C7/C8/H7 types

Note) Refer to page 1225 for details of BBA3.

The D-H7BA/G5BA are set on the cylinder with the stainless steel screws above when shipped. When an auto switch is shipped independently, BBA3 or BBA4 is attached.



\* Band (c) is mounted so that the projected part is on the internal side (contact side with the tube).

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

Type	Model	Electrical entry	Features
Reed	D-C73, C76, B53	Grommet (In-line)	—
	D-C80		Without indicator light
Solid state	D-H7A1, H7A2, H7B, G59, G5P, K59	Grommet (In-line)	—
	D-H7BW, H7NW, H7PW, G59W, G5PW, K59W		Diagnostic indication (2-color indicator)
	D-G5BA		Water resistant
	D-G5NT		With timer

\* With pre-wired connector is also available with solid state auto switches. Refer to pages 1192 and 1193 for details.

\* Normally closed (NC = b contact) solid state auto switches (D-M9□E(V)) are also available. Refer to page 1592-1 for details.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA2

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□



## MLGC Series

# Specific Product Precautions

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.

### Installations/Adjustment

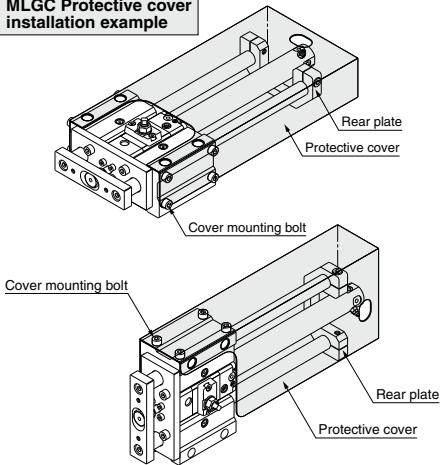
#### Warning

##### 1. Installing a protective cover (In the case of rear plate)

During mounting, handling and operation, the rear plate makes reciprocating movements. Therefore, pay careful attention not to insert your hand, etc., between the cylinder and the rear plate.

When you are going to fit this product to the outside of your equipment, take preventative measures such as installing a protective cover.

MLGC Protective cover installation example



#### Caution on Handling the Fine Lock Cylinder

#### Caution

1. For details, make sure to refer to “Fine Lock Cylinder (CLG1 series)” on pages 786 to 789.

#### Caution

##### 1. Use caution that no scratch or dent will be given to the slide part of the guide rod.

Because the outer circumference of the guide rod is manufactured with precise tolerances, even a slight deformation, scratch, or gouge can lead to faulty operation or reduced durability.

##### 2. When fitting the guide body, use the guide body which has high flatness of the fitting surface.

If the guide rod has twisted, operation resistance will become abnormally higher and the bearing will wear at an early stage, thereby resulting in poor performance.

##### 3. Mount in locations where maintenance will be easy.

Ensure enough clearance around the cylinder to allow for unobstructed maintenance and inspection work.

##### 4. Do not adjust the rod stroke by moving the rear plates,

as doing so will cause the rear plates to come into direct contact with the guide body or the bracket mounting bolt. The resulting impact cannot be absorbed easily, the stroke position cannot be maintained, and faulty operation may result.

##### 5. Lubrication

When you are going to oil the bearings, do so by using a nipple so that no foreign matter will be mixed.

For the grease, we recommended using high-quality lithium soap-based grease no. 2.

##### 6. Mounting orientation

For ceiling mounting (the opening of the rear plate is downward.), the rear plate may interfere with the basic cylinder head end due to the deflection of guide rods. Please consult with SMC.

##### 7. Fixing of base cylinder

When the product is mounted and operated in a location with low rigidity, bending moment may be applied to the base cylinder by vibrations generated at the stroke end, causing damage to the cylinder. In such cases, install a support bracket to suppress the vibration of the body of the base cylinder or reduce the piston speed until the body does not vibrate at the stroke end.