



Guide Cylinder Series NGG $_{\emptyset 20, \ \emptyset 25, \ \emptyset 32, \ \emptyset 40, \ \emptyset 50, \ \emptyset 63, \ \emptyset 80, \ \emptyset 100}$

Integration of a basic cylinder and guide rods Linear Transfer Unit



• End lock type now standard



• Made to order specifications are now available

- Stainless steel components: -XC6
- With coil scraper: -XC35
- Water resistant type/Built-in hard plastic magnets: -XC58
- Fluoro rubber seals/Built-in hard plastic magnets: -XC59
- Helical insert thread specification: -XC71
- Without built-in auto switch magnets: -XC72
- Built-in cylinder with lock: -XC73

Basic cylinder with integrated guide rods in a compact configuration

Series MGG Cylinder with Guide – Updated Design

Series MGG Guide Cylinder

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

Modified body design allows easier installation of fittings, speed controllers and auto switches as well as improved auto switch adjustment.

Bore size	Open section	Enlargement	
(mm)	Old type New type		(%)
20	1208.5	1486.9	18.7%
25	1749.5	2255.4	22.4%
32	2321.6	2797.2	17.0%
40	3739.4	4520.0	17.3%
50	4999.1	6037.8	17.2%



Cylinder position can be detected

All models have built-in magnets for auto switches. Auto switch capable throughout entire stroke range.

Application examples



Non-rotating accuracy improved by using two guide rods

Standard strokes

Bore size (mm)	20	25	32	40	50	63	80	100
Slide bearing	±0.07°	±0.06°	±0.06°	±0.05°	±0.04°	±0.04°	±0.04°	±0.03°
Ball bushing	±0.06°	±0.05°	±0.04°	±0.04°	±0.04°	±0.03°	±0.03°	±0.02°

(Excluding deflection of the guide rods)

A grease port is provided as standard

This allows lubrication of the bearings.



A linear transfer unit that achieves high lateral load resistance and non-rotating precision



Two types of guide rod bearings

Slide bearing Excellent wear resistance and heavy load capacity Ball bushing High precision and smooth operation





Shock absorbers and adjustment bolts are standard

Stroke end shock absorption for high speed operation and fine stroke adjustment are possible.

Simple adjustment of extension stroke

The extension stroke can be adjusted by moving the rear plate.



Four mounting styles



Wide range of made to order specifications (See pages 37 through 47.)

Guide Cylinder Series MGG ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order



Applicable auto switches/Refer to pages 29 through 36 for detailed auto switch specifications.

		Electrical.	light	Wiring		Load	/oltage	Switch mo	ounting so	crew in-line	direction	Perpendicular	Lead v	vire le	ength	(m)*	A 1'	
Туре	Special function	entry	Indicator	(output)		DC	AC	ø20 ø25	ø32	ø40 to ø63	ø80 ø100	ø20 to ø63	0.5 (Nil)	3 (L)	5 (Z)	None (N)	Appli loa	ad
				3 wire (NPN equiv.)	—	5V			C76			B76	•	٠	—	—	IC circuit	
			Vac				100V		C73			B73	•	٠	•	_		Relay, PLC
ء		Grommet	103			101/		(B	53)	B	53	—	•	•	•	—		PLC
/itc		Giomine				120	100V, 200V	(B	54)	B	54	—	•	ullet	\bullet	-		
SV			No	Quuiro	2411		200V or less	(B6	64)	B	64	—	•	ullet	—	—		
sed				2 wire	240	5V, 12V	100V or less		C80			B80	•		—	—	IC circuit	Relay
Å		Connector	Yes			12V			C73C		—	B73C	•	٠	•	•	_	PLC
		Connector	No			5V, 12V	24V or less		C80C			B80C	•	ullet	\bullet		IC circuit	
	Diagnostic indication (2 color indicator)	Grommet	Yes					(B59W)		B59W		—	•	•	-	-		
				3 wire (NPN)		51 401			H7A1		G59	G79	•	•	0	—	IC circuit	
		Grommet		3 wire (PNP)]	5V, 12V			H7A2		G5P		•	•	0	—		
				2 wiro		401/			H7B		K59	K79	•	•	0	—		
Ę		Connector		2 WIE		120			H7C			K79C	•	\bullet	•	•		
vitc				3 wire (NPN)		514 4014			H7NW		G59W		•	•	0	—	IC circuit	
s	Diagnostic indication			3 wire (PNP)	2411	5V, 12V			H7PW		G5PW	—	•	٠	0	-		Relav.
tate	(2 color indicator)		Yes	2 wire	240	121/			H7BW		K59W	—	•	•	0	—		PLC
q	Water resistant (2 color indicator)			2 WIE		120			H7BA		G5BA	—	-	•	0	-		
ilo,	With timer	Grommet		3 wire (NPN)]	(G5	NT)	G5	NT	—	-	•	0	-		
	With diagnostic output (2 color indicator)					5V, 12V			H7NF		G59F	—	•	•	0	_	IC circuit	
	Latch type with diagnostic output (2 color indicator)					_			H7LF				•	•	0	_		

* Lead wire length symbols 0.5m Nil Example: B80C 5m Z Example: B80CZ

3m L Example: B80CL None N Example: B80CN

* Solid state switches marked with "O" are produced upon receipt of order

* Refer to page 29 when using solid state switches (G59, G5P, K59, G59W, G5PW, K59W, G5BA, G59F) on bore sizes ø20 to ø63.

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



Models and Specifications

JIS symbol







Models and strokes

Model	Bearing type	Bore size (mm)	Standard stroke (mm)	Long stroke (mm)				
		20	75, 100, 125, 150, 200	250, 300, 350, 400				
MGGM	Slide bearing	25		350, 400, 450, 500				
MOGIM	Silde bearing	32		350, 400, 450, 500, 600				
		40		350, 400, 450, 500, 600, 700, 800				
		50	75, 100, 125, 150,	350, 400, 450, 500, 600, 700, 800, 900, 1000				
MCCI	Dell hushing	63	200, 200, 300	350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100				
MGGL	Ball bushing	80		350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100, 1200				
		100		350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300				

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

Specifications

Мо	del	MGG□□20	MGG 25	MGG 32	MGG□□40	MGG□□50	MGGDD63	MGG□□80	MGG□□100		
Base c	ylinder	CDG1BN20	CDG1BN25	CDG1BN32	CDG1BN40	CDG1BN50	CDG1BN63	CDG1BN80	CDG1BN100		
Bore si	ze (mm)	20	25	32	40	50	63	80	100		
Action					Double	acting					
Fluid					A	ir					
Proof pressure	•	1.5MPa									
Maximum oper	ating pressure		1.0MPa								
Minimum opera	ating pressure		0.15MPa (horizontal with no load)								
Ambient and flu	id temperature				-10° to	o 60°C					
Piston speed				50 to 10	00mm/s			50 to 7	00mm/s		
Cuchien	Base cylinder				Rubber	bumper					
Cushion	Guides				Built-in shock al	bsorber (2 pcs.)					
Stroke adjustmer [built-in adjustme	nt range (one side) nt bolts (2 pcs.)]	0 to -10mm				0 to –15mm					
Base cylinder I	ubrication				Non-	lube					
Thread toleran	ce				JIS cl	ass 2					
Stroke length t	olerance			^{+1.9} _{+0.2} mm (100	0mm or less), $^{+2}_{+0}$.3 _{.2} mm (1001mm	or more)				
Non-rotating accu	racy Slide bearing	±0.07°	±0.06°	±0.06°	±0.05°	±0.04°	±0.04°	±0.04°	±0.03°		
except deflection of guide rods	Ball bushing	±0.06°	±0.06° ±0.05° ±0.04° ±0.04° ±0.04° ±0.03° ±0.03° ±0.02°								
Port size			Rc	1/8		Rc	1/4	Rc 3/8	Rc 1/2		

Shock absorber specifications

Shock at	osorber model	RB1007	RB1412	RB2015	RB2725				
Applicable guide cylinder		MGG□□20	MGG□□25, 32	MGG□□40, 50, 63	MGG□□80, 100				
Maximum energy absorption J		5.88	19.6	58.8	147				
Stroke absorption mm		7	7 12 15						
Maximum colli	sion speed m/s		5						
Maximum operat	ting frequency cycle/min*	70	45	25	10				
Ambient temperature range °C			-10° to	o 80°C					
Spring force	Extended	4.22	6.86	8.34	8.83				
N	Compressed	6.86	15.98	20.5	20.01				

* With the maximum energy absorption per cycle. Consequently, the operating frequency can be increased depending on the energy absorption.



Theoretical Output

											IN	(Unit: N)
Bore size	Rod size	Operating	Piston area			С	perating pr	essure (MP	a)			
(mm)	(mm)	direction	(mm²)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
20	0	OUT	314	62.8	94.2	126	157	188	220	251	283	314
20	ŏ	IN	264	52.8	79.2	106	132	158	185	211	238	264
25	40	OUT	491	98.2	147	196	246	295	344	393	442	491
25	10	IN	412	82.4	124	165	206	247	288	330	371	412
22	40	OUT	804	161	241	322	402	482	563	643	724	804
32	12	IN	691	138	207	276	346	415	484	553	622	691
40	16	OUT	1260	252	378	504	630	756	882	1010	1130	1260
40	10	IN	1060	212	318	424	530	636	742	848	954	1060
50	20	OUT	1960	392	588	784	980	1180	1370	1570	1760	1960
50	20	IN	1650	330	495	660	825	990	1160	1320	1490	1650
63	20	OUT	3120	624	936	1250	1560	1870	2180	2500	2810	3120
63	20	IN	2800	560	840	1120	1400	1680	1960	2240	2520	2800
80	25	OUT	5030	1010	1510	2010	2520	3020	3520	4020	4530	5030
80	20	IN	4540	908	1360	1820	2270	2720	3180	3630	4090	4540
100	20	OUT	7850	1570	2360	3140	3930	4710	5500	6280	7070	7850
100	30	IN	7150	1430	2150	2860	3580	4290	5010	5720	6440	7150

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

Weights

									(kg
Bo	ore size (mm)	20	25	32	40	50	63	80	100
Standard	Basic type	1.2	1.98	2.66	5.21	8.23	10.26	16.79	23.61
weight	Front mounting flange type	1.75	2.71	3.41	6.81	9.99	14.17	23.25	31.95
Weight by	Slide bearing	0.73	1.13	1.53	2.8	4.33	5.98	8.96	12.93
type	Ball bushing	0.74	1.14	1.52	2.78	4.51	6.6	9.76	14.24
Additional	Additional weight per 50mm of stroke		0.17	0.25	0.4	0.61	0.82	1.11	1.48
Additional weight for long stroke		0.01	0.01	0.02	0.03	0.06	0.1	0.19	0.26
Additiona	al weight with bracket	0.012	0.017	0.018	0.031	0.062	0.27	0.39	0.57

Calculation method Example: MGGLB32-500 (basic type, ball bushing, ø32, 500mm stroke, with bracket)

• Standard weight 2.66 (basic type)

Bearing weight 1.52 (ball bushing)
Additional weight for stroke 0.25/50mm
2.66 + 1.52 + 0.25 x 500/50 + 0.02 + 0.018 = 6.718kg

• Stroke 500mm Additional weight for long stroke ... 0.02

• Additional weight with bracket 0.018

Weights of Moving Parts

								(kg)
Bore size (mm)	20	25	32	40	50	63	80	100
Moving parts basic weight	0.73	1.23	1.74	3.32	5.61	8.45	13.21	18.79
Additional weight per 50mm of stroke	0.11	0.135	0.203	0.327	0.51	0.68	0.949	1.266

Air-hydro Type

Low pressure hydraulic cylinder of 1.0MPa or less

When used together with a series CC air-hydro unit, constant and low speed actuation, and intermediate stopping similar to hydraulic units are possible with the use of valves and other pneumatic equipment.

мgg <u>H</u>	Bearing type	Mounting	Bore size	Stroke	

Air-hvdro type

Specifications

Bo	ore size (mm)	20, 25, 32, 40, 50, 63
Action		Double acting
Fluid		Turbine oil
Proof pres	sure	1.5MPa
Maximum operating pressure		1.0MPa
Minimum operating pressure		0.18MPa (horizontal with no load)
Piston spe	ed	15 to 300mm/s
Cushion	Base cylinder	None
Cusilion	Guides	Built-in shock absorber (2 pcs.)
Ambient a	nd fluid temperature	+5° to 60°C
Thread tol	erance	JIS class 2
Mounting		Basic type Front mounting flange type

* Refer to page 2 for specifications other than the above.

* Auto switch capable

Dimensions



Copper-Free Type (for CRT production processes)

In order to eliminate the adverse effects of copper ions and halogen ions on CRT production processes, this type does not use copper or fluorine materials.

<u>20</u> -мсс	Bearing type	Mounting	Bore size	-	Stroke
Copper-fr	ee				

Specifications

Bore size (mm)		20, 25, 32, 40, 50, 63, 80, 100
Action		Double acting
Fluid		Air
Maximum o	perating pressure	1.0MPa
Minimum o	perating pressure	0.15MPa (horizontal with no load)
Base cylinder		Rubber bumper
Guides		Built-in shock absorber (2 pcs.)
Mounting		Basic type Front mounting flange type

* Refer to page 2 for specifications and pages 17 through 20 for dimensions other than the above. * Auto switch capable

Water Resistant Type

The installation of a special scraper in front of the rod seal on the base cylinder protects against the entry of liquids from the environment into the cylinder. This type can be used in environments with machine tool coolants, and with water spray such as food processing and car washing equipment.



Specifications

Bore	size (mm)	32, 40, 50, 63, 80, 100
Action		Double acting
Fluid		Air
Maximum	operating pressure	1.0MPa
Minimum operating pressure		0.15MPa (horizontal with no load)
Bearing t	уре	Slide bearing
Base cylinder		Rubber bumper
Guides		Built-in shock absorber (2 pcs.)
Mounting		Basic type Front mounting flange type

* Refer to page 2 for specifications other than the above.
 * Auto switch capable (water resistant type)
 Note) RBL (coolant resistant) type shock absorbers are used.

Dimensions

ø32 to ø50

Front mounting flange



ø63 to ø100

Front mounting flange



			(mm)
Bore size (mm)	Q	Х	Y
32	25	39	86 (94)
40	29	46	96 (105)
50	31	57	109 (121)
63	34	56	112 (124)
80	46	68	137 (151)
100	47	68	138 (152)

 Dimensions inside () are for long strokes.
 Dimensions other than the above are the same as those on pages 17 through 20.

Refer to the separate catalog (CAT.E244-(B)) for detailed specifications (except Ø63 to Ø100).

Slide Bearing Allowable End Load and Deflection



















Ball Bushing Allowable End Load and Deflection



















Slide Bearing Allowable End Load and Deflection













MGGM 63- Stroke







Ball Bushing Allowable End Load and Deflection







MGGL 40- Stroke



MGGL 50- Stroke 1.5 900st (Ball bushing type) Deflection Y (mm) 800 700st 600st 500st 0.5 400st 300st st: Stroke (mm) 200s 100st 0 20 40 100 0 60 80 Allowable end load F (N)



120



MGGL 63- Stroke





Allowable Eccentric Load



Slide bearing/MGGM



(Set the maximum allowable load so that it does not exceed the following percentages of the theoretical output: 35% for ø20, 40% for ø25, 50% for ø32, 55% for ø40 and ø50, and 50% for ø63, ø80 and ø100.)

Ball bushing/MGGL



(Set the maximum allowable load so that it does not exceed the following percentages of the theoretical output: 40% for \emptyset 20, 50% for \emptyset 25, and 60% for \emptyset 32, \emptyset 40, \emptyset 50, \emptyset 63, \emptyset 80 and \emptyset 100.)



Construction

ø20 to ø50/MGG□□



Parts list

No.	Description	Material	No	ote
1	Rod cover	Aluminum alloy	Clear hard anodized	
2	Tube cover	Aluminum alloy	Clear hard anodized	
3	Piston	Aluminum alloy	Chror	mated
4	Piston rod	Carbon steel	Hard chrome plated	ø20, ø25 are stainless steel
5	Bushing	Oil-impregnated sintered alloy	ø40 and larger are	lead-bronze casting
6	Bumper A	Urethane		
7	Bumper B	Urethane	ø40 and larger are th	ne same as bumper A
8	Rubber magnet	Synthetic rubber		
9	Snap ring	Stainless steel		
10	Wear ring	Resin		
11	Rod end nut	Rolled steel	Nickel plated	
12	Piston gasket	NBR		
13	Head cover	Aluminum alloy	Clear hard anodized	For long strake
14	Cylinder tube	Aluminum alloy	Hard anodized	FOI IONG SUOKE
15	Guide body	Aluminum alloy	Clear anodized	
16	Small flange	Dellad steel	Flat nickel plated	For basic type
10	Large flange	Rolled steel	Fiat nickel plated	For front mounting flange type
17	Front plate	Rolled steel	Flat nick	el plated
18	Rear plate	Cast iron	Metall	ic gold
40	Slide bearing	Special friction material	For slide	e bearing
19	Ball bush bearing	—	For ball	bushing
		Carbon steel	Hard chrome plated	For slide bearing
20	Guide rod	High carbon chromium bearing steel	Tempered, hard chrome plated	For ball bushing
21	End bracket	Carbon steel	Flat nick	el plated
22	Flat washer	Rolled steel	Nickel	plated
23	Spring washer	Steel wire	Nickel	plated
24	Felt	Felt		
25	Holder	Stainless steel		

Pa	ts list			
No.	Description	Material	l	Note
26	C type snap ring for hole	Carbon tool steel	Nickel plated	
27	Bracket	Stainless steel		
28	Shock absorber	_		
29	Adjustment bolt	Rolled steel	Nicke	el plated
30	Nut	Rolled steel	Nicke	el plated
31	Parallel pin	High carbon chromium bearing steel	Nickel plated	
32	Grease nipple	_	Nickel plated	
33	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated	For cylinder mounting
34	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated	For large/small flange mounting
35	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated	For front plate mounting
36	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated	For rear plate mounting
37	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated	For bracket mounting
38	Rod seal	NBR		
39	Piston seal	NBR		
40	Tube gasket	NBR		

Replacement parts: Seal kits

Bore size (mm)	Seal kit no.	Content			
20	CG1N20-PS				
25	CG1N25-PS	A set of the above			
32	CG1N32-PS	nos 38 39 40			
40	CG1N40-PS	103. 00, 00, 40			
50	CG1N50-PS				

Seal kits are sets of items 38 through 40, which can be ordered using the seal kit number for each bore size.



Construction

ø63 to ø100/MGG B



Parts list

Par	ts list			
No.	Description	Material	No	ote
1	Rod cover	Aluminum alloy	Clear hard anodized	
2	Tube cover	Aluminum alloy	Clear hard anodized	
3	Piston	Aluminum alloy	Chromated	
4	Piston rod	Carbon steel	Hard chrome plated	
5	Bushing	Lead-bronze casting	1	
6	Bumper	Urethane		
7	Rubber magnet	Synthetic rubber		
8	Snap ring	Stainless steel	Not required fo	r ø80 and ø100
9	Wear ring	Resin		
10	Rod end nut	Rolled steel	Nickel plated	ø100 is carbon steel
11	Piston gasket	NBR		
12	Head cover	Aluminum alloy	Clear hard anodized	For long stroke
13	Cylinder tube	Aluminum alloy	Hard anodized	T OF IONG STOKE
14	Guide body	Aluminum alloy	Metallic silver	
15	Front plate	Rolled steel	Flat nickel plated	
16	Rear plate	Cast iron	Metallic gold	
17	Slide bearing	Special friction material	The For slide bearing	
	Ball bush bearing	—	For ball	bushing
	0.11	Carbon steel	Hard chrome plated	For slide bearing
18	Guide rod	High carbon chromium bearing steel	Tempered, hard chrome plated	For ball bushing
19	End bracket	Carbon steel	Flat nickel plated	
20	Flat washer	Rolled steel	Nickel plated	Not required for ø100
21	Spring washer	Steel wire	Nickel	plated
22	Felt	Felt		
23	Holder	Rolled steel	Nickel	plated
24	C type snap ring for hole	Carbon tool steel	Nickel	plated
	•			

Parts list

No.	Description	Material	No	ote		
25	Bracket	Aluminum alloy	Clear anodized			
26	Shock absorber	_				
27	Adjustment bolt	Rolled steel	Nickel	plated		
28	Nut	Rolled steel	Nickel	plated		
29	Parallel pin	High carbon chromium bearing steel	Nickel	plated		
30	Grease nipple	_	Nickel plated			
31	Flat washer	Carbon steel	Nickel plated			
32	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated	For cylinder mounting		
33	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated	For front plate mounting		
34	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated	For rear plate mounting		
35	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated	For bracket mounting		
36	Rod seal	NBR				
37	Piston seal	NBR				
38	Tube gasket	NBR				

Replacement parts: Seal kits

Bore size (mm)	Seal kit no.	Content
63	CG1N63-PS	A set of the above
80	CG1N80-PS	nos 36 37 38
100	CG1N100-PS	1103. 30, 37, 30

Seal kits are sets of items 36 through 38, which can be ordered using the seal kit number for each bore size.



ø63 to ø100/MGG□F







View A-A'





For Ø80, Ø100

Parts list

No.	Description	Material	N	ote
1	Rod cover	Aluminum alloy	Clear har	d anodized
2	Tube cover	Aluminum alloy	Clear hard anodized	
3	Piston	Aluminum alloy	Chro	mated
4	Piston rod	Carbon steel	Hard chro	ome plated
5	Bushing	Lead-bronze casting		
6	Bumper	Urethane		
7	Rubber magnet	Synthetic rubber		
8	Snap ring	Stainless steel	Not required fo	r ø80 and ø100
9	Wear ring	Resin		
10	Rod end nut	Rolled steel	Nickel plated	ø100 is carbon steel
11	Piston gasket	NBR		
12	Head cover	Aluminum alloy	Clear hard anodized	For long strake
13	Cylinder tube	Aluminum alloy	Hard anodized	For long stroke
14	Guide body	Aluminum alloy	Metallic silver	
15	Front plate	Rolled steel	Flat nickel plated	
16	Rear plate	Cast iron	Metallic gold	
17	Slide bearing	Special friction material	For slide bearing	
	Ball bush bearing		For ball	bushing
		Carbon steel	Hard chrome plated	For slide bearing
18	Guide rod	High carbon chromium bearing steel	Tempered, hard chrome plated	For ball bushing
19	End bracket	Carbon steel	Flat nickel plated	
20	Flat washer	Rolled steel	Nickel plated	Not required for ø100
21	Spring washer	Steel wire	Nickel	plated
22	Felt	Felt		
23	Holder	Rolled steel	Nickel	plated
24	C type snap ring for hole	Carbon tool steel	Nickel	plated
25	Bracket	Aluminum alloy	Clear anodized	

Par	ts list			
No.	Description	Material	Note	
26	Shock absorber			
27	Adjustment bolt	Rolled steel	Nickel	plated
28	Nut	Rolled steel	Nickel	plated
29	Parallel pin	High carbon chromium bearing steel	Nickel plated	
30	Grease nipple	—	Nickel	plated
31	-			
32	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated	For cylinder mounting
33	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated	For front plate mounting
34	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated	For rear plate mounting
35	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated	For bracket mounting
36	Rod seal	NBR		
37	Piston seal	NBR		
38	Tube gasket	NBR		
39	Large flange	Rolled steel	Nickel plated	
40	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated	For large flange mounting

Replacement parts: Seal kits

Bore size (mm)	Seal kit no.	Content	
63	CG1N63-PS	A set of the above	
80	CG1N80-PS	nos 36 37 38	
100	CG1N100-PS	1103. 00, 07, 00	

Seal kits are sets of items 36 through 38, which can be ordered using the seal kit number for each bore size.



Dimensions

Basic type/MGG B ø20 to ø50







For standard stroke

Stroke range Bore size AC AD AE AF AP в D Е F G Α AA AB С н L J κ М Ν L (mm) (mm) 20 75, 100, 125, 150, 200 99 12 11 16.5 75 30 M5 x 0.8 depth 10 25 108 24 60 92 5.5 9.5 depth 6 M8 x 1.25 depth 14 30 55 60 80 25 45 25 109 16 13 16.5 85 30 M6 x 1 depth 12 30 130 26.5 65 113 6.6 11 depth 8 M10 x 1.5 depth 18 35 65 70 100 35 54 75, 100 32 16 16 19 100 35 M6 x 1 depth 12 35 135 29 80 118 6.6 11 depth 8 M10 x 1.5 depth 18 80 106 35 60 125, 150 129 40 73 200, 250 50 40 19 22 120 40 M8 x 1.25 depth 16 45 170 32 100 150 9 14 depth 10 M12 x 1.75 depth 21 134 75 152 19 50 93 95 300 50 150 45 M10 x 1.5 depth 20 50 194 37 120 170 11 17 depth 12 M14 x 2 depth 25 55 103 115 152 182 25 21 22 56 90

													<u> </u>
Bore size (mm)	о	Р	Q	R	s	т	υ	v	w	x	Y	z	Bo
20	M6 x 1 depth 9	Rc 1/8	21	12	26	12	82	48	40	30	80	157	
25	M6 x 1 depth 13	Rc 1/8	21	12	31	13	100	57	46	37	80	175	
32	M6 x 1 depth 13	Rc 1/8	21	12	38	16	114	65	52	37	82	201	
40	M8 x 1.25 depth 16	Rc 1/8	25	12	47	20	138	84	62	44	92	238	
50	M10 x 1.5 depth 21	Rc 1/4	26	14	58	25	164	94	75	55	104	285	

For long	strokes			Bracket m	ounting strokes
Bore size (mm)	Stroke range (mm)	R	Y	Bore size (mm)	Bracket mounting stroke
20	250 to 400	14	88	20	100mm or more
25	350 to 500	14	88	25	125mm or more
32	350 to 600	14	90	32	150mm or more
40	350 to 800	15	101	40	200mm or more
50	350 to 1000	16	116	50	250mm or more

(mm)





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Z + Stroke

Y + Stroke



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For standard strokes

Bore size (mm)	Stroke range (mm)	A	AA	АВ	AC	AD	AE	AF	AP	в	с	D	Е	F	G	Н	I	L	к	L	м	N
63	75, 100	200	25	25	15	170	50	M12 x 1.75 depth 24	60	228	30	140	200	13.5	20 depth 14.5	M16 x 2 depth 28	65	117	135	180	66	100
80	125, 150	230	30	27	15	200	55	M12 x 1.75 depth 24	70	262	30	170	234	13.5	20 depth 14.5	M16 x 2 depth 28	75	138	160	214	76	115
100	300	280	32	30	17.5	245	70	M14 x 2 depth 28	80	304	35	210	274	15	23 depth 17	M18 x 2.5 depth 32	85	153	190	245	80	125

Bore size (mm)	0	Р	Q	R	s	т	U	v	w	x	Y	z
63	M12 x 1.75 depth 23	Rc 1/4	29	14	72	30	192	108	86	54	107	308
80	M12 x 1.75 depth 28	Rc 3/8	40	19	89	35	224	128	104	66	131	355
100	M14 x 2 depth 30	Rc 1/2	40	19	110	40	262	143	128	66	131	410

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AA

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A

For long	strokes		
Bore size (mm)	Stroke range (mm)	R	Y
63	350 to 1100	16	119
80	350 to 1200	23	145
100	350 to 1300	23	145

Bracket m	ounting strokes
Poro oizo	Brooket

AP

v

Bore size	Bracket
(mm)	mounting stroke
63	300mm or more
80	400mm or more
100	500mm or more

AB

R

(mm)

Dimensions

Front mounting flange type/MGG□F ø20 to ø50





Mounting dimensions

(mm)

For standard strokes

Bore size (mm)	Stroke range (mm)	А	AA	АВ	AG	АН	AI	AJ	AK	AL	АМ	AN	AO	АР	в	I	J	к	L	м	N	0
20	75, 100, 125, 150, 200	99	12	11	112	125	82	95	6.6	9	65	115	M6	25	108	30	55	60	80	25	45	M6 x 1 depth 9
25	75 100	109	16	13	134	150	92	108	9	9	75	135	M8	30	130	35	65	70	100	35	54	M6 x 1 depth 13
32	125, 150	129	16	16	134	150	102	118	9	9	85	140	M8	35	135	40	73	80	106	35	60	M6 x 1 depth 13
40	200, 250	152	19	19	170	186	134	150	9	12	105	175	M8	45	170	50	93	95	134	50	75	M8 x 1.25 depth 16
50	300	182	25	21	190	210	140	160	11	12	115	200	M10	50	194	55	103	115	152	56	90	M10 x 1.5 depth 21

Bore size (mm)	Р	Q	R	s	т	U	v	w	х	Y	z
20	Rc 1/8	21	12	26	12	82	48	40	30	80	157
25	Rc 1/8	21	12	31	13	100	57	46	37	80	175
32	Rc 1/8	21	12	38	16	114	65	52	37	82	201
40	Rc 1/8	25	12	47	20	138	84	62	44	92	238
50	Rc 1/4	26	14	58	25	164	94	75	55	104	285

For long strokes

Stroke range (mm)	R	Y
250 to 400	14	88
350 to 500	14	88
350 to 600	14	90
350 to 800	15	101
350 to 1000	16	116
	Stroke range (mm) 250 to 400 350 to 500 350 to 600 350 to 800 350 to 1000	Stroke range (mm) R 250 to 400 14 350 to 500 14 350 to 600 14 350 to 800 15 350 to 1000 16

Bracket mounting strokes

Bore size (mm)	Bracket mounting stroke
20	100mm or more
25	125mm or more
32	150mm or more
40	200mm or more
50	250mm or more





Mounting dimensions

For standard strokes

Bore size (mm)	Stroke range (mm)	A	АА	АВ	AG	АН	AI	AJ	АК	AL	АМ	AN	AO	АР	в	I	J	к	L	м	N	ο	Р
63	75, 100	200	25	25	228	250	158	180	14	12	135	234	M12	60	228	65	117	135	180	66	100	M12 x 1.75 depth 23	Rc 1/4
80	125, 150	230	30	27	262	284	178	200	14	16	155	268	M12	70	262	75	138	160	214	76	115	M12 x 1.75 depth 28	Rc 3/8
100	300	280	32	30	300	326	200	226	16	16	175	310	M14	80	304	85	153	190	245	80	125	M14 x 2 depth 30	Rc 1/2

Bore size (mm)	Q	R	s	т	U	v	w	x	Y	z
63	29	14	72	30	192	108	86	54	107	308
80	40	19	89	35	224	128	104	66	131	355
100	40	19	110	40	262	143	128	66	131	410

Front mounting flange type/MGG□F ø63 to ø100

For long strokes											
Bore size (mm)	Stroke range (mm)	R	Y	E							
63	350 to 1100	16	119								
80	350 to 1200	23	145								
100	350 to 1300	23	145	_							

Bracket m	ounting strokes
Bore size	Bracket

Bore size	Bracket
(mm)	mounting stroke
63	300mm or more
80	400mm or more
100	500mm or more

(mm)

Guide Cylinder/End Lock Type Series MGG Ø20, Ø25, Ø32, Ø40, Ø50, Ø63, Ø80, Ø100

How to Order



Refer to the models and strokes table on page 22.

Applicable auto switches/Refer to pa	ges 29 through 36 for detailed auto switch specifications
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			ght	A Color of		Load	voltage	Switch mo	ounting sc	rew in-line	direction	Perpendicular	Lead	vire I	ength	י (m)*		
Туре	Special function	Electrical entry	Indicator li	(output)	1	DC	AC	ø20 ø25	ø32	ø40 to ø63	ø80 ø100	ø20 to ø63	0.5 (Nil)	3 (L)	5 (Z)	None (N)	Appl Ic	icable bad
				3 wire (NPN equiv.)	—	5V			C76			B76	•	٠	—	—	IC circuit	
				5			100V		C73		_	B73	•	•		—		Relay, PLC
ء	G	Grommet	Yes			121/	—	(B	53)	B	53	—		•	•	_		PLC
itc						120	100V, 200V	(B	54)	B	54		•	•		—		
Sv					2411		200V or less	(B6	64)	B	64			•	—	_		
sed			No	2 wire	24V	5V, 12V	100V or less		C80			B80	•	•	—	—	IC circuit	Relay
Å		Connector	Yes	es Io		12V	—		C73C			B73C	•	•		•	—	PLC
	Conn	Connector	No			5V, 12V	24V or less		C80C		_	B80C	•	•		•	IC circuit	
	Diagnostic indication (2 color indicator)	Grommet	Yes			—		(B59W)		B59W		—	•	•	-	—	_	
	Grom			3 wire (NPN)		E\/ 10\/			H7A1 G59		G59	G79		٠	0	—		
		Grommet	Grommet	3 wire (PNP)	-	5V, 12V			H7A2		G5P		•	•	0	—		
				2 wire		12\/			H7B		K59	K79	•	•	0	—		
		Connector		2 wire		121			H7C			K79C	•	•	\bullet	•		
_				3 wire (NPN)		5\/ 12\/			H7NW		G59W		•	•	0	—		
tch	(2 color indication		Yes	3 wire (PNP)	0.01	JV, 12V			H7PW		G5PW		•	•	0	—		Relay
svi			105		240				H7BW		K59W		•	•	0	—		PLC
state	Water resistant (2 color indicator)			2 wire		12V			H7BA		G5BA		-	•	0	—		
lid	With timer	Grommet						(G5N	NT)	G5	NT		-	•	0	—		
Soli	With diagnostic output (2 color indicator)			3 wire (NPN)		5V, 12V			H7NF		G59F		•	•	0	_	IC circuit	
	Latch type with diagnostic output (2 color indicator)			4 wire (NPN)					H7LF				•	•	0	_		

* Lead wire length symbols 0.5m Nil Example: B80C 5m Z Example: B80CZ

3m L Example: B80CL None N Example: B80CN

* Solid state switches marked with "O" are produced upon receipt of order.

* Refer to page 29 when using solid state switches (G59, G5P, K59, G59W, G5PW, K59W, G5BA, G59F) on bore sizes ø20 to ø63.

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



Models and Specifications



Models and strokes

JIS symbol

Model	Bearing type	Bore size (mm)	Standard stroke (mm)	Long stroke (mm)				
		20	75, 100, 125, 150, 200	250, 300, 350, 400				
MGGM	Slide bearing	25		350, 400, 450, 500				
	Child bearing	32		350, 400, 450, 500, 600				
		40	75 400 405 450	350, 400, 450, 500, 600, 700, 800				
		50	75, 100, 125, 150, 200, 250, 300	350, 400, 450, 500, 600, 700, 800, 900, 1000				
MCCI	Dell hush hearing	63	200, 230, 300	350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100				
MGGL	Ball bush bearing	80		350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100, 1200				
		100		350, 400, 450, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300				

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

Specifications

Mo	del	MGG 20	MGG 25	MGG 32	MGG□□40	MGG 50	MGG 63	MGG 80	MGG 100							
Base c	ylinder	CDBC	S1BN Bore	size – Stroke	- Lock pos	ition Manua	al release –	Auto switch	-XC70							
Bore si	ze (mm)	20	25	32	40	50	63	80	100							
Action		Double acting														
Fluid		Air														
Proof pressur	e				1.5M	1Pa										
Maximum ope	erating pressure				1.0M	1Pa										
Minimum ope	rating pressure			0.	15MPa (horizor	ntal with no load)									
Ambient and f	luid temperature	–10° to 60°C														
Piston speed				50 to 10)00mm/s			50 to 7	00mm/s							
Cushian	Base cylinder	Rubber bumper														
Cushion	Guides			I	Built-in shock ab	osorber (2 pcs.)										
Stroke adjustme [built-in adjustm	ent range (one side) lient bolts (2 pcs.)]	0 to –10mm	0 to –10mm 0 to –15mm													
Base cylinder	lubrication	Non-lube														
Thread tolera	nce				JIS cla	ass 2										
Stroke length	tolerance			^{+1.9} _{+0.2} mm (1000	mm or less), $^{+2}_{+0}$.2 ³ mm (1001mm	or more)									
Non-rotating	Slide bearing	±0.07°	±0.06°	±0.06°	±0.05°	±0.04°	±0.04°	±0.04°	±0.03°							
(except deflection) (of guide rods)	Ball bush bearing	±0.06°	±0.05°	±0.04°	±0.04°	±0.04°	±0.03°	±0.03°	±0.02°							
Port size			Rc	1/8		Rc	1/4	Rc 3/8	Rc 1/2							

Lock Unit Specifications

Bore size (mm)	20	25	32	40	50	63	80	100		
Holding force (maximum) N	215 330 550 860 1340 2140 3450									
Lock position		Rear side, Front side								
Backlash				2mm	or less					
Manual release	Non-locking type, Locking type									

Adjust switch positions so that they will operate for movement to both the stroke end and backlash (2mm) positions.

Shock absorber specifications

Shock ab	sorber model	RB1007	RB1412	RB2015	RB2725				
Applicabl	e guide cylinder	MGG□□20	MGG□□25, 32	MGG□□40, 50, 63	MGG□□80, 100				
Maximum ene	ergy absorption J	5.88	19.6	58.8	147				
Stroke absorp	otion mm	7	12	15	25				
Maximum col	lision speed m/s	5							
Max. operating	frequency cycle/min*	70	45	25	10				
Ambient temp	perature range °C	-10° to 80°C							
Spring force	Extended	4.22	6.86	8.34	8.83				
N	Compressed	6.86	15.98	20.5	20.01				

* With the maximum energy absorption per cycle. Consequently, the operating frequency can be increased depending on the energy absorption.



Theoretical Output

											IN	(Unit: N)	
Bore size	Rod diameter (mm)	Operating	Piston area	Operating pressure (MPa)									
(mm)		direction	(mm²)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	
20	0	OUT	314	62.8	94.2	126	157	188	220	251	283	314	
20	0	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	
25	10	IN	412	82.4	124	165	206	247	288	330	371	412	
22	10	OUT	804	161	241	322	402	482	563	643	724	804	
52	12	IN	691	138	207	276	346	415	484	553	442 371 724 622 1130 954 1760	691	
40	16	OUT	1260	252	378	504	630	756	882	1010	1130	1260	
40	10	IN	1060	212	318	424	530	636	742	848	954	1060	
50		OUT	1960	392	588	784	980	1180	1370	1570	1760	1960	
50	20	IN	1650	330	495	660	825	990	1160	1320	1490	1650	
63	20	OUT	3120	624	936	1250	1560	1870	2180	2500	2810	3120	
03	20	IN	2800	560	840	1120	1400	1680	1960	2240	2520	2800	
20	25	OUT	5030	1010	1510	2010	2520	3020	3520	4020	4530	5030	
00	25	IN	4540	908	1360	1820	2270	2720	3180	3630	4090	4540	
100	20	OUT	7850	1570	2360	3140	3930	4710	5500	6280	7070	7850	
100	30	IN	7150	1430	2150	2860	3580	4290	5010	5720	6440	7150	

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

Weights

											(kg)
	Bo	re size	e (mm)	20	25	32	40	50	63	80	100
Stan we	ndard		Basic type	1.2	1.98	2.66	5.21	8.23	10.26	16.79	23.61
	eight	Front	mounting flange type	1.75	2.71	3.41	6.81	9.99	14.17	23.25	31.95
Wei	ight by		Slide bearing	0.73	1.13	1.53	2.8	4.33	5.98	8.96	12.93
bea ty	ype	Ba	all bush bearing	0.74	1.14	1.52	2.78	4.51	6.6	9.76	14.24
Additional weight per 50mm of stroke			0.14	0.17	0.25	0.4	0.61	0.82	1.11	1.48	
Additi	ional wei	ght fo	r long stroke	0.01	0.01	0.02	0.03	0.06	0.1	0.19	0.26
Additi	ional wei	ght wi	th bracket	0.012	0.017	0.018	0.031	0.062	0.27	0.39	0.57
ight	Head si	de	Non-locking type (N)	0.05	0.07	0.08	0.17	0.26	0.44	0.8	1.15
k un	lockin	g (Ħ)	Locking type (L)	0.07	0.08	0.1	0.21	0.3	0.48	0.88	1.23
ition.	Rod si	de (R)	Non-locking type (N)	0.07	0.08	0.12	0.19	0.31	0.51	0.9	1.31
Add	lockin	g (IX)	Locking type (L)	0.09	0.1	0.14	0.23	0.34	0.54	0.97	1.39

Calculation method Example: MGGLB32-500-HN (basic type, ball bushing, ø32, 500mm stroke, with bracket)

• Standard weight2.66 (basic type)

• Bearing weight 1.52 (ball bushing)

Additional weight for stroke 0.25/50mm

• Additional weight for long stroke ... 0.02

• Additional weight with bracket 0.018

• Stroke 500mm

 $2.66 + 1.52 + 0.25 \times 500/50 + 0.02 + 0.018 + 0.08 = 6.798$ kg • Additional weight of lock unit....... 0.08 (head side non-locking type)

Weights of Moving Parts

								(kg)
Bore size (mm)	20	25	32	40	50	63	80	100
Moving parts basic weight	0.73	1.23	1.74	3.32	5.61	8.45	13.21	18.79
Additional weight per 50mm of stroke	0.11	0.135	0.203	0.327	0.51	0.68	0.949	1.266

Calculating weight of moving parts Example: MGGLB32-500-HN

• Stroke 500mm

1.74 + 0.203 x 500/50 = 3.77kg

Refer to pages 5 through 13 for the allowable end load and deflection, as well as the allowable eccentric load.

Construction

ø20 to ø100/MGG



With rod side locking (base cylinder only)

locking type)
For ø80, ø100
on-locking type) 28
For Ø80, Ø100

* Since the guide unit drawing is the same as the standard type, refer to pages 14 through 16.

For ø40 to ø100

Par	ts list							
No.	Description	Material	No	ote				
1	Rod cover	Aluminum alloy	Clear hard	anodized				
2	Tube cover	Aluminum alloy	Clear hard	anodized				
3	Piston	Aluminum alloy	Chror	nated				
4	Piston rod	Carbon steel	Hard chrome plated	ø20, ø25 are stainless steel				
5	Bushing	Oil-impregnated sintered alloy	ø40 and larger are l	ead-bronze casting				
6	Bumper A	Urethane	Description is "Bumper" for ø63 and					
7	Bumper B	Urethane	ø40 and larger are the same as numb					
8	Rubber magnet	Synthetic rubber	er					
9	Snap ring	Stainless steel	Not required for ø80, ø100					
10	Wear ring	Resin						
11	Rod end nut	Rolled steel	Nickel plated	ø100 is carbon steel				
12	Piston gasket	NBR						
13	Head cover	Aluminum alloy	Clear hard anodized	For head side				
14	Cylinder tube	Aluminum alloy	Hard anodized	and long stroke				
15	Lock piston	Carbon steel	Hard chrome pla	ted, Heat treated				
16	Lock bushing	Bronze alloy						
17	Lock spring	Stainless steel						
18	Bumper	Urethane						
19	Hexagon socket head cap screw	Chromium molybdenum steel	Black zinc	chromated				
20	Cap A	Die-cast aluminum	Black coating	For non-locking type				
21	Сар В	Carbon steel	Oxide film treatment	For locking type				
22	Rubber cap	Synthetic rubber	er For non-locking type					
23	M/O knob	Die-cast zinc	Black Coating	For locking type				
24	M/O bolt	Chromium molybdenum steel	Black zinc chromated, Red coating	For locking type				
25	M/O spring	spring Steel wire Zinc chromated For						

Parts list

No.	Description	Material	Note					
26	Stopper ring	Carbon steel	Zinc chromated	For locking type				
27	Piston holder	Urethane	Used for ø4	0 and larger				
28	Seal retainer	Rolled steel	Used for ø80 and ø100					
29	Rod seal	NBR						
30	Piston seal	NBR						
31	Tube gasket	NBR						
32	Lock piston seal	NBR						

* Since guide unit parts are the same as the standard type, refer to pages 14 through 16.

Replacement parts: Seal kits

Bore size (mm)	Seal kit no.	Content
20	CBG1N20-PS	
25	CBG1N25-PS	
32	CBG1N32-PS	
40	CBG1N40-PS	A set of the above
50	CBG1N50-PS	nos. 29, 30, 31, 32
63	CBG1N63-PS	
80	CBG1N80-PS	
100	CBG1N100-PS	

Seal kits are sets of items 29 through 32 which can be ordered using the seal kit number for each bore size.

Dimensions



For standard strokes

Bore size (mm)	Stroke range (mm)	Α	AA	AB	AC	AD	AE	AF	AP	в	с	D	Е	F	G	н	I	J	к	L	м	N
20	75, 100, 125, 150, 200	99	12	11	16.5	75	30	M5 x 0.8 depth 10	25	108	24	60	92	5.5	9.5 depth 6	M8 x 1.25 depth 14	30	55	60	80	25	45
25	75 100	109	16	13	16.5	85	30	M6 x 1 depth 12	30	130	26.5	65	113	6.6	11 depth 8	M10 x 1.5 depth 18	35	65	70	100	35	54
32	125, 150	129	16	16	19	100	35	M6 x 1 depth 12	35	135	29	80	118	6.6	11 depth 8	M10 x 1.5 depth 18	40	73	80	106	35	60
40	200, 250	152	19	19	22	120	40	M8 x 1.25 depth 16	45	170	32	100	150	9	14 depth 10	M12 x 1.75 depth 21	50	93	95	134	50	75
50	300	182	25	21	22	150	45	M10 x 1.5 depth 20	50	194	37	120	170	11	17 depth 12	M14 x 2 depth 25	55	103	115	152	56	90

Bore size (mm)	0	Ρ	s	т	U	v	w	x	z	Bor
20	M6 x 1 depth 9	Rc 1/8	26	12	82	48	40	30	157	(n
25	M6 x 1 depth 13	Rc 1/8	31	13	100	57	46	37	175	
32	M6 x 1 depth 13	Rc 1/8	38	16	114	65	52	37	201	
40	M8 x 1.25 depth 16	Rc 1/8	47	20	138	84	62	44	238	
50	M10 x 1.5 depth 21	Rc 1/4	58	25	164	94	75	55	285	-
For long strokes Bracket mounting strokes										

9	strokes	Bracket	mounting strok
	Stroke range (mm)	Bore size (mm)	Bracket mounting stroke
	250 to 400	20	100mm or more
	350 to 500	25	125mm or more
	350 to 600	32	150mm or more
	350 to 800	40	200mm or more

50

250mm or more

Bore size	For locking type	For non-locking type
(mm)	HN*	HR*
20	37	25.3
25	40	28.3
32	43	31.3
40	52.5	38.3
50	58.5	44.5

Bore size (mm)	W	ith rod side	With head side locking					
	Q*	R	Y *	Q	R*	Y *		
20	47.5	12 (14)	107 (115)	21	11	104		
25	48	12 (14)	107 (115)	21	11	104		
32	49	12 (14)	110 (118)	21	11	106		
40	53	12 (15)	121 (130)	25	11	123		
50	59	14 (16)	137 (149)	26	16	140		

Note) Dimensions inside () are for long strokes.

350 to 1000



Bore size (mm)	0	Ρ	s	т	U	v	w	х	z			
63	M12 x 1.75 depth 23	Rc 1/4	72	30	192	108	86	54	308			
80	M12 x 1.75 depth 28	Rc 3/8	89	35	224	128	104	66	355			
100	M14 x 2 depth 30	Rc 1/2	110	40	262	143	128	66	410			
For long strokes Bracket mounting strokes												

For long strokes

Bore size (mm)	Stroke range (mm)	Bore size (mm)	Bracket mounting stroke
63	350 to 1100	63	300mm or more
80	350 to 1200	80	400mm or more
100	350 to 1300	100	500mm or more

Bore size For Iocking type non-locking type (mm) HR* HN* 63 59 45 80 68 53.5 100 79 64.5

Bore size	W	ith rod side	With head side locking						
(mm)	Q*	R	Y *	Q	R*	Y *			
63	63	14 (16)	142 (154)	29	15	147			
80	82	19 (23)	175 (189)	40	17	182			
100	85	19 (23)	180 (194)	40	23	188			
N DI									

Note) Dimensions inside () are for long strokes.

SMC

Dimensions

Front mounting flange type/MGG□F ø20 to ø50



For standard strokes

															·····									
Bore size (mm)	Stroke range (mm)	A	AA	АВ	AG	АН	AI	AJ	АК	AL	AP	в	I	J	к	L	м	N	0	Ρ	s	т	U	v
20	75, 100, 125, 150, 200	99	12	11	112	125	82	95	6.6	9	25	108	30	55	60	80	25	45	M6 x 1 depth 9	Rc 1/8	26	12	82	48
25	75 100	109	16	13	134	150	92	108	9	9	30	130	35	65	70	100	35	54	M6 x 1 depth 13	Rc 1/8	31	13	100	57
32	125, 150	129	16	16	134	150	102	118	9	9	35	135	40	73	80	106	35	60	M6 x 1 depth 13	Rc 1/8	38	16	114	65
40	200, 250	152	19	19	170	186	134	150	9	12	45	170	50	93	95	134	50	75	M8 x 1.25 depth 16	Rc 1/8	47	20	138	84
50	300	182	25	21	190	210	140	160	11	12	50	194	55	103	115	152	56	90	M10 x 1.5 depth 21	Rc 1/4	58	25	164	94

Bore size (mm)	w	х	z
20	40	30	157
25	46	37	175
32	52	37	201
40	62	44	238
50	75	55	285

For I	long	strokes	
-------	------	---------	--

Bore size (mm)	Stroke range (mm)						
20	250 to 400						
25	350 to 500						
32	350 to 600						
40	350 to 800						
50	350 to 1000						

Bore size	For locking type	For non-locking type				
(mm)	HN*	HR*				
20	37	25.3				
25	40	28.3				
32	43	31.3				
40	52.5	38.3				
50	58.5	44.5				
.						

Bracket mounting strokes Bore size Bracket mounting (mm) stroke 20 100mm or more 25 125mm or more 32 150mm or more 40 200mm or more 50 250mm or more

Bore size	Wi	th rod side	With head side locking					
(mm)	Q*	R	Y*	Q	R*	Y *		
20	47.5	12 (14)	107 (115)	21	11	104		
25	48	12 (14)	107 (115)	21	11	104		
32	49	12 (14)	110 (118)	21	11	106		
40	53	12 (15)	121 (130)	25	11	123		
50	59	14 (16)	137 (149)	26	16	140		

Note) Dimensions inside () are for long strokes.



Bore size (mm)	Stroke range (mm)	A	AA	АВ	AG	АН	AI	AJ	AK	AL	AP	в	I	ſ	к	L	м	N	ο	Ρ	s	т	U	v
63	75, 100, 125	200	25	25	228	250	158	180	14	12	60	228	65	117	135	180	66	100	M12 x 1.75 depth 23	Rc 1/4	72	30	192	108
80	150, 200, 250	230	30	27	262	284	178	200	14	16	70	262	75	138	160	214	76	115	M12 x 1.75 depth 28	Rc 3/8	89	35	224	128
100	300	280	32	30	300	326	200	226	16	16	80	304	85	153	190	245	80	125	M14 x 2 depth 30	Rc 1/2	110	40	262	143

Bore size (mm)	w	х	z
63	86	54	308
80	104	66	355
100	128	66	410

For long strokes

Bore size (mm)	Stroke range (mm)						
63	350 to 1100						
80	350 to 1200						
100	350 to 1300						

(mm)	HN*	HR*	1
63	59	45	_
80	68	53.5	
100	79	64.5	_
Bracke	et mounti	ng strokes	N

Bracket mounting

stroke

300mm or more

400mm or more

500mm or more

Bore size For locking type For non-locking type

Bore size

(mm)

63

80

100

Bore size	Wi	th rod side	With head side locking				
(mm)	Q*	R	Y *	Q	R*	Y *	
63	63	14 (16)	142 (154)	29	15	147	
80	82	19 (23)	175 (189)	40	17	182	
100	85	19 (23)	180 (194)	40	23	188	

Note) Dimensions inside () are for long strokes.

Series MGG **Auto Switch Specifications**





6		Switcl	h mounting	screw dir	ection		
Type			In-line			Perpendicular	Electrical entry
	ø20, ø25	ø32	ø40	ø50, ø63	ø80, ø100	ø20 to ø63	
		C	76			B76	
		C	73			B73	
	(B	53)		B53			Crommet
/itch	(B	54)		B54			Grommer
d sv	(B6	64)		B64			
Ree		C	30			B80	
		C7	3C			B73C	Connector
		C8	0C			B80C	Connector
	(B59W)		B5	9W			Grommet (2 color indicator)
	H7A1,	(G59)	H7A1	, G59	G59	G79	
	H7A2,	(G5P)	H7A2	, G5P	G5P		Grommet
	H7B,	(K59)	H7B	, K59	K59	K79	
÷		H7	′С			K79C	Connector
swite	H7NW,	(G59W)	H7NW	, G59W	G59W		
ate :	H7PW,	(G5PW)	H7PW,	G5PW	G5PW		Grommet (2 color indicator)
d st	H7BW,	(K59W)	H7BW	, K59W	K59W		, , ,
Soli	H7BA,	(G5BA)	H7BA,	G5BA	G5BA		Grommet (2 color indicator, water resistant)
	(G5	NT)		G5NT			Grommet (with timer)
	ŀ	17NF, (G5	9F)	H7NF, G59F	G59F		Grommet (2 color indicator
		H7	LF				with diagnostic output)

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

▲ Specific Product Precautions

I.

L

- l Be sure to read before handling.
- Refer to pages 53 through 55 for auto switch precautions.

Auto Switch Internal Circuits

Lead wire colors inside [] are those prior to conformity with IEC standards.



Series MGG Auto Switch Specifications

Auto Switch Hysteresis

Hysteresis is the distance from the position at which piston movement turns an auto switch ON, to the position at which reverse movement turns the switch OFF. This hysteresis is included in part of the operating range (on one side).



Contact Protection Boxes/CD-P11, CD-P12

1

<Applicable switch models>

D-C7/C8, D-C73C/C80C, D-B7/B8, D-B73C/B80C

- The above auto switches do not have built-in contact protection circuits.
- 1. The operated load is an induction load.
- 2. The length of wiring to the load is $5\mathrm{m}$ or more.
- 3. The load voltage is 100 or 200VAC. Use a contact protection box in any of the above situations.

2

Furthermore, even in the case of a type having a built-in contact protection circuit (D-B54, B64, D-B59W), if the length of the wiring to the load is extremely long (30m or more) and a PLC having a large rush current is used, confirm with SMC whether a contact protection box may be necessary.

Contact protection box specifications

Part number	CD-	CD-P12	
Load voltage	100VAC or less	200VAC	24VDC
Maximum load current	25mA	12.5mA	50mA

* Lead wire length Switch connection side 0.5m



Contact protection box internal circuits



Contact protection box dimensions



Contact protection box connection

To connect a switch unit to a contact protection box, connect the lead wire from the side of the contact protection box marked SWITCH to the lead wire coming out of the switch unit. Keep the switch as close as possible to the contact protection box, with a lead wire length of no more than 1 meter.



Otherwise, the life of the contacts may be reduced. (They may stay on continuously.)

How to Insert the Connector

D-C73C/C80C, D-H7C D-B73C/B80C, D-K79C

Keeping the protruding section of the connector on top, insert it all the way until the sleeve contacts the auto switch, and then tighten the fastening ring.

(Do not tighten it with pliers or other tools.)

5. Make changes to the detection position

under the same conditions as in step 3.

Auto Switch Mounting

A Caution

- 1. Do not tighten with more than the recommended tightening torque.
- 2. Mount so that the band does not run on a diagonal.





Incorrect mounting

Correct mounting

Auto switch mounting bracket part no. (Including band and screw)

Auto switch	Bore size (mm)											
model	20	25	32	40	50	63	80	100				
D-C7/C8	BMA2	BMA2	BMA2	BMA2	BMA2	BMA2						
D-H7	- 020	- 025	- 032	- 040	- 050	- 063						
D-B5/B6	BA	BA	BA	BA	BA	BA	BA	BA				
D-G5/K5	- 01	- 02	- 32	- 04	- 05	- 06	- 08	- 10				
D-B7/B8	BM1	BM1	BM1	BM1	BM1	BM1						
D-G7/K7	- 01	- 02	- 32	- 04	- 05	- 06						

<Stainless steel mounting screw kit>

The following stainless steel mounting screw kits (including set screws) are available for use depending on the operating environment. (Order the mounting band separately, as it is not included.)

BBA3: For types D-B5/B6/G5/K5

BBA4: For types D-C7/C8/H7

When D-G5BAL and H7BAL type switches are mounted on a cylinder at the factory, the above stainless steel screws are used. When switches are shipped separately, **BBA3** and **BBA4** are included.

Mounting and Moving Auto Switches



5. Make changes to the detection position under the same conditions as in step 3.

under the same conditions as in step 3

(with the cover installed).

Proper Auto Switch Mounting Position (Stroke End)



Auto switch mounting position (mm) Auto switch mounting height (mr										ht (mm)								
Auto switch model D-B7, B8 D-B73C D-C7, C8 D-B5, B6 D-G5□W D-B80C D-C73C D-K59W D-G7, K7 D-C73C D-K59W D-G7, K7 D-C80C D-G5BAL D-G59F D-G59F						D-B59W D-H7 D-H7C			D-H7 D-H7 D-H7	″⊟W ″⊡F ″BAL	D-G D-K D-G	5 5 5NTL	D-C7, C8 D-H7 D-H7⊡W D-H7⊡F D-H7BAL	D-C73C D-C80C	D-B7, B8 D-B73C D-B80C D-G7, K7 D-K79C D-H7C	D-G5, K5 D-G5⊟W D-K59W D-G5NTL D-B5, B6 D-B59W D-G5BAL D-G59F		
bore size	A	В	Α	В	Α	В	А	В	А	В	А	В	Α	В	Hs	Hs	Hs	Hs
20	30.5	21.5 (29.5)	29.5	20.5 (28.5)	24	16 (23)	27	18 (26)	28.5	19.5 (27.5)	27	21 (29)	25.5	17.5 (24.5)	24.5	27	27.5	27.5
25	30.5	21.5 (29.5)	29.5	20.5 (28.5)	24	16 (23)	27	18 (26)	28.5	19.5 (27.5)	27	21 (29)	25.5	17.5 (24.5)	27	29.5	30	30
32	31.5	22.5 (30.5)	30.5	21.5 (29.5)	25	16 (24)	28	19 (27)	29.5	20.5 (28.5)	28	22 (30)	26.5	17.5 (25.5)	30.5	33	33.5	33.5
40	36.5	24.5 (33.5)	35.5	23.5 (32.5)	30	18 (27)	33	21 (30)	34.5	22.5 (31.5)	33	24.5 (33.5)	31.5	19.5 (28.5)	35	37.5	38	38
50	43.5	29.5 (41.5)	42.5	28.5 (40.5)	37	23 (35)	40	26 (38)	41.5	27.5 (39.5)	40	29 (41)	38.5	24.5 (36.5)	40.5	43	43.5	43.5
63	43.5	29.5 (41.5)	42.5	28.5 (40.5)	37	23 (35)	40	26 (38)	41.5	27.5 (39.5)	40	29 (41)	38.5	24.5 (36.5)	47.5	50	50.5	50.5
80	_	_	_	_	47	31 (45)	50	34 (48)	_	_	_	_	48.5	32.5 (46.5)	_	_	—	59
100	_	_	_	_	47	31 (45)	50	34 (48)	_	_	_	_	48.5	32.5 (46.5)	_	—	_	69.5

 \ast Numbers inside () are for long strokes.

Proper Auto Switch Mounting Position (Stroke End)/End Lock Type: With Head Side Locking



Auto switch mounting position (mm) Auto switch mounting height (mm)																		
Auto switch model D-B7, B8 D-B73C D-B80C D-67, K7 D-67, K7 D-C7, C8 D-C7, C8 D-65 D-G5 D-K59W D-65BAL D-G59F D-B59W D-B59W D-B59W						D-H D-H	D-H7 D-H7C D-H7C D-H7BAL			D-G5 D-K5 D-G5NTL		D-C7, C8 D-H7 D-H7⊟W D-H7⊡F D-H7BAL	D-C73C D-C80C	D-B7, B8 D-B73C D-B80C D-G7, K7 D-K79C D-H7C	D-G5, K5 D-G5⊟W D-K59W D-G5NTL D-B5,B6 D-B59W D-G5BAL D-G59F			
bore size	A	В	Α	В	Α	В	А	В	Α	В	А	В	Α	В	Hs	Hs	Hs	Hs
20	30.5	45.5	29.5	44.5	24	40	27	42	28.5	43.5	27	45	25.5	41.5	24.5	27	27.5	27.5
25	30.5	45.5	29.5	44.5	24	40	27	42	28.5	43.5	27	45	25.5	41.5	27	29.5	30	30
32	31.5	46.5	30.5	45.5	25	40	28	43	29.5	44.5	28	46	26.5	41.5	30.5	33	33.5	33.5
40	36.5	55.5	35.5	54.5	30	49	33	52	34.5	53.5	33	55.5	31.5	50.5	35	37.5	38	38
50	43.5	65.5	42.5	64.5	37	59	40	62	41.5	63.5	40	65	38.5	60.5	40.5	43	43.5	43.5
63	43.5	69.5	42.5	68.5	37	63	40	66	41.5	67.5	40	69	38.5	64.5	47.5	50	50.5	50.5
80	_	_	_	_	47	82	50	85	_	_	_	_	48.5	83.5	_	—	_	59
100	_	_	_	_	47	88	50	91	_	_	_	_	48.5	89.5	_	_	_	69.5

Proper Auto Switch Mounting Position (Stroke End)/End Lock Type: With Rod Side Locking



Auto switch mounting position (mm) Auto switch mounting height (mm									ht (mm)									
Auto switch model	Auto switch model D-B7, B8 D-B73C D-B73C D-B80C D-C7, C8 D-G5 D-C73C D-C73C D-C73C D-C73C D-C5 D-C5 D-C5 D-C5 D-C5 D-C5 D-C5 D-C				5, B6 5⊟W 59W 5BAL 59F	D-B59W		D-H7 D-H7C		D-H7⊡W D-H7⊡F D-H7BAL		D-G5 D-K5 D-G5NTL		D-C7, C8 D-H7 D-H7⊟W D-H7⊡F D-H7BAL	D-C73C D-C80C	D-B7, B8 D-B73C D-B80C D-G7, K7 D-K79C D-H7C	D-G5, K5 D-G5⊟W D-K59W D-G5NTL D-B5, B6 D-B59W D-G5BAL D-G59F	
bore size	A	В	Α	В	Α	В	Α	В	Α	В	Α	В	Α	В	Hs	Hs	Hs	Hs
20	57.5	21.5 (29.5)	56.5	20.5 (28.5)	51	16 (23)	54	18 (26)	55.5	19.5 (27.5)	54	21 (29)	52.5	17.5 (24.5)	24.5	27	27.5	27.5
25	57.5	21.5 (29.5)	56.5	20.5 (28.5)	51	16 (23)	54	18 (26)	55.5	19.5 (27.5)	54	21 (29)	52.5	17.5 (24.5)	27	29.5	30	30
32	59.5	22.5 (30.5)	58.5	21.5 (29.5)	53	16 (24)	56	19 (27)	57.5	20.5 (28.5)	56	22 (30)	54.5	17.5 (25.5)	30.5	33	33.5	33.5
40	65.5	24.5 (33.5)	64.5	23.5 (32.5)	59	18 (27)	62	21 (30)	63.5	22.5 (31.5)	62	24.5 (33.5)	60.5	19.5 (28.5)	35	37.5	38	38
50	76.5	29.5 (41.5)	75.5	28.5 (40.5)	70	23 (35)	73	26 (38)	74.5	27.5 (39.5)	73	29 (41)	71.5	24.5 (36.5)	40.5	43	43.5	43.5
63	78.5	29.5 (41.5)	77.5	28.5 (40.5)	72	23 (35)	75	26 (38)	76.5	27.5 (39.5)	75	29 (41)	73.5	24.5 (36.5)	47.5	50	50.5	50.5
80	_	_	_	—	91	31 (45)	94	34 (48)	_	_	_	_	92.5	32.5 (46.5)	_	_	_	59
100	_	_	_	_	96	31 (45)	99	34 (48)	_	_	_	_	97.5	32.5 (46.5)	_	_	_	69.5

* Numbers inside () are for long strokes.

SMC

Series MGG **Auto Switch Connections and Examples**

Basic Wiring



Sink input specifications



Source input specifications



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

Connection Examples for AND (Series) and OR (Parallel)



2-wire with 2 switch AND connection



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



Internal voltage drop in switch is 4V



The indicator lights will light up when both switches are turned ON.

2-wire with 2 switch OR connection



<Solid state> When two switches are connected in \oplus parallel, malfunction $\overline{\ominus}$ may occur because the load voltage will increase when in the OFF state.

Switch 1

Switch 2

<Reed switch>

Browr [Red]

Black

[White

[Red]

Bli

Blue

[Black]

[Black] Brow

Because there is no current leakage, the load voltage will not increase when turned OFF. However, depending on the number of switches in the ON state, the indicator lights may sometimes dim or not light up, because of dispersion and reduction of the current flowing to the switches.

Load

 $(\mp$

 \ominus

Black

[White]

 \oplus

Θ

Leakage x 2 pcs. x Load impedance Load voltage at OFF = = 1mA x 2 pcs. x 3kΩ = 6 V Example: Load impedance is 3kΩ Leakage current from switch is 1mA

SMC

Series MGG Contact SMC for detailed specifications, lead times and pricing. Contact SMC for detailed specifications, lead times and pricing.

— Symbol —	- Specifications/Content	
1 -XB6	Heat Resistant Cylinder (150°C)	Page 38
2 -XB13	Low Speed Cylinder	38
3 -XC4	With Heavy Duty Scraper	38
4 -XC6□	Stainless Steel Components	38
5 -XC8	Variable Stroke Cylinder with Adjustable Extension	39
6 -XC9	Variable Stroke Cylinder with Adjustable Retraction	40
7 -XC11	Dual Stroke Cylinder with Single Rod	41
8 -XC13	Auto Switch Rail Mounting	42
9 -XC18	NPT Piping Ports	43
10-XC22	Fluoro Rubber Seals	43
11-XC35	With Coil Scraper	43
12-XC37	Enlarged Piping Port Orifice	43
13-XC56	With Knock Pin Holes	44
14-XC58	Water Resistant Type with Built-in Hard Plastic Magnet	44
15 -XC59	Fluoro Rubber Seals with Built-in Hard Plastic Magnet	45
16-XC71	Helical Insert Thread Specifications	45
177-XC72	Without Built-in Auto Switch Magnet	46
18-XC73	Built-in Cylinder with Lock (CDNG)	46, 47
19-X440	With Piping Ports for Grease	47

Series MGG Made to Order Specifications

Contact SMC for detailed dimensions, specifications and lead times.

1 Heat Resistant Cylinder (150°C)

MGG Standard part number from page 1 — XB6

Heat resistant cylinder

This is an air cylinder with seal and grease materials modified to allow operation at high ambient temperatures up to 150°C.

Specifications

Series	MGG					
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100					
Ambient temperature range	-10° to 150°C					
Piston speed	50 to 500mm/s					
Seal material	Fluoro rubber					
Grease	Heat resistant grease					
Auto switches	Not applicable					

* With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

* Shock absorbers and rubber bumpers are not applicable.

Precautions on Usage

 Be aware that there is a danger of generating gases harmful to the human body if tobacco products are smoked with heat resistant grease on one's hands.

∆Caution

- 1. Use this type of cylinder without lubrication.
- The maintenance schedule for this cylinder is different from the one for the standard cylinder. Contact SMC for further details.

2 Low Speed Cylinder

MGG	Μ	
	_	

____.

Slide bearing Low speed cylinder Operates smoothly without sticking and slipping at drive speeds as low as 5 to 50mm/s.

Standard part number from page 1

Specifications

Series	MGGM
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100
Bearing type	Slide bearing
Piston speed	5 to 50mm/s

* With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

* Shock absorbers are not applicable.

1. Avoid operating this cylinder with lubrication.

3 With Heavy Duty Scraper



With heavy duty scraper

XC4

XB13

Heavy duty scrapers are used for the piston rod and guide rods (front and rear). This cylinder is suitable for use in extremely dusty conditions, and in environments where dirt gets on the cylinder, as in the case of casting equipment, construction equipment and industrial vehicles.

Specifications

Series	MGG
Bore size (mm)	32, 40, 50, 63, 80, 100
Heavy duty scraper	SCB scraper

* With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

4 Stainless Steel Components

MGG	Standard part number from page 1	<u>— xce</u>		
	Stainless steel compo	nents •	• Parts	symbol
Suitable	e for use where there is a		Α	Stainless steel used on all standard iron parts
danger	of rust or corrosion, when		В	Stainless steel rod end moving parts
immers	ed in water, etc.		С	Stainless steel rods
			* Refer to	the table below regarding parts changed to stainless steel.

Specifications

Series	MGG							
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100							
* With the exception of the ab	With the execution of the above, all other encodifications and dimensions for this product are							

standard. Please refer to the standard specifications accordingly.

Note) RBL (coolant resistant) type shock absorbers are used (-XC6A only).

Parts changed to stainless steel

Symbol	Bore size (mm)	Part number	Note
VCGA	20, 25, 32, 40, 50	41116171819221223262930313334353637	19 is type L only.
-ACOA	63, 80, 100	4 10 15 16 17 18 19 20 21 23 24 27 28 29 31 32 33 34 35 39 40	⑦ is type L only, ③ is type B only, ③ and ④ are type F only.
VCCD	20, 25, 32, 40, 50	4111720212233335	(3) is rod side only.
-XC0B	63, 80, 100	4.10.15.18.1920202933	29 is rod side only.
VCCC	20, 25, 32, 40,50	4112	
-7000	63, 80, 100	4.1018	

* For part numbers, refer to the construction drawings on pages 14, 15 and 16.



5 Variable Stroke Cylinder with Adjustable Extension

	MGG	Bearing type	Mounting type	Bore size	Stroke	Stroke adjustment symbol	— XC8
--	-----	--------------	---------------	-----------	--------	--------------------------	-------

The extension stroke can be adjusted within a range of "0 to 25mm" or "0 to 50mm" from the full stroke.

A stroke adjustment mechanism is provided on the rear side which adjusts the extension stroke. (Since the rear shock absorber is changed to a free state after stroke adjustment, movement of the rear plate is recommended.)

Specifications

Series	MGG
Bore size (mm)	20, 25, 32, 40, 50, 63
Stroke adjustment	Stopper adjustment
Stroke adjustment range (adjustment symbol)	A: 0 to 25mm B: 0 to 50mm
Piston speed	50 to 500mm/s (extension)

* With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.



Precautions on Usage

A Warning

 There is a danger of injury to human body parts and damage to peripheral equipment if they are caught between the stroke adjustment stopper bracket and the cylinder body during operation. Therefore, implement safety measures such as protective cover installation, etc., as needed.

 When adjusting the stroke, be sure to loosen the nut after securing the wrench flats of the stopper bracket. Be aware that if the nut is loosened without securing the stopper bracket, there is a danger of the load and piston rod connector or the load side and stopper bracket side piston rod connector becoming loose first.

Dimensions

ø20 to ø50

ø63

Front mounting flange Ô Width across flats MA MM Ó E φ Ξ £ -0 Æ Ð ٢ Ē R MT Śtr ML Y + Stroke MH + Stroke ZZ + 2 strokes Front mounting flange Width across flats MA мм C Ξ ۲ ₽Ŧ R MT. Stroke ML Y + Stroke MH + Stroke ZZ + 2 strokes

													(mm)
Bore size	Б	v	84.6	MD	MI	NANA	мт	Adjustn	nent 0 to	25mm	Adjustr	nent 0 to	50mm
(mm)	ĸ	I	IVIA				MI	MH	ML	ZZ	MH	ML	ZZ
20	12	86	14	8	16.2	M8 x 1.25	9	63	43	179	88	68	204
25	12	86	17	10	19.7	M10 x 1.25	11	66	43	189	91	68	214
32	12	88	17	12	19.7	M10 x 1.25	11	66	43	191	91	68	216
40	13	99	24	16	27.8	M14 x 1.5	11	72	47	215	97	72	240
50	14	114	32	20	37	M18 x 1.5	11	85	53	254	110	78	279
63	14	117	32	20	37	M18 x 1.5	13	85	53	256	110	78	281

* Dimensions other than the above are the same as those on pages 17 through 20.



6 Variable Stroke Cylinder with Adjustable Retraction



within a range of "0 to 25mm" or "0 to 50mm" on the return stroke. (After stroke adjustment, the front shock absorber is changed to a free state.)

Specifications

Series	MGG
Bore size (mm)	20, 25, 32, 40, 50, 63
Stroke adjustment	Adjustment bolt
Stroke adjustment range (adjustment symbol)	A: 0 to 25mm B: 0 to 50mm
Piston speed	50 to 500mm/s (return side)

* With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.



▲ Caution

- If the stroke adjustment bolt is loosened beyond the stroke adjustment range while air is being supplied to the cylinder, the stroke adjustment bolt may fly out and air may be ejected. Use caution, as there is a danger of human injury or damage to peripheral equipment.
- 2. Perform stroke adjustment when there is no air pressure.
 - If the stroke is adjusted while pressure is being applied, the adjustment unit seal may be deformed and cause air leakage.

Dimensions

ø20 to ø50





							(mm)
Bore size	R	Y	вм	Adjus 0 to 2	tment 25mm	Adjus 0 to 5	tment 50mm
(((((((((((((((((((((((((((((((((((((((MH	ZZ	MH	ZZ
20	12	86	M6 x 1	48	164	73	189
25	12	86	M6 x 1	48	171	73	196
32	12	88	M8 x 1.25	50	175	75	200
40	13	99	M12 x 1.75	65	208	90	233
50	14	114	M12 x 1.75	58	227	83	252
63	14	117	M16 x 2	65	236	90	261

* Dimensions other than the above are the same as those on pages 17 through 20.

ø**63**





With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.



When air pressure is supplied from both ports (A) and (C), the output force in the range of stroke A is doubled

When air pressure is supplied from port (C), the rod is

operated by the amount of stroke B

Dimensions



							(11111)
Bore size (mm)	GC	SA	SB	sz	zz	Bracket mounting stroke (Stroke A +) Stroke B	Stroke A availability
20	21	50	96	127	176	35mm or more	to 200
25	21	50	96	138	183	60mm or more	
32	23	52	100	164	189	80mm or more	
40	24	59	111	194	214	125mm or more	to 300
50	28	66	129	230	250	160mm or more	
63	28	66	132	254	252	210mm or more	

* Dimensions other than the above are the same as those on pages 17 through 20.





Auto switch

rail mounting

8 Auto Switch Rail Mounting

MGG	Bearing type	Mounting type	Bore size	Stroke	Auto switch type	Auto switch symbol	— <u>XC13</u>

In addition to the standard auto switch mounting method (band mounting), this type has rails attached to the cylinder body making auto switch mounting possible.

Specifications

Serie	s	MGG
Bore size	(mm)	20, 25, 32, 40, 50, 63, 80, 100
Annlinghla	Reed type	D-A7/A8, D-A7□H/A80H, D-A73C/A80C, D-A79W
auto switches	Solid state	D-F7□, D-F7□V, D-F7BAL, D-F7□F, D-F7□W,
		D-F7□WV, D-J79, D-J79C, D-J79W, D-F7NTL

* With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

* Refer to "Best Pneumatics No. 2" page 5.3-2 for detailed specifications of individual auto switches.

Dimensions



ø63 to ø100



Auto switch mounting position

Bore size (mm)	D-A72, A7□H, A80H D-A73C, A80C D-F7□, F7□V, F7□W D-F7□WV, F7BAL D-J7□		D-A73 D-A80		D-A79W		D-F7⊡F		D-F7NTL	
	Α	В	Α	В	Α	В	Α	В	Α	В
20	40.5	39.5	40	39	37.5	36.5	44.5	43.5	45.5	44.5
25	40.5	39.5	40	39	37.5	36.5	44.5	43.5	45.5	44.5
32	41.5	40.5	41	40	38.5	37.5	45.5	44.5	46.5	45.5
40	46.5	43.5	46	43	43.5	40.5	50.5	47.5	51.5	48.5
50	53.5	51.5	53	51	50.5	48.5	57.5	55.5	58.5	56.5
63	53.5	51.5	53	51	50.5	48.5	57.5	55.5	58.5	56.5
80	63.5	51.5	63	51	60.5	48.5	67.5	55.5	68.5	56.5
100	63.5	51.5	63	51	60.5	48.5	67.5	55.5	68.5	56.5

<mark>₄ HS</mark> ↓ View C-C'

Width across flats HT

View D-D'

Auto s	Auto switch mounting height (mm)				
D-A7, A8	D-A7⊡H, J79W D-A80H, F7BAL D-F7⊡, F7⊡F D-J79, F7NTL D-F7⊡W	D-A73C D-A80C D-F7⊡WV	D-F7⊡V	D-J79C	D-A79W
Hs	Hs	Hs	Hs	Hs	Hs
26.5	26.5	32.5	29	31	30
29	29	35	31.5	33.5	32.5
32	32.5	38.5	34.5	36.5	35.5
36.5	37	43	39	41	40
42	42	48	44.5	46.5	45.5
49	49	55	51.5	53.5	52.5
58	58	64	60.5	62.5	61.5
68.5	69	74.5	71	73	72

(mm)

9 NPT Piping Ports

MGG Standard part number from page 1

NPT piping ports

·XC18

The air cylinder's piping ports are changed from Rc thread to NPT thread.

Dimensions



10 Fluoro Rubber Seals

Standard part number from page 1 MGG

Fluoro rubber seals

Seals are changed to a fluoro rubber material having superior chemical resistance.

Specifications

Series	MGG
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100
Piston speed	50 to 500mm/s

* With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly. * RBL type shock absorbers are used.

With Coil Scraper 11

MGG Standard part number from page 1

XC35

XC22

With coil scraper

Scrapers are used on the piston rod and guide rods (front and rear) to protect the seals by removing frost, welding spatter and chips, etc., that adhere to the moving parts.

Specifications

Series	MGG
Bore size (mm)	32, 40, 50, 63, 80, 100

* With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly

Enlarged Piping Port Orifice 12



Dimensions



Specifications

Series	MGG
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100
With the exception of the abo	ove, all other specifications and dimensions Please refer to the standard specifications

accordingly.



Dimensions other than the above are the same as those on pages 17 through 20.

▲ Caution

- 1. Confirm with SMC, as use may not be possible in some cases depending on the type of chemical and the operating temperature.
- 2. Cylinders with auto switches can also be produced; however, auto switch related parts (auto switch units, mounting brackets, built-in magnets) are the same as standard products. Before using these, contact SMC regarding their suitability for the operating environment.

Specifications

Series	MGG
Bore size (mm)	20, 25, 32, 40, 50, 63

* With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

	(mm)
Bore size (mm)	AQ
20	5
25	5
32	6
40	7
50	9
63	9

* Dimensions other than the above are the same as those on pages 17 through 20.



13 With Knock Pin Holes



14 Water Resistant Type with Built-in Hard Plastic Magnet



The auto switch magnet for this water resistant cylinder have been changed to hard plastic magnet. This prevents swelling of the magnet.

Dimensions

ø32 to ø50

Front mounting flange



Specifications

Series		MGGM	
Bore size (mm) 32, 40, 50		32, 40, 50	
Action		Double acting	
Fluid		Air	
Maximum	operating pressure	sure 1.0MPa	
Minimum o	operating pressure	e 0.15MPa (horizontal with no load)	
Bearing ty	ре	Slide bearing	
Cushion Base cylinder		Rubber bumper	
Guide unit		Built-in shock absorbers (2 pcs.)	
Mounting	type	Basic type Front mounting flange	

*Refer to page 2 for specifications other than the above.

*Auto switch capable (water resistant type)

Note) RBL (coolant resistant) type shock absorbers are used.

				(mm)
Bore size (mm)	Q	R	Х	Y
32	25	13	39	86 (94)
40	29	14	46	96 (105)
50	31	15	57	109 (121)

* Dimensions inside () are for long strokes.

* Dimensions other than the above are the same as those on pages 17 and 19.

15 Fluoro Rubber Seals with Built-in Hard Plastic Magnet

MGGM Mounting type

Stroke — XC59

Slide bearing

The auto switch magnet for this fluoro rubber seal cylinder have been changed to hard plastic magnet. This prevents swelling of the magnet.

Specifications

Series	MGGM
Bore size (mm)	20, 25, 32, 40, 50
Piston speed	50 to 500mm/s

Bore size

* With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

* RBL type shock absorbers are used.

Dimensions





Fluoro rubber seals and built-in hard plastic magnet

ACaution

- 1. Confirm with SMC, as use may not be possible in some cases depending on the type of chemical and the operating temperature.
- 2. Cylinders with auto switches can also be produced; however, auto switch related parts (auto switch units, mounting brackets, built-in magnets) are the same as standard products. Before using these, contact SMC regarding their suitability for the operating environment.

	(mm)
Bore size (mm)	R
20	14
25	14
32	13
40	14
50	15
Dimensione eth	

* Dimensions other than the above are the same as those on pages 17 and 19.

16 Helical Insert Thread Specifications



The guide body mounting threads are helical insert threads.

Specifications

MGG□B		
20, 25, 32, 40, 50		
Basic type		

* With the exception of the above, all other specifications and dimensions for this product are standard. Please refer to the standard specifications accordingly.

Dimensions

ø20 to ø50









		(mm)
Bore size (mm)	н	AF
20	M6 x 1 depth 12	M5 x 0.8 depth 7.5
25	M8 x 1.25 depth 16	M6 x 1 depth 9
32	M8 x 1.25 depth 16	M6 x 1 depth 9
40	M10 x 1.5 depth 20	M8 x 1.25 depth 12
50	M12 x 1.75 depth 24	M10 x 1.5 depth 15

* Dimensions other than the above are the same as those on page 17.





40

115 152

56

90 M10 x 1.5 depth 16 40

93 116 12 47 25 164 94 75 44 4

183 274

40

350 to 800

15 192

Dimensions



For standard strokes

Bore size (mm)	Stroke range (mm)	Α	AA	АВ	AG	АН	AI	AJ	АК	AL	АМ	AN	AO	AP	в	GC	GK	GL	GQ	GR	I	J	к	L	м	N
20	75, 100, 125, 150, 200	129	12	16	134	150	102	118	9	9	85	140	M8	35	135	27	5.5	6	8	4	40	73	80	106	35	60
25	75, 100, 125	149	16	19	170	186	134	150	9	9	105	175	M8	45	170	34	6.5	9	10	7	50	93	95	134	50	75
32	150, 200, 250	149	16	19	170	186	134	150	9	9	105	175	M8	45	170	34	6.5	9	10	7	50	93	95	134	50	75
40	300	182	19	21	190	210	140	160	11	12	115	200	M10	50	194	38	7	11	12	7	55	103	115	152	56	90

															For long strokes						
Bore size (mm)	ο	PG	PL	Q	R	s	т	U	v	w	х	ХА	Y	z	Bore size (mm)	Stroke range (mm)	R	Y			
20	M6 x 1 depth 9	30.5	74	94	12	26	16	114	65	52	30	3	152	194	20	250 to 400	14	160			
25	M8 x 1.25 depth 13	35.5	82	105	12	31	20	138	84	62	37	3	162	228	25	350 to 500	14	170			
32	M8 x 1.25 depth 13	35.5	82	106	12	38	20	138	84	62	37	3	165	228	32	350 to 600	14	173			
40	M10 x 1.5 depth 16	40	93	116	12	47	25	164	94	75	44	4	183	274	40	350 to 800	15	192			

19 With Piping Ports for Grease

MGG Bearing type | Mounting type | Bore size Stroke

This type is equipped with Rc 1/8 piping ports for grease on both sides of the guide body.

25	350 to 500	14	170
32	350 to 600	14	173
40	350 to 800	15	192

(mm)

-X440

With piping ports for grease

Specifications

Series MGG							
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100						
With the exception of the above, all other specifications and dimensions for this product are							

Dimensions

ø20 to ø50

ø63 to ø100



standard. Please refer to the standard specifications accordingly.

Bore size (mm) CL 20 49 25 54 32 64 40 77 50 92 63 100 80 115 100 140		(mm)
20 49 25 54 32 64 40 77 50 92 63 100 80 115 100 140	Bore size (mm)	CL
25 54 32 64 40 77 50 92 63 100 80 115 100 140	20	49
32 64 40 77 50 92 63 100 80 115 100 140	25	54
40 77 50 92 63 100 80 115 100 140	32	64
50 92 63 100 80 115 100 140	40	77
6310080115100140	50	92
80 115 100 140	63	100
100 140	80	115
	100	140

* Dimensions other than the above are the same as those on pages 17 through 20.

 The standard grease supply port has a hexagon socket head set screw.

@SMC

Series MGG Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by a label of **"Caution", "Warning"** or **"Danger"**. To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.



Note 2) JIS B 8370: General Rules for Pneumatic Equipment



- 2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, press applications, or safety equipment.
- 3. An application which has the possibility of having negative effects on people, property, or animals, and therefore requires special safety analysis.

SMC

Series MGG Actuator Precautions 1 Be sure to read before handling.

Design

AWarning

1. There is a danger of sudden action by air cylinders if sliding parts of machinery are twisted, etc., and changes in forces occur.

In such cases, human injury may occur, e.g., by catching hands or feet in the machinery, or damage to the machinery itself may occur. Therefore, the machinery should be designed to avoid such dangers.

2. A protective cover is recommended to minimize the risk of personal injury.

If a driven object and moving parts of a cylinder pose a danger of personal injury, design the structure to avoid contact with the human body.

3. Securely tighten all stationary parts and connected parts so that they will not become loose.

Particularly when a cylinder operates with high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.

4. A deceleration circuit or shock absorber, etc., may be required.

When a driven object is operated at high speed or the load is heavy, a cylinder's cushion will not be sufficient to absorb the impact. Install a deceleration circuit to reduce the speed before cushioning, or install an external shock absorber to relieve the impact. In this case, the rigidity of the machinery should also be examined.

5. Consider a possible drop in operating pressure due to a power outage, etc.

When a cylinder is used in a clamping mechanism, there is a danger of work pieces dropping if there is a decrease in clamping force due to a drop in circuit pressure caused by a power outage, etc. Therefore, safety equipment should be installed to prevent damage to machinery and human injury. Suspension mechanisms and lifting devices also require consideration for drop prevention.

6. Consider a possible loss of power source.

Measures should be taken to protect against human injury and equipment damage in the event that there is a loss of power to equipment controlled by pneumatics, electricity or hydraulics, etc.

7. Design circuitry to prevent sudden lurching of driven objects.

When a cylinder is driven by an exhaust center type directional control valve or when starting up after residual pressure is exhausted from the circuit, etc., the piston and its driven object will lurch at high speed if pressure is applied to one side of the cylinder because of the absence of air pressure inside the cylinder. Therefore, equipment should be selected and circuits designed to prevent sudden lurching because there is a danger of human injury and/or damage to equipment when this occurs.

8. Consider emergency stops.

Design so that human injury and/or damage to machinery and equipment will not be caused when machinery is stopped by a safety device under abnormal conditions such as a power outage or a manual emergency stop.

Design

▲Warning

9. Consider the action when operation is restarted after an emergency stop or abnormal stop.

Design machinery so that human injury or equipment damage will not occur upon restart of operation.

When the cylinder has to be reset at the starting position, install safe manual control equipment.

Selection

Warning 1. Confirm the specifications.

The products featured in this catalog are designed according to use in industrial compressed air systems. If the products are used in conditions where pressure and/or temperature are out of specification, damage and/or malfunction may occur. Do not use in these conditions. (Refer to specifications.)

Consult SMC if you use a fluid other than compressed air.

2. Intermediate stops

When intermediate stopping of a cylinder piston is performed with a 3 position closed center type directional control valve, it is difficult to achieve stopping positions as accurate and precise as with hydraulic pressure due to the compressibility of air.

Furthermore, since valves and cylinders are not guaranteed for zero air leakage, it may not be possible to hold a stopped position for an extended period of time. Contact SMC in case it is necessary to hold a stopped position for an extended period.

▲Caution

1. Operate within the limits of the maximum usable stroke.

The piston rod will be damaged if operated beyond the maximum stroke. Refer to the specifications for the maximum usable stroke.

2. Operate the piston within a such range that collision damage will not occur at the stroke end.

Operate within a range such that damage will not occur when the piston having inertial force stops by striking the cover at the stroke end.

3. Use a speed controller to adjust the cylinder drive speed, gradually increasing from a low speed to the desired speed setting.

Series MGG Actuator Precautions 2 Be sure to read before handling.

Mounting

≜Caution

1. Do not scratch or gouge the sliding parts of the cylinder tube or piston rod by striking or grasping them with other objects.

Cylinder bores are manufactured to precise tolerances, so that even a slight deformation may cause faulty operation.

Also, scratches or gouges in the piston rod may lead to damaged seals and cause air leakage.

2. Do not use until verifying that equipment can operate properly.

Verify correct mounting by suitable function and leakage tests after compressed air and power is connected following mounting, maintenance or conversions.

3. Instruction manual

The product should be mounted and operated after thoroughly reading the manual and understanding its contents.

Keep the instruction manual where it can be referred to as needed.

Piping

∆Caution

1. Preparation before piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

2. Wrapping of sealant tape

When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the piping.

Also, when sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



Operating Environment

AWarning

1. Do not use in environments where there is a danger of corrosion.

Refer to the construction drawings regarding cylinder materials.

2. In dusty locations or where water or oil splash on the equipment, take suitable measures to protect the rod.

Use the heavy duty scraper type (-XC4) in situations where there is a lot of dust. Use a water resistant cylinder when there is splash or spray of liquids.

Lubrication

Caution

1. Lubrication of non-lube type cylinder

The cylinder is lubricated at the factory and can be used without any further lubrication.

However, in the event that it will be lubricated, use class 1 turbine oil (with no additives) ISO VG32.

Stopping lubrication later may lead to malfunction due to the loss of the original lubricant. Therefore, lubrication must be continued once it has been started.

Air Supply

▲Warning

1. Use clean air.

Do not use compressed air containing chemicals, synthetic oils containing organic solvents, salt or corrosive gases, etc., as it can cause damage or malfunction.

1. Install air filters.

Install air filters at the upstream side of valves. The filtration degree should be $5\mu m$ or finer.

2. Install an air dryer, after-cooler or water separator, etc.

Air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an air dryer, after-cooler or water separator, etc.

3. Use the product within the specified range of fluid and ambient temperature.

Take measures to prevent freezing when below 5°C, since moisture in circuits can be frozen, and this may cause damage to seals and lead to malfunction.

Refer to SMC's "Air Cleaning Equipment" catalog for further details on compressed air quality.

Maintenance

AWarning

1. Perform maintenance according to the procedure indicated in the instruction manual.

If handled improperly, malfunction and damage of machinery or equipment may occur.

2. Removal of components, and supply/exhaust of compressed air

When machinery is removed, first check measures to prevent dropping of driven objects and run-away of equipment, etc. Then cut off the supply pressure and electric power, and exhaust all compressed air from the system.

When machinery is restarted, proceed with caution after confirming measures to prevent cylinder lurching.

≜Caution

1. Filter drainage

Drain out condensate from air filters regularly. (Refer to specifications.)

Series MGG Actuator Precautions 3

Be sure to read before handling.

Air-Hydro

Design

Warning

1. Do not use near flames or in equipment or machinery where the ambient temperature exceeds 60°C.

There is a danger of causing a fire because the air-hydro cylinder uses a flammable hydraulic fluid.

ACaution

1. Do not use in environments, equipment or machinery where mist is unacceptable.

Air-hydro cylinders generate an oil mist during operation which may affect the environment.

2. Be sure to install an exhaust cleaner on a directional control valve used for an airhydro cylinder.

A very small amount of hydraulic fluid is discharged from the exhaust port of the air-hydro cylinder's directional control valve, and this may contaminate the surrounding area.

3. Mount an air-hydro cylinder in a location where maintenance will be easy.

Since an air-hydro cylinder requires maintenance, such as refilling of hydraulic fluid and bleeding of air, ensure sufficient space for these activities.

Selection

ACaution

1. Select an air-hydro cylinder in combination with an air-hydro unit.

Since good operation of an air-hydro cylinder depends on combination with an air-hydro unit, be sure to select an appropriate air-hydro unit.

2. Set the air-hydro cylinder's load at 50% or less of its theoretical output.

For an air-hydro cylinder to obtain constant speed and stopping accuracy close to that of a hydraulic cylinder, it is necessary to keep the load at 50% or less of the theorectical output.

Piping

ACaution

1. Use self-align fittings in the piping for an air-hydro cylinder.

Do not use One-touch fittings in the piping for an air-hydro cylinder, as oil leakage may occur.

2. Use tubing materials such as hard nylon or copper for air-hydro cylinder piping.

As in the case of hydraulic circuits, surge pressures greater than the operating pressure may occur in an air-hydro cylinder's piping, making it necessary to use safer piping materials.

Supply of Hydraulic Fluid

A Warning

1. Supply hydraulic fluid to the air-hydro unit after exhausting all of the compressed air from the system.

When supplying hydraulic fluid to the air-hydro unit, first confirm that safety measures are implemented to prevent dropping of driven objects and release of clamped objects, etc. Then, shut off the air supply and the equipment's electric power, and exhaust the compressed air in the system.

If the air-hydro unit's supply port is opened with compressed air still remaining in the system, there is a danger of hydraulic fluid being blown out.

Maintenance

A Caution

1. Bleed air from the air-hydro cylinder regularly.

Since air may accumulate inside an air-hydro cylinder, bleed air from it at times such as before starting work. Bleed air from a bleeder valve provided on the air-hydro cylinder or the piping.

2. Confirm the amount of fluid in the air-hydro system regularly.

Since a very small amount of hydraulic fluid is discharged from the air-hydro cylinder and air-hydro unit circuit, the fluid will gradually decrease. Therefore, check the fluid regularly and refill as necessary.

The amount of fluid can be confirmed with the level gauge on the air-hydro converter.



Series MGG Auto Switch Precautions 1 Be sure to read before handling.

Design and Selection

AWarning

1. Confirm the specifications.

Read the specifications carefully and use the product appropriately. The product may be damaged or malfunction if it is used outside the range of specifications of load current, voltage, temperature or impact.

2. Take precautions when multiple cylinders are used close together.

When multiple auto switch cylinders are used in close proximity, magnetic field interference may cause the switches to malfunction. Maintain a minimum cylinder separation of 40mm. (When the allowable interval is specified, use the indicated value.)

3. Monitor the length of time that a switch is ON at an intermediate stroke position.

When an auto switch is placed at an intermediate position of the stroke and a load is driven at the time the piston passes, the auto switch will operate, but if the speed is too great, the operating time will be shortened and the load may not operate properly. The maximum detectable piston speed is:

 $V(mm/s) = \frac{Auto switch operating range (mm)}{Load operating time (ms)} \times 1000$

In the case of a high piston speed, it is possible to extend the operating time of the load by using an auto switch (D-G5NT) with a built-in off delay timer (approx. 200ms).

4. Keep wiring as short as possible.

<Reed switches>

As the length of the wiring to a load gets longer, the rush current at switching ON becomes greater, and this may shorten the product's life. (The switch will stay ON all the time.)

- 1) For an auto switch without a contact protection circuit, use a contact protection box when the wire length is 5m or longer.
- 2) Even when an auto switch has a built-in contact protection circuit, if the lead wire length is 30m or more, the rush current cannot be adequately absorbed and the life of the switch may be shortened. Contact SMC, as it is also necessary in this case to connect a contact protection box to extend the switch life.

<Solid state switches>

3) Although wire length should not affect switch function, use a wire 100m or shorter.

5. Be careful of the internal voltage drop of the switch.

<Reed switches>

- 1) Switches with an indicator light (except D-B76, C76)
- If auto switches are connected in series as shown below, be aware that there will be a large voltage drop because of internal resistance in the light emitting diodes. (Refer to internal voltage drop in the auto switch specifications.)

[The voltage drop will be "n" times larger when "n" auto switches are connected.]

Even though an auto switch operates normally, the load may not operate.

AWarning

• Simply, when operating below a specified voltage, it is possible that the load may be ineffective even through the auto switch function is normal.

Supply _ Internal voltage > Minimum operating voltage drop of switch > voltage of load

2) If the internal resistance of a light emitting diode causes a problem, select a switch without an indicator light (D-B80, C80).

<Solid state switches>

3) Generally, the internal voltage drop will be greater with a 2 wire solid state auto switch than with a reed switch. Take the same precautions as in 1).

Also, note that a 12VDC relay is not applicable.

6. Be careful of leakage current.

<Solid state switches>

With a 2 wire solid state auto switch, current (leakage current) flows to the load to operate the internal circuit even when in the OFF state.

Operating current of load (OFF condition) > Leakage current

If the condition given in the above formula is not met, it will not reset correctly (stays ON). Use a 3 wire switch if this specification cannot be satisfied.

Moreover, leakage current flow to the load will be "n" times larger when "n" auto switches are connected in parallel.

7. Do not use a load that generates surge voltage.

<Reed switches>

If driving a load such as a relay that generates a surge voltage, use a switch with a built-in contact protection circuit or a contact protection box.

<Solid state switches>

Although a zener diode for surge protection is connected at the output side of a solid state auto switch, damage may still occur if the surge is applied repeatedly. When a load, such as a relay or solenoid, which generates surge is directly driven, use a type of switch with a built-in surge absorbing element.

8. Cautions for use in an interlock circuit

When an auto switch is used for an interlock signal requiring high reliability, devise a double interlock system to avoid trouble by providing a mechanical protection function, or by also using another switch (sensor) together with the auto switch.

Also, perform periodic maintenance and confirm proper operation.

9. Ensure sufficient clearance for maintenance activities.

When designing an application, be sure to allow sufficient clearance for maintenance and inspections.

Series MGG Auto Switch Precautions 2 Be sure to read before handling.

Mounting and Adjustment

AWarning

1. Do not drop or bump.

Do not drop, bump or apply excessive impacts $(300m/s^2 \text{ or more for reed switches and }1000m/s^2 \text{ or more for solid state switches})$ while handling. Although the body of the switch may not be damaged, the inside of the switch could be damaged and cause a malfunction.

2. Do not carry a cylinder by the auto switch lead wires.

Never carry a cylinder by its lead wires. This may not only cause broken lead wires, but it may cause internal elements of the switch to be damaged by the stress.

3. Mount switches using the proper tightening torque.

When a switch is tightened beyond the range of tightening torque, the mounting screws, mounting bracket or switch may be damaged.

On the other hand, tightening below the range of tightening torque may allow the switch to slip out of position. (Refer to page 32 regarding switch mounting, movement and tightening torque, etc.)

4. Mount a switch at the center of the operating range.

Adjust the mounting position of an auto switch so that the piston stops at the center of the operating range (the range in which a switch is ON). (The mounting positions shown on pages 33 to 35 indicate the optimum position at the stroke end.) If mounted at the end of the operating range (around the borderline of ON and OFF), operation will be unstable.

Wiring

AWarning

1. Avoid repeatedly bending or stretching lead wires.

Broken lead wires will result from repeatedly applying bending stress or stretching force to the lead wires.

2. Be sure to connect the load before power is applied.

<2-wire type>

If the power is turned ON when an auto switch is not connected to a load, the switch will be instantly damaged because of excess current.

3. Confirm proper insulation of wiring.

Be certain that there is no faulty wiring insulation (contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.

4. Do not wire with power lines or high voltage lines.

Wire separately from power lines or high voltage lines, avoiding parallel wiring or wiring in the same conduit with these lines. Control circuits including auto switches may malfunction due to noise from these other lines. Wiring

5. Do not allow short circuit of loads.

<Reed switches>

If the power is turned ON with a load in a short circuited condition, the switch will be instantly damaged because of excess current flow into the switch.

<Solid state switches>

D-G5NB and all models of PNP output type switches do not have built-in short circuit protection circuits. If loads are short circuited, the switches will be instantly damaged.

Take special care to avoid reverse wiring with the brown [red] power supply line and the black [white] output line on 3 wire type switches.

6. Avoid incorrect wiring.

<Reed switches>

A 24VDC switch with indicator light has polarity. The brown [red] lead wire is (+), and the blue [black] lead wire is (–).

1) If connections are reversed, the switch will operate, however, the light emitting diode will not light up.

Also note that a current greater than specified will damage a light emitting diode and it will no longer operate.

Applicable models: D-B73, B73C, C73, C73C, B53, B54

 Note however, in the case of 2-color indicator type auto switches (D-B59W), if the wiring is reversed, the switch will be in a normally ON condition.

<Solid state switches>

- If connections are reversed on a 2-wire type switch, the switch will not be damaged if protected by a protection circuit, but the switch will be in a normally ON condition. However, it is still necessary to avoid reversed connections, since the switch could be damaged by a load short circuit in this condition.
- If connections are reversed (power supply line + and power supply line -) on a 3-wire type switch, the switch will be protected by a protection circuit. However, if the power supply line (+) is connected to the blue [black] wire and the power supply line (-) is connected to the black [white] wire, the switch will be damaged.

* Lead wire color changes

Lead wire colors of SMC switches and related products have been changed in order to meet NECA Standard 0402 for production beginning September 1996 and thereafter. Please refer to the tables provided.

Special care should be taken regarding wire polarity during the time that the old colors still coexist with the new colors.

2-wire	3-wir		
	Old	New	
Output (+)	Red	Brown	Power
Output (-)	Black	Blue	GND

Solid state with diagnostic output

	Old	New
Power supply+	Red	Brown
GND	Black	Blue
Output	White	Black
Diagnostic output	Yellow	Orange

••									
	Old	New							
Power supply+	Red	Brown							
GND	Black	Blue							
Output White Black									
Solid state with latch									

 Old
 New

 Power supply+
 Red
 Brown

 GND
 Black
 Blue

 Output
 White
 Black

 Latch type
 Yellow
 Orange

Series MGG Auto Switch Precautions 3 Be sure to read before handling.

Operating Environment

1. Never use in an atmosphere of explosive gases.

The construction of auto switches is not intended to prevent explosion. Never use in an atmosphere with an explosive gas since this may cause a serious explosion.

2. Do not use in an area where a magnetic field is generated.

Auto switches will malfunction or magnets inside cylinders will become demagnetized. (Consult SMC regarding the availability of a magnetic field resistant auto switch.)

3. Do not use in an environment where the auto switch will be continually exposed to water.

Although switches, except for some models, satisfy IEC standard IP67 construction (JIS C 0920: watertight construction), they should not be used in applications where they are continually exposed to water splash or spray. Poor insulation or swelling of the potting resin inside switches may cause malfunction.

4. Do not use in an environment with oil or chemicals.

Consult SMC if auto switches will be used in an environment with coolant, cleaning solvent, various oils or chemicals. If auto switches are used under these conditions for even a short time, they may be adversely affected by improper insulation, malfunction due to swelling of the potting resin, or hardening of the lead wires.

5. Do not use in an environment with temperature cycles.

Consult SMC if switches are used where there are temperature cycles other than normal air temperature changes, as they may be adversely affected internally.

6. Do not use in an environment where there is excessive impact shock.

<Reed switches>

When excessive impact (300m/s² or more) is applied to a reed switch during operation, the contact point may malfunction and generate or cut off a signal momentarily (1ms or less). Consult SMC regarding the need to use a solid state switch depending on the environment.

7. Do not use in an area where surges are generated.

<Solid state switches>

When there are units (solenoid type lifter, high frequency induction furnace, motor, etc.) that generate a large amount of surge in the area around cylinders with solid state auto switches, this may cause deterioration or damage to the switch. Avoid sources of surge generation and crossed lines.

8. Avoid accumulation of iron waste or close contact with magnetic substances.

When a large amount of ferrous waste such as machining chips or welding spatter is accumulated, or a magnetic substance (something attracted by a magnet) is brought into close proximity with an auto switch cylinder, it may cause the auto switch to malfunction due to a loss of the magnetic force inside the cylinder.

Maintenance

A Warning

- 1. Perform the following maintenance periodically in order to prevent possible danger due to unexpected auto switch malfunction.
 - Securely tighten switch mounting screws.
 If screws become loose or the mounting position is dislocated, retighten them after readjusting the mounting position.
 - 2) Confirm that there is no damage to lead wires.

To prevent faulty insulation, replace switches or repair lead wires, etc., if damage is discovered.

3) Confirm that the green light on the 2 color indicator type switch lights up.

Confirm that the green LED is on when stopped at the established position. If the red LED is on, the mounting position is not appropriate. Readjust the mounting position until the green LED lights up.

Other

A Warning

1. Consult SMC concerning water resistance, flexibility of lead wires and usage at welding sites, etc.



Series MGG Specific Product Precautions 1

Be sure to read before handling. Refer to pages 49 through 55 for safety instructions, actuator precautions and auto switch precautions.

Mounting and Adjustment

AWarning

1. Install a protective cover.

Since the rear plate moves back and forth during mounting, handling and operation, be careful that hands, etc., do not get caught between the cylinder and the rear plate.

In cases where this product is installed on the outside of equipment, implement safety measures such as providing a protective cover.

Protective cover installation example



Shock Absorber Handling

A Caution

Be sure to confirm by referring to the shock absorber (series RB) for details.

1. Do not scratch or gouge the sliding sections of the guide rods by grasping or striking them with other objects.

Since the exterior of a guide rod is manufactured to precise tolerances, even a slight deformation or scratch, etc., can cause malfunction or decreased durability.

2. When mounting the guide body, use a mounting surface having a high degree of flatness.

If twisting or bending occurs in the guide rods, this can cause problems such as a large increase in operating resistance and reduced performance due to premature wear of the bearings.

3. Mount in a location where maintenance will be easy.

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

4. Extension stroke adjustment

To adjust the extension stroke by moving the rear plate, loosen the hexagon socket head screws on the left and right sides of the plate, move the rear plate to the desired stroke position in proximity to the guide body, and retighten the hexagon socket head screws on the left and right.



5. Lubrication of bearings

Lubricate from the grease nipple so that there is no contamination from foreign matter.

In addition, use good quality No. 2 lithium soap base grease.



Series MGG Specific Product Precautions 2

Be sure to read before handling.

Refer to pages 49 through 55 for safety instructions, actuator precautions and auto switch precautions.

End Lock Type

Use the recommended pneumatic circuits.

▲Caution

• This is necessary for proper operation and release of the lock.



Operation

∆Caution

1. Do not use 3 position solenoid valves.

Avoid use in combination with 3 position solenoid valves (especially closed center metal seal types). If pressure is trapped in the port on the lock mechanism side, the cylinder cannot be locked.

Furthermore, even after being locked, the lock may be released after some time, due to air leaking from the solenoid valve and entering the cylinder.

2. Back pressure is required when releasing the lock.

Before starting operation, be sure to control the system so that air is supplied to the side without the lock mechanism as shown in the figure above. There is a possibility that the lock may not be released. (Refer to the section on releasing the lock.)

3. Release the lock when mounting or adjusting the cylinder.

If mounting or other work is performed when the cylinder is locked, the lock unit may be damaged.

- **4. Operate with a load ratio of 50% or less.** If the load ratio exceeds 50%, this may cause problems such as failure of the lock to release, or damage to the lock unit.
- 5. Do not operate multiple synchronized cylinders.

Avoid applications in which two or more end lock cylinders are synchronized to move one workpiece, as one of the cylinder locks may not be able to release when required.

6. Use a speed controller with meter-out control. It may not be possible to release the lock with meter-in control. Operation

▲Caution

7. Be sure to operate completely to the cylinder stroke end on the side with the lock.

If the cylinder piston does not reach the end of the stroke, locking and unlocking may not be possible. Therefore, do not adjust the stroke with the adjustment bolts or shock absorbers.

8. Do not use an air cylinder as an air-hydro cylinder.

This will cause leakage of hydraulic fluid.

9. Adjust an auto switch's position so that it operates for movement to both the stroke end and backlash (2mm) positions.

A 2 color indication switch adjusted for green indication at the stroke end may change to red indication after the backlash return, but this is not abnormal.

∕∆Warning

1. Operate within the prescribed cylinder speed. Otherwise, cylinder and seal damage may occur.

Operating Pressure

Caution

1. Use air pressure of at least 0.15MPa for the port on the lock mechanism side. This is necessary to release the lock.

Exhaust Speed

Caution

1. Locking will occur automatically if the pressure applied to the port on the lock mechanism side drops to 0.05MPa or less. In cases where the piping on the lock mechanism side is long and thin, or the speed controller is separated at some distance from the cylinder port, the exhaust speed will be reduced and some time may be required for the lock to engage. In addition, clogging of a silencer mounted on the solenoid valve exhaust port can produce the same result.

Releasing the Lock

A Warning

 Before releasing the lock, be sure to supply air to the side without the lock mechanism, so that there is no load applied to the lock mechanism when it is released. (Refer to the recommended pneumatic circuits.) If the lock is released when the port on the other side is in an exhaust state, and with a load applied to the lock unit, the lock unit may be subjected to an excessive force and be damaged. Furthermore, the piston rod may move suddenly, which is very dangerous.





Series MGG Specific Product Precautions 3

Be sure to read before handling.

Refer to pages 49 through 55 for safety instructions, actuator precautions and auto switch precautions.

End Lock Type

Manual Release

∆Caution

1. Non-locking type

Insert the accessory bolt from the top of the rubber cap (it is not necessary to remove the rubber cap), and after screwing it into the lock piston, pull it to release the lock. If you stop pulling the bolt, the lock will return to an operational state.

Thread sizes, pulling forces and strokes are as shown below.

Bore size (mm)	Thread size	Pulling force N	Stroke (mm)	Rubber cap
20, 25, 32	M2.5 x 0.45 x 25 / or more	4.9	2	
40, 50, 63	M3 x 0.5 x 30 /or more	10	3	LE COL
80, 100	M5 x 0.8 x 40 /or more	24.5	3	

* Remove the bolt for normal operation.

It can cause lock malfunction or faulty release.

2. Locking type

While pushing the M/O knob, turn it 90° counterclockwise. The lock is released (and remains in a released state) by aligning the \blacktriangle mark on the cap with the \blacktriangledown OFF mark on the M/O knob.

To operate the lock, turn the M/O knob 90° clockwise while pushing it all the way down, and align the \blacktriangle mark on the cap with the \blacktriangledown ON mark on the M/O knob. When doing this, be sure that it locks into place with a click. Failure to click it into place properly can cause the lock to disengage.







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