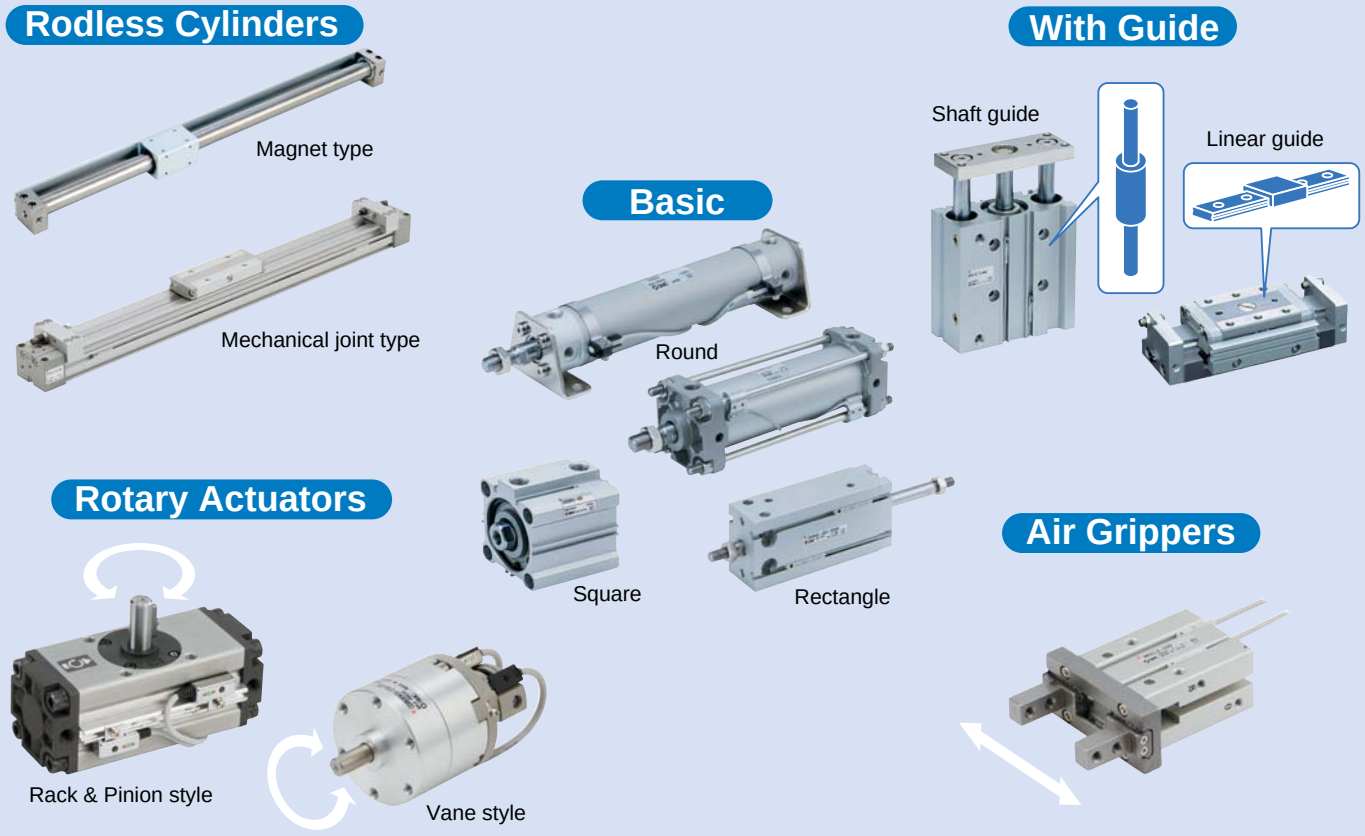
Actuators



INDEX

General Specifications

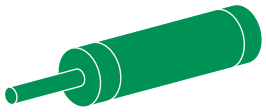
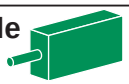
Operating fluid	Air
Ambient and operating temperature	With auto switch: –10 to 60°C (–10 to 150°C)*
	Without auto switch: –10 to 70°C (–10 to 150°C)*
Lubrication	Non-lube
Minimum operating pressure	0.05 MPa or less (0.001 MPa)
Maximum operating pressure	1.0 MPa
Proof pressure	1.5 MPa
Minimum operating speed	50 mm/s or less (0.3 mm/s)
Maximum operating speed	500 to 1000 mm/s (3000 mm/s)

* With no freezing, Figures in ( ) are the manufacturable minimum or maximum values.

Since each value in the left table shows the representative values for the general actuators, it is not applicable for all the actuators.
The value may change depending on a model or cylinder's inner diameter.
For details, refer to each cylinder's specification.

SMC's Actuator Variations

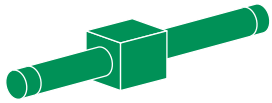
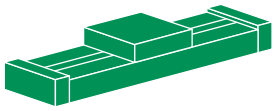
Basic

	Model	Bore size (mm)
Round 	CJP	6, 10, 15
	CJP2	4, 6, 10, 16
	CJ1	2.5, 4
	CJ2	6, 10, 16
	CM2	20, 25, 32, 40
	CG1	20, 25, 32, 40, 50, 63, 80, 100
	CA2	40, 50, 63, 80, 100
	MB / MB1	32, 40, 50, 63, 80, 100, 125
	CS1	125, 140, 160, 180, 200, 250, 300
	CS2	125, 140, 160
	C85 (Conforming to ISO)	8, 10, 12, 16, 20, 25
	C95 (Conforming to ISO)	32, 40, 50, 63, 80, 100, 125, 160, 180, 200, 250
Square 	CQS	12, 16, 20, 25
	CQ2	12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 140, 160, 180, 200
	RQ	20, 25, 32, 40, 50, 63, 80, 100
	NCQ8	056, 075, 106, 150, 200, 250, 300, 400(øinch)
	C55 (Conforming to ISO)	20, 25, 32, 40, 50, 63
Rectangle 	CUJ	4, 6, 8, 10
	CU	6, 10, 16, 20, 25, 32
	MU	25, 32, 40, 50, 63

Bore size (mm)	Maximum stroke (mm)*		
	Basic		
	Round	Square	Rectangle
2.5	10	—	—
4	20		10
6	60		60
10	150		
12	—	30	—
16	200		60
20	1500	50	100
25			300
32	2000	300	
40			
50	1500		
63			
80			—
100			
125	1600		
140			
160			
180	2000		
200			
250	2400	—	
300			

* The maximum stroke changes depending on the model.

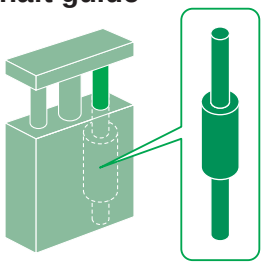
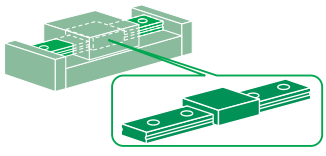
Rodless Cylinders

Magnet type 	CY3B	6, 10, 15, 20, 25, 32, 40, 50, 63
	CY3R	6, 10, 15, 20, 25, 32, 40, 50, 63
	CY1S	6, 10, 15, 20, 25, 32, 40
	CY1L	6, 10, 15, 20, 25, 32, 40
	CY1H	10, 15, 20, 25
	CY1HT	25, 32
	MXY	6, 8, 12
	CY1F	10, 15, 25
Mechanical joint type 	MY1B	10, 16, 20, 25, 32, 40, 50, 63, 80, 100
	MY3A	16, 25, 40, 63
	MY3B	16, 25, 40, 63
	MY3M	16, 25, 40, 63
	MY1M	16, 20, 25, 32, 40, 50, 63
	MY1C	16, 20, 25, 32, 40, 50, 63
	MY1H	10, 16, 20, 25, 32, 40
	MY1HT	50, 63
	MY2C	16, 25, 40
	MY2H	16, 25, 40
	MY2HT	16, 25, 40

Bore size (mm)	Maximum stroke (mm)*1	
	Rodless cylinders	
	Magnet*2	Mechanical joint
6	300	—
10	500	3000
15/16	1000	
20	1500	5000
25	3000	
32		
40	3000	
50	5000	
63		
80	—	
100	—	

* The maximum stroke changes depending on the model.
* The maximum stroke for cylinders with a magnet is compatible with CY3B.

With Guide

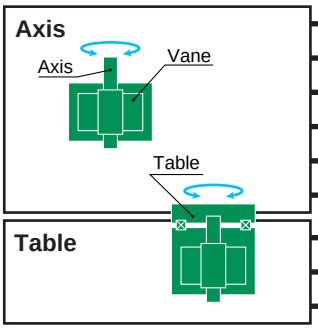
Shaft guide 	CXS	6, 10, 15, 20, 25, 32
	CXSJ	6, 10, 15, 20, 25, 32
	CXW	10, 16, 20, 25, 32
	CXT	12, 16, 20, 25, 32, 40
	CQM	12, 16, 20, 25, 32, 40, 50, 63, 80, 100
	MGP	
	MGQ	
	MGG	20, 25, 32, 40, 50, 63, 80, 100
	MGC	20, 25, 32, 40, 50
	MGJ	6, 10
	MGF	40, 63, 100
	MTS	8, 12, 16, 20, 25, 32, 40
Linear guide 	MXF	8, 12, 16, 20
	MXS	6, 8, 12, 16, 20, 25
	MXQ	6, 8, 12, 16, 20, 25
	MXW	8, 12, 16, 20, 25
	MXP	6, 8, 10, 12, 16
	MXJ	4, 6, 8
	MXY	6, 8, 12
	MXH	6, 10, 16, 20

Bore size (mm)	Maximum stroke (mm)*	
	With shaft guide	With linear guide
4	—	10
6	50	200
8	—	300
10	75	—
12	250	400
16		200
20	400	250
25	500	300
32	600	—
40	800	—
50	1000	—
63	1100	—
80	1200	—
100	1300	—

* The maximum stroke changes depending on the model.

Rotary Actuators

Vane

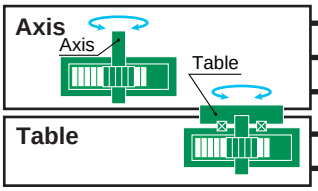


Model	Actuation	Torque (at 0.5 MPa) N·m: 0.04	0.1	0.2	0.3	0.7	1	2	3	5	7	10	20	30	40	70	Max. rotation angle
CRB2	Single		0.12		0.32	0.70		1.83	3.73								Up to 270°
	Double				0.25	0.65	1.45		3.70		7.59						Up to 100°
CRBU2	Single		0.12		0.32	0.70		1.83	3.73								Up to 270°
	Double				0.25	0.65	1.45		3.70		7.59						Up to 100°
CRB1	Single									5.69		10.8	18.0		35.9		Up to 280°
	Double											11.8	22.7		36.5	72.6	Up to 100°

Table

Model	Actuation																
MSUB	Single		0.11		0.31	0.69		1.78									Up to 180°
	Double				0.23	0.62	1.42		3.63								Up to 90°
MSUA	Single		0.11		0.31	0.69		1.78									Up to 180°

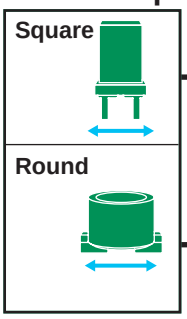
Rack & Pinion



Model	Actuation																
CRJ	Single	0.042	0.095														Up to 190°
CRA1	Single							1.91				9.27	17.2	31.7		74.3	Up to 190°
CRQ2	Double				0.3	0.75		1.84	3.11	5.3							Up to 360°
MSQB	Double		0.09	0.18	0.29	0.56	0.89	1.84	2.73	4.64	6.79	10.1	19.8				Up to 190°
MSQA	Double		0.09	0.18	0.29	0.56	0.89	1.84	2.73	4.64							

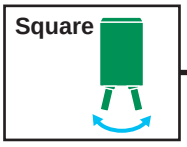
Air Grippers

Parallel Opening



Model	Size: 6	7	8	10	12	15	16	20	25	30	32	40	50	63	80	100	125
	External gripping force (at 0.5 MPa) N																
MHZ2 (2-finger)	3.3			11			34	42	65		158	254					
MHL2 (2-finger)				14			45	74	131		228	396					
MHF2 (2-finger)			19		48		90	141									
MHK2 (2-finger)					15		31	46	80								
MHS2 (2-finger)							21	37	63		111	177	280	502			
MHR2 (2-finger)				12		24		33		58							
MHS3 (3-finger)							14	25	42		74	118	187	335	500	750	1270
MHR3 (3-finger)				7		13											
MHS4 (4-finger)							10	19	31		55	88	140	251			

Fulcrum Opening



Model																	
	External gripping moment (at 0.5 MPa) N·m																
MHC2 (2-finger)	0.038	0.017		0.1			0.39	0.7	136								
MHT2 (2-finger)											12.4	36	63	106			
MHY2 (2-finger)				0.16			0.54	1.1	2.28								
MHW2 (2-finger)								0.3	0.73		1.61	3.7	8.27				

Series included in these two pages are as follows:

∗ Cylinders with specifications outside Japan. Contact SMC for details.

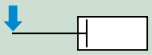
Basic Characteristics of Air Cylinders

The basic characteristics of air cylinders are as shown below.

Use the figures in the table below as a guide for model selection since they may be different depending on a model or bore size. For details, refer to the individual actuator's catalog.

1 Bore Size Selection

Use the table below as a guide for selecting a bore size.

Bore size (mm)	Maximum stroke (mm)	Transfer load (kg) • Below figures were obtained with an operating pressure of 0.7 MPa and a load ratio of η = 0.7. • The cylinder's speed will be determined based on an operating pressure and a load ratio, mounting orientation. Refer to Front matter 22 in Best Pneumatics No. 2 for details.	Allowable rod end lateral load (N) With rod retracted	 With max. rod extended	
2.5	Up to 10	0.2	—	—	
4	Up to 20	0.6	—	—	
6	Up to 60	1.4	0.2	0.05	
8	Up to 400	2.5	0.4	0.05	
10		3.8	0.7	0.08	
12		5.5	1.2	0.15	
16		9.8	2.0	0.2	
20	Up to 1500	15	5.0	1.0	
25		24	7.0	1.5	
32		39	10	2	
40		62	18	3	
50		96	30	4	
63		153	45	5	
80		246	70	8	
100		385	100	10	
125	Up to 1600	601	250	25	
160		985	400	40	
180	Up to 2000	1246	500	45	
200		1539	600	55	
250	Up to 2400	2404	1000	100	
300		3462	1200	150	

2 Minimum Operating Pressure

(MPa)

Bore size (mm)	6	10	16	20	25	32	40	50	63	80	100	125	160	180	200
Standard cylinder	0.12	0.06		0.05											
Low friction cylinder		0.03		0.025				0.01				0.005			
Metal seal cylinder (High speed, low friction)	0.02	0.005													

∗ Consult with SMC for figures other than those shown in this table.

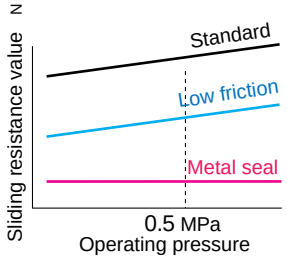
Sliding resistance of a cylinder varies depending on the operating pressure.

Sliding resistance values at 0.5 kPa are shown in the table below.

(Guide value)

Standard cylinder	19 to 102N (ø40 to ø100)
Low friction cylinder	8 to 40N (ø40 to ø100)
Metal seal cylinder	0.05 to 0.2N (ø6 to ø40)

∗ Contact SMC regarding the bore sizes which do not have a resistance value shown.



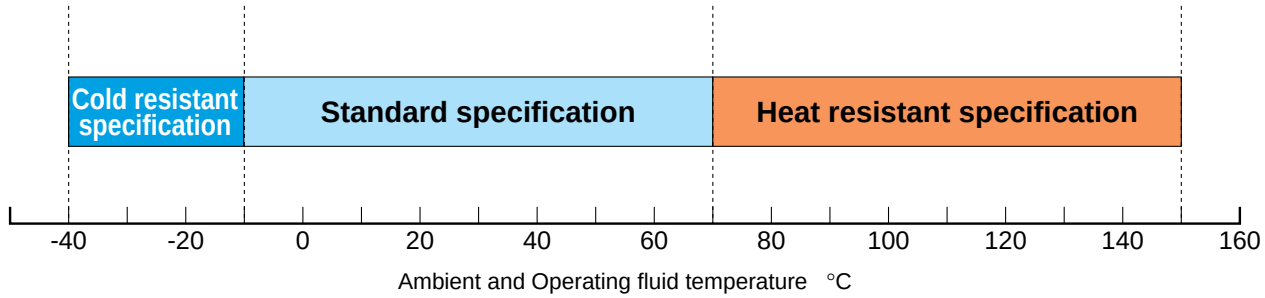
3 Cylinder Speed

(mm/s)

Bore size (mm)	6	10	16	20	25	32	40	50	63	80	100	125	160	180	200
Standard cylinder	50 to 750			50 to 1000								50 to 500			
Low speed cylinder	—	1 to 300		0.5 to 300								—			
High power cylinder (High speed)	—			50 to 3000								—			
Metal seal cylinder	0.5 to 3000 (ø6: Up to 1000)			—											

∗ Consult with SMC for figures other than those shown in this table.

4 Ambient and Operating Fluid Temperature



∗ For the selection of a piston speed and an operating pressure with cold or heat resistant specification and an auto switch, refer to the following pages.

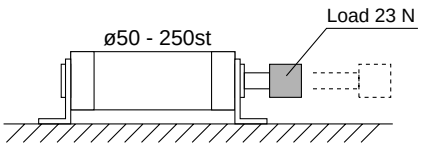
5 Service Life

This cylinder service life data is based on the service life test conducted under the test conditions shown below. This does not guarantee the service life under the customers' operating conditions.

Traveling distance	**8000 km running (16 million reciprocating cycles)**
Condition of cylinder	**Operation condition: Good**
	External air leakage: 5 cm³/min. ANR or less
	Seals: No problem in operation although there is slight friction.
	Piston rod: No abnormal change

Test Condition

Cylinder tested	Air cylinder/CA2 series
Bore size	50 mm
Stroke	250 mm
Operating direction	Horizontal
Operating pressure	0.7 MPa
Cylinder speed	650 mm/s
Operating frequency	65 complete cycles/min
Ambient temperature	Room temperature
Rod end load	23 N
Operating air supply	Using Air filter/AF and Mist Separator/AM
Lubrication	Non-lube (Initial lubrication by grease)
Air cushion	Adequately used



Others

Regarding the service life for other models, Clean Series, water resistant cylinder and oil-free (using white Vaseline), consult with SMC.

Basic

Round

Panel mount, mountable in embedded style
Short total length

CJP

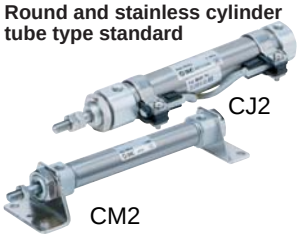
Two auto switches can be mounted, even on bore size ø4 (5-mm stroke)

CJP2

Bore size ø2.5 standardized

CJ1

Round and stainless cylinder tube type standard



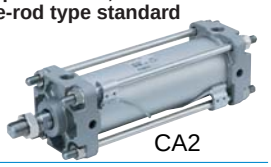
CJ2

CM2

One-piece construction with head cover and tube allows for a shorter total length.

CG1

Square cover, tie-rod type standard



CA2

MB

MB1

Square cover, tie-rod type standard

CS1

CS2

Conforming to ISO, round tube and square cover, tie-rod type standard

C85

C95

CJP ····· P.21 CJP2 ····· P.21 CJ1 ····· P.15 CJ2 ····· P.39 CM2 ····· P.125
CG1 ····· P.219 CA2 ····· P.353 MB ····· P.285 MB1 ····· P.329 CS1 ····· P.409
CS2 ····· P.447

Model	Bore size (mm)	Port size (Rc, NPT, G)	Stroke (mm)	Speed (mm/s)	Pressure (MPa)	Actuation: Double acting	Actuation: Single acting	Cushion (J): Rubber	Cushion (J): Air	Mounting
CJP	6, 10, 15	M5 x 0.8	Up to 15	50 to 500	0.2 to 0.7 (6), 0.15 to 0.7 (10, 15)	—	●	—	—	Panel
CJP2	4	M3 x 0.5	Up to 20	50 to 500	0.12 to 0.7 (4, 6), 0.06 to 0.7 (10, 16)	●	▲	●	—	Foot, Rod flange, Head flange, Rod trunnion, Center trunnion, Head trunnion, Clevis
	6		Up to 25							
	10		Up to 40							
	16	M5 x 0.8	Up to 40							
CJ1	2.5	ø4 tube	Up to 10		0.3 to 0.7	—	●	—	—	
	4		Up to 20		0.2 to 0.7	●				
CJ2	6	M5 x 0.8	Up to 60	50 to 750	0.12 to 0.7 (6), 0.06 to 0.7 (10, 16)	●	●	0.012 to 0.090	—	
	10		Up to 150						0.07 to 0.18	
	16		Up to 200							
CM2	20	1/8	Up to 1000		0.05 to 1.0	●	●	0.27 to 1.2	0.54 to 2.35	
	25		Up to 1500							
	32		Up to 2000							
	40	1/4								
CG1	20	1/8/ M5 x 0.8(G)	Up to 1500	50 to 1000		●	●	0.28 to 9.9	0.35 to 16.7	
	25									
	32	1/8								
	40									
	50	1/4					▲			
	63									
	80	3/8		50 to 700						
	100	1/2								
CA2	40	1/4	Up to 800	50 to 500		●	▲	▲	2.8 to 29	
	50	3/8	Up to 1200							
	63	3/8								
	80	1/2	Up to 1400							
	100	1/2	Up to 1500							
MB / MB1	32	1/8	Up to 700	50 to 1000		●	▲	▲	2.2 to 45	
	40	1/4	Up to 800							
	50	1/4	Up to 1000							
	63	3/8								
	80	3/8								
	100	1/2								
	125	1/2	Up to 1400							
CS1	125	1/2	Up to 1600	50 to 500	0.05 to 0.97	●	▲	▲	32.3 to 265	
	140	1/2								
	160	3/4								
	180	3/4	Up to 2000							
	200	3/4								
	250	1	Up to 2400							
	300	1								
CS2	125	1/2	Up to 1600			●	▲	▲		
	140	1/2								
	160	3/4								
C85 (Conforming to ISO)	8	M5	Up to 400	50 to 750	0.05 to 1.0	●	●	0.02 to 0.40	—	
	10	M5							0.17 to 0.97	
	12	M5								
	16	M5								
	20	1/8	Up to 1000							
	25	1/8								
C95 (Conforming to ISO)	32	1/8	Up to 1000	50 to 1000		●	▲	1.7 to 25.8	2.2 to 147	
	40	1/4	Up to 1900							
	50	1/4								
	63	3/8								
	80	3/8								
	100	1/2								
	125	1/2		50 to 700						
	160	3/4	Up to 2000	50 to 500				▲		
	200	3/4								
	250	1								

●: Standard ▲: Available with a special order (Consult with SMC.)

SMC

Square

Thin cover and piston

Square type with shorter total length

CQ2

Auto switch mountable on 4 faces (3 faces) even though it is ø25 or less

CQS

CQ2, CQS + Air cushion
The dimension range extends from 2.5 to 9 mm Flange on rod side
(compared with CQ2, CQS/with rubber bumper)

RQ

Model	Bore size (mm)	Port size (Rc, NPT, G)	Stroke (mm)	Speed (mm/s)	Pressure (MPa)	Actuation: Double acting	Actuation: Single acting	Cushion (J): Rubber	Cushion (J): Air	Mounting
CQ2	12	M5 x 0.8	Up to 30	50 to 500	0.07 to 1.0	●	●	0.043 to 12.4	—	Tapped (Direct), Through-hole (Direct), Foot, Head flange, Rod flange, Clevis
	16									
	20		Up to 50		0.05 to 1.0					
	25									
	32	1/8	Up to 300				▲			
	40									
	50	1/4								
	63									
	80	3/8								
	100									
	125									
	140									
	160									
	180	1/2		20 to 400	0.05 to 0.7					
	200									
CQS	12	M5 x 0.8	Up to 100	50 to 500	0.07 to 1.0	●	●	0.043 to 0.18	—	
	16									
	20		Up to 200		0.05 to 1.0					
	25		Up to 300							
RQ	20	M5 x 0.8	Up to 50		0.05 to 1.0	●	—	—	0.40 to 10.00	
	25									
	32	1/8	Up to 100							
	40									
	50	1/4								
	63									
	80	3/8								
	100									

●: Standard ▲: Available with a special order (Consult with SMC.)

Rectangle

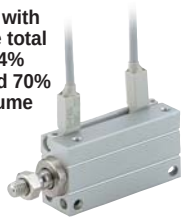
Directly mountable in 3 directions

Auto switch mountable on 2 faces

CU

CUK
Non-rotating

Compared with the CU, the total length is 64% shorter and 70% less in volume



CUJ

Elliptical piston width is shortened.

MU

Model	Bore size (mm)	Port size (Rc, NPT, G)	Stroke (mm)	Speed (mm/s)	Pressure (MPa)	Actuation: Double acting	Actuation: Single acting	Cushion (J): Rubber	Cushion (J): Air	Mounting
CU/ CUK	6	M5 x 0.8	Up to 60	50 to 500	0.12 to 0.7	●	●	0.0125 to 0.29	—	Axial direction, Vertical, Horizontal, Foot with axial direction, Rod flange, Clevis, Bottom mounting, Horizontal mounting, Axial mounting
	10				0.06 to 0.7					
	16									
	20		Up to 100		0.05 to 0.7				0.28 to 0.70	
	25									
	32	1/8								
CUJ	4	M3 x 0.5	Up to 20		0.15 to 0.7	●	●	▲	—	
	6									
	8		Up to 30							
	10				0.1 to 0.7					
MU (Cross-section of a tube)	25	M5 x 0.8	Up to 300		0.05 to 0.7	●	●	0.18 to 1.54	—	
	32	1/8								
	40	1/8								
	50	1/4							▲	
	63	1/4								

●: Standard ▲: Available with a special order (Consult with SMC.)

Air Cylinder/Series CG1

Compact, Lightweight!

Total length: Short
Cover: Small
Weight: Light

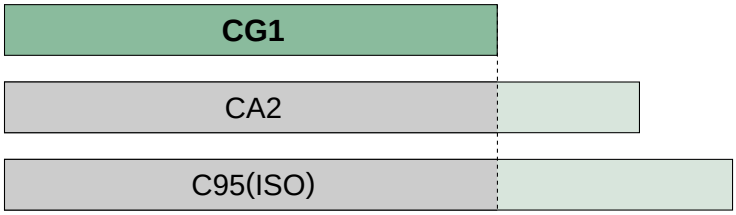
CG1

CA2

C95(ISO)

Total Length

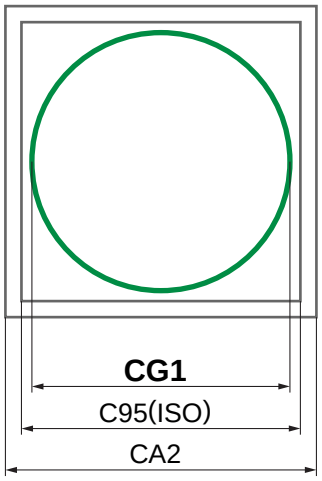
Length at the stroke of 0 mm



Extended dimensions on the basis of the CG1 series (mm)

Bore size	40	50	63	80	100
CG1	**130**	**150**	**150**	**182**	**182**
CA2	+16	+9	+20	+22	+33
C95(ISO)	+33	+29	+44	+36	+51

Cover Size



Extended dimensions on the basis of the CG1 series (mm)

Bore size	40	50	63	80	100
CG1	**47**	**58**	**72**	**89**	**110**
CA2	+13	+12	+13	+13	+6
C95(ISO)	+5	+7	+3	+6	+4

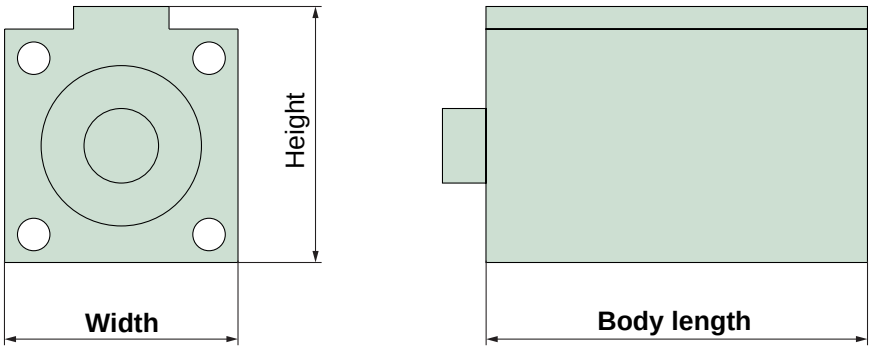
Mass

Mass at the stroke of 300 mm

Additional mass on the basis of the CG1 series (0) (kg)

Bore size	40	50	63	80	100
CG1	**1.3**	**2.0**	**2.6**	**4.1**	**6.2**
CA2	+0.5	+1.1	+0.7	+1.7	+1.6
C95(ISO)	+0.4	+1.2	+0.8	+1.2	+1.6

Compact Cylinder/Series CQ2



Body Length

Without magnet

Extended dimensions on the basis of the CQ2 series (mm)

Bore size	CQS	**CQ2**	C55(ISO)	NCQ8
12	0	**17**	—	—
16 (14.2)	-1.5	**18.5**	—	-4.3
20 (19.1)	0	**19.5**	+17.5	-5.3
25 (26.9)	0	**22.5**	+16.5	-0.1
32	—	**23**	+21	—
40 (38.1)	—	**29.5**	+15.5	-7.1
50 (50.8)	—	**30.5**	+14.5	-6.6
63 (63.5)	—	**36**	+13	-5.8
80	—	**43.5**	—	—
100	—	**53**	—	—

( ): NCQ8 bore size when converted to millimeter from inch.

With magnet

Extended dimensions on the basis of the CQ2 series (mm)

Bore size	CQS	**CQ2**	C55(ISO)	NCQ8	NCQ8□Z
12	-6	**28**	—	—	—
16 (14.2)	-8.5	**30.5**	—	+6.1	-3.6
20 (19.1)	-2	**31.5**	5.5	+5.1	-4.6
25 (26.9)	0	**32.5**	6.5	+12.0	-0.7
32	—	**33**	11.0	—	—
40 (38.1)	—	**39.5**	5.5	+5.0	-7.7
50 (50.8)	—	**40.5**	4.5	+5.5	-10.2
63 (63.5)	—	**46**	3.0	+6.3	-9.4
80	—	**53.5**	—	—	—
100	—	**63**	—	—	—

( ): NCQ8 bore size when converted to millimeter from inch.

Height

Extended dimensions on the basis of the CQ2 series (mm)

Bore size	CQS	**CQ2**	C55(ISO)	NCQ8
12	0	**25**	—	—
16 (14.2)	0	**29**	—	-0.3
20 (19.1)	0	**36**	0	-2.7
25 (26.9)	0	**40**	0	+3.7
32	—	**49.5**	-1.5	—
40 (38.1)	—	**57**	-2	-1.4
50 (50.8)	—	**71**	-5	-1.7
63 (63.5)	—	**84**	-7	-2.0
80	—	**104**	—	—
100	—	**123.5**	—	—

( ): NCQ8 bore size when converted to millimeter from inch.

Width

Extended dimensions on the basis of the CQ2 series (mm)

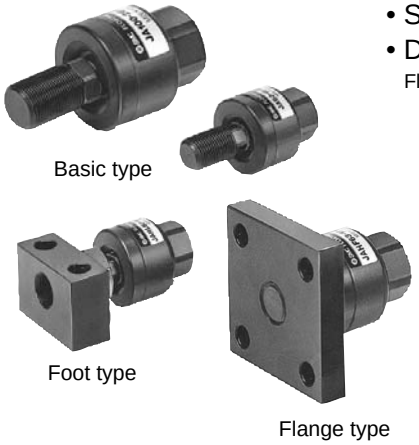
Bore size	CQS	**CQ2**	C55(ISO)	NCQ8
12	0	**25**	—	—
16 (14.2)	0	**29**	—	-0.3
20 (19.1)	0	**36**	0	-4.3
25 (26.9)	0	**40**	0	-0.4
32	—	**45**	+1	—
40 (38.1)	—	**52**	0	-1.2
50 (50.8)	—	**64**	0	0.3
63 (63.5)	—	**77**	-3	-4.9
80	—	**98**	—	—
100	—	**117**	—	—

( ): NCQ8 bore size when converted to millimeter from inch.

Floating Joint

●For male thread/JA

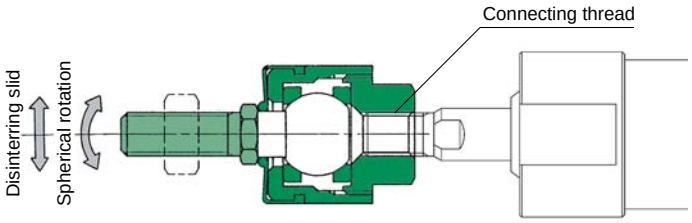
P.908



●For male thread/JS (Stainless steel)

P.918

- Stainless steel 304 (External parts)
- Dust cover
  Fluorine rubber/Silicon rubber



Thread diameter	Bore size*	JA	JS
M3 x 0.5	6	●	—
M4 x 0.7	10	●	●
M5 x 0.8	10, 15, 16	●	●
M6 x 1	15, 16	●	—
M8 x 1	20	●	—
M8 x 1.25		●	●
M10 x 1	32	●	—
M10 x 1.25	25, 32	●	●
M10 x 1.5	25	●	—
M12 x 1.25	32, 40	●	—
M12 x 1.5	40	●	—
M12 x 1.75	32, 40	●	—
M14 x 1.5	40	●	●
M16 x 1.5	50	●	—
M16 x 2	50, 63	●	—
M18 x 1.5		●	●
M20 x 2.5	80	●	—
M22 x 1.5		●	—
M24 x 3		●	—
M26 x 1.5	100	●	—
M27 x 1.5		●	—
M27 x 2	125	●	—
M30 x 1.5	125, 140	●	—
M33 x 2	160	●	—
M36 x 1.5	160	●	—

*This is a reference for the bore size of an applicable cylinder.
The rod end diameter varies according to the model.

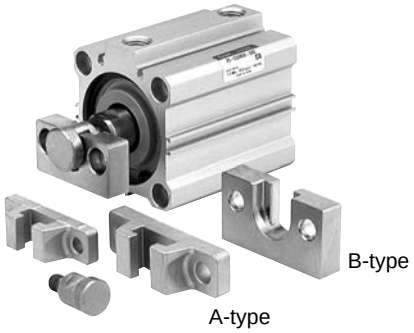
●For female thread (for compact cylinders)/JB

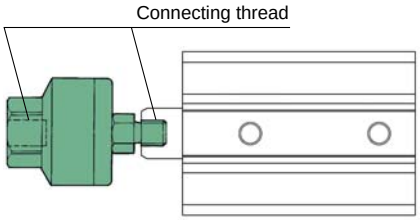
P.916

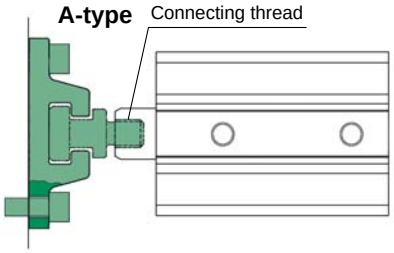
Thread diameter	Bore size*
M3 x 0.5	12
M4 x 0.7	16
M5 x 0.8	20
M6 x 1	25
M8 x 1.25	32, 40
M10 x 1.5	50, 63
M16 x 2	80
M20 x 2.5	100
M22 x 2.5	125, 140
M24 x 3	160

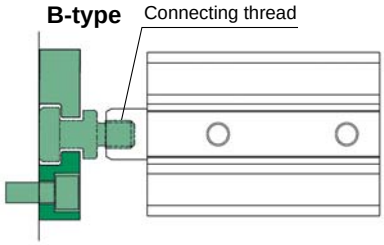
*This is a reference for the bore size of an applicable cylinder.
The rod end diameter varies according to the model.

●Simple joint (for compact cylinders)





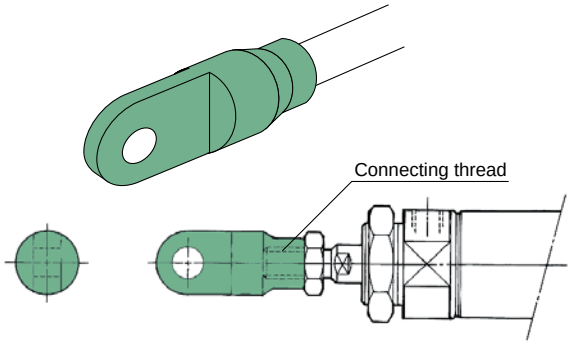




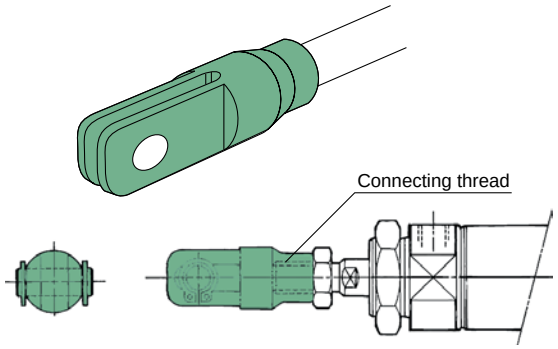
*B-type bracket can be mounted reversely, too.

Knuckle Joint

●Single clevis



●Double clevis



Thread diameter	Bore size*	Applicable pin diameter ø*
M3 x 0.5	6	—
M4 x 0.7	10	3.3
M5 x 0.8	10, 15, 16	5
M6 x 1	15, 16	—
M8 x 1.25	20	8
M10 x 1.25	25, 32	10
M14 x 1.5	40	10
M18 x 1.5	50, 63	14
M22 x 1.5	80	18
M26 x 1.5	100	22
M30 x 1.5	100	22
M36 x 1.5	125, 140, 160	25
M40 x 1.5	180	40
M45 x 1.5	200	40
M56 x 2	250	50
M64 x 2	300	63

* This is a reference for the bore size of an applicable cylinder.
The rod end and applicable pin diameters vary according to the model.

Basic: Option

Round

Model	CJP	CJP2	CJ1	CJ2	CM2	CG1	CA2	MB/MB1	CS1	CS2	C85 (Conforming to ISO)	C95 (Conforming to ISO)
Bore size (mm)	6 10 15	4 6 10 16	2.5 4	6 10 16	20 25 32 40	20 25 32 40 50 63 80 100	40 50 63 80 100	32 40 50 63 80 100 125	125 140 160 180 200 250 300	125 140 160	8 10 12 16 20 25	32 40 50 63 80 100 125 160 200 250
Rod												
Double rod	▲	▲	—	CJ2W	CM2W	CG1W	CA2W	MBW	CS1W	CS2W	C85W	C95S□-□W
Non-rotating rod	— ▲	▲	—	— CJ2K	CM2K	CG1K ▲	CA2K ▲	MBK —	—	—	C85K	C95K —
Combination												
With rod	—	—	—	— CJ2	CLM2	CNG/CLG1 —	CNA/CLA/CL1	MNB —	CNS CLS CLS —	▲	— CL85	C95N —
With end lock	—	—	—	— CBJ2	CBM2	CBG1	CBA2	MBB ▲	-X1347 ▲	▲	— ▲	○
With guide rod	▲	▲	▲	▲	▲	MGG	▲	▲	▲	▲	▲	▲
With valve	▲	▲	▲	▲ CVJ3 CVJ5	CVM3/CVM5	▲	CV3/CVS1	▲	▲	▲	▲	▲
Actuation												
Single acting	●	—	●	●	●	● ○	○	○ ▲	▲	▲	●	▲
Low speed	—	— ●	—	MQM CJ2X	MQM CM2X	CG1Y	CA2Y	-XB13 ▲	▲	▲	○	○ ▲
High speed	—	—	—	MQM	MQM ▲	RHC	▲	▲	▲	▲	▲	▲
Low friction	— ▲	—	—	MQM CJ2Q	CM2Y	CG1Y	CA2Y	MBQ ▲	CS1Q ▲	▲	— ▲ C85Q	○
Environmentally resistant												
Heat resistant	▲	◎	▲	◎	◎	◎	◎	◎ ▲	◎	▲	◎	● ○
Cold resistant	▲	◎	▲	◎	◎	◎	○	○ ▲	○	▲	▲ ◎	○
Improved water and oil resistance	— ▲	—	—	▲ CJ5	●	▲ ●	●	● ▲	▲	▲	▲	▲
Clean	▲	▲	—	●	●	●	● ▲	● 10- ▲	▲	▲	▲	▲
Copper-free, Fluorine-free	●	●	▲	●	●	●	●	● ▲	●	▲	○	○
Stainless steel												
External parts	▲	▲	—	▲ CJ5	-XB12	CG5	▲	▲	▲	▲	▲	▲
Rod, Bracket	▲	▲	▲	▲ CJ5	◎	◎	◎	◎ ◎	◎	○	○	○
Others												
Air-hydro	▲	▲	—	▲	●	●	●	▲	●	▲	▲	▲
Tandem	▲	▲	— ▲	▲	◎	◎	◎	◎ ▲	○	▲	○ ▲	○
Dual stroke	▲	▲	— ▲	▲ ◎	◎	◎ ▲	◎	◎ ▲	◎	▲	○ ▲	○
Adjustable stroke	▲	▲	— ▲	▲ ◎	◎	◎ ▲	◎	◎ ▲	◎	▲	○ ▲	○
Inch size	—	—	—	—	NCM	NCG ▲	NCA		—			

Model and ● : Available with a standard model, Model and ◎ : Available with Made to Order, ○ : Available with a special order A (∗1), ▲ : Available with a special order B (∗2), — : Not available

∗ 1: In the case of being available with simple changes, compared with standard.
∗ 2: This is technically possible, but consult with SMC for dimensions, costs and delivery. For the United States of America (Bore size, Thread size: Inch)

Basic: Option

Square

Model	CQS	CQ2	RQ	RQ: With air cushion
Bore size (mm)	12, 16, 20, 25	12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 140, 160, 180, 200	20, 25	32, 40, 50, 63, 80, 100
Rod				
Double rod	CQSW	CQ2W	○	○
Non-rotating rod	CQSK	CQ2K / ▲ / —	○	○
Combination				
With rod	— / CLQ	— / CLQ / ▲	▲ / RLQ / ▲	
With end lock	▲ / CBQ2	▲ / CBQ2 / ▲	▲	
With guide rod	CQM	CQM / ▲	○	
With valve	▲	▲ / CVQ / ▲	▲	
Actuation				
Single acting	●	● / ○ / ▲	—	
Low speed	CQSX/MQQ	CQ2X/MQQ / ▲	—	
High speed	▲	▲	—	
Low friction	CQSY/MQQ	CQ2Y/MQQ / ▲	—	
Environmentally resistant				
Heat resistant	◎	◎ / ▲	▲	
Cold resistant	◎	◎ / ▲	—	
Improved water and oil resistance	▲ / ○	— / ● / ▲	○	
Clean	●	● / ▲	○	
Copper-free, Fluorine-free	●	● / ▲	○	
Stainless steel				
External parts	▲	▲	▲	
Rod, Bracket	▲	▲	▲	
Others				
Air-hydro	●	● / ▲	—	
Tandem	▲	▲	▲	
Dual stroke	◎	◎ / ▲	▲	
Adjustable stroke	◎	◎ / ▲	○	
Inch size	**NCQ7/NCQ8** (Bore size: 0.56, 0.75, 1.06, 1.50, 2.00, 2.50)		—	

Rectangle

Model	CUJ	CU	MU
Bore size (mm)	4, 6, 8, 10	6, 10, 16, 20, 25, 32	25, 32, 40, 50, 63
Rod			
Double rod	▲	CUW	MUW
Non-rotating rod	▲	CUK	●
Combination			
With rod	—	—	MLU / —
With end lock	—	—	▲
With guide rod	—	CUK	—
With valve	▲	— / ▲	▲
Actuation			
Single acting	●	●	●
Low speed	▲	CUX	▲
High speed	—	— / ▲	▲
Low friction	—	— / ▲	▲
Environmentally resistant			
Heat resistant	— / ◎	◎	—
Cold resistant	▲	◎	—
Improved water and oil resistance	—	— / ▲	▲
Clean	●	● / ▲	○
Copper-free, Fluorine-free	▲	●	●
Stainless steel			
External parts	▲	— / ▲	▲
Rod, Bracket		●	▲
Others			
Air-hydro	—	— / ▲	—
Tandem	—	—	—
Dual stroke	▲	— / ▲	▲
Adjustable stroke	▲	— / ○	○
Inch size	—	—	—

Model and ● : Available with a standard model, Model and ◎ : Available with Made to Order, ○ : Available with a special order A (∗1), ▲ : Available with a special order B (∗2), — : Not available

∗ 1: In the case of being available with simple changes, compared with standard.
∗ 2: This is technically possible, but consult with SMC for dimensions, costs and delivery. For the United States of America (Bore size, Thread size: Inch)

Basic Characteristics of Rodless Cylinders

A performance comparison between a magnet and mechanically joint type rodless cylinder is shown below.

Use the figures in the table below as a guide for model selection since they may be different depending on a model or bore size. For details, refer to the individual actuator's catalog.

1 Bore Size and Stroke

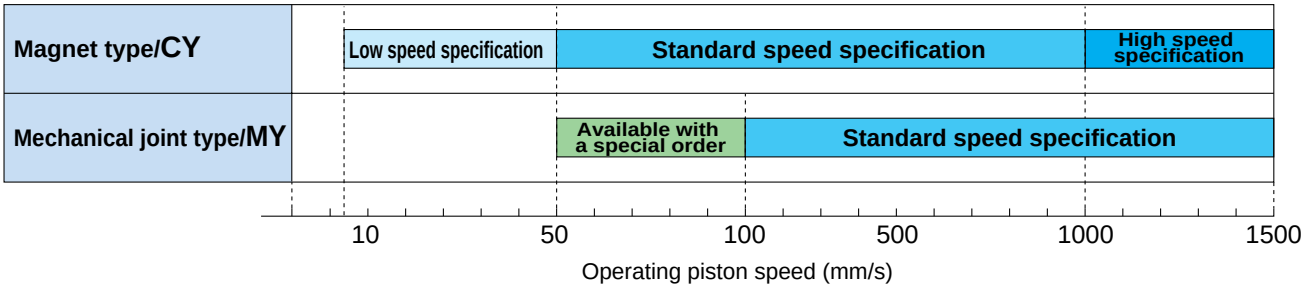
Manufacturable maximum stroke is shown below.

(mm)

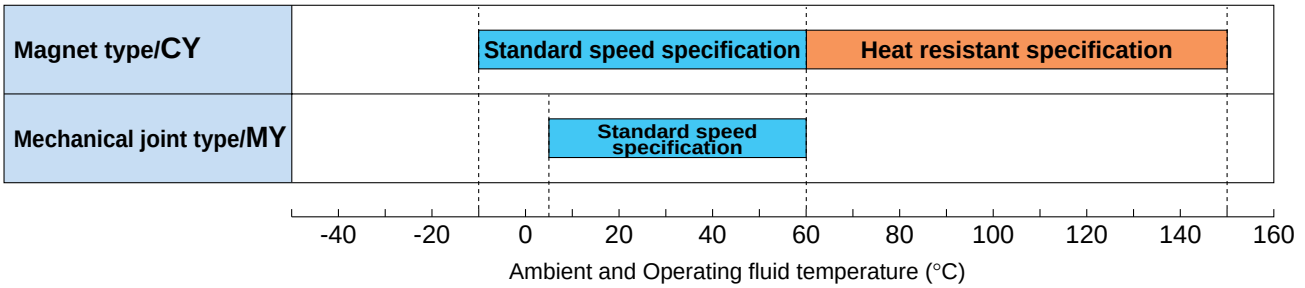
	Bore size (mm)										
	6	10	15(16)	20	25	32	40	50	63	80	100
Magnet type/CY*	300	500	1000	1500	3000			5000		—	
Mechanical joint type/MY	—	3000		5000							

* The maximum stroke for cylinders with a magnet is compatible with CY3B.
Mechanical joint type rodless cylinders: Those shown in the table exclude the linear guide type.

2 Operating Piston Speed



3 Ambient and Operating Fluid Temperature



4 Operating Pressure

The minimum operating pressure is shown below.

(MPa)

	Bore size (mm)										
	6	10	15(16)	20	25	32	40	50	63	80	100
Magnet type/CY	0.16	0.16	0.16		0.15	0.14	0.12			—	
Mechanical joint type/MY	—	0.2	0.1(0.15)								

The maximum operating pressure is shown below.
Magnet type rodless cylinder: 0.7 MPa
Mechanical joint type rodless cylinder: 0.8 MPa

CY ····· 2 P.1165
MY ····· 2 P.943

5 Function Comparison

Comparison by function is shown below.

	Magnet type rodless cylinder/CY	Mechanical joint type rodless cylinder/MY
With guide variation	• Basic • Slide bearing • Ball bushing bearing • Linear guide	• Basic • Slide bearing (made of resin) • Cam follower guide • Linear guide
Clean Series	12-Series Clean rodless cylinder/CYP (Special grease)	—
Improved water resistance	—	With protective cover/MY1CW, MY1MW
Intermediate stop	Using 3 position solenoid valve (all ports blocked)	With lock/ML1C
Cushion	Rubber bumper Shock absorber Sign rodless cylinder/REA, REB	Rubber bumper Air cushion Shock absorber
Air-hydro specification	○	—

5 Service Life

This cylinder service life data is based on the service life test conducted under the test conditions shown below. This does not guarantee the service life under the customers' operating conditions.

	Magnet type rodless cylinder/CY	Mechanical joint type rodless cylinder/MY
Traveling distance	3500 km	3000 km
Condition of cylinder	• Operation condition: Good • External air leakage: 1 cc/min or less • Interior air leakage: 1 cc/min or less • External appearance: Lubricated condition is good and there are no flaws on it. • Minimum operating pressure: Equivalent to the initial value	• Operation condition: Good • Dust seal band: No peeling off, bulging or cracks • Air leakage: Equivalent to the initial value • Minimum operating pressure: Equivalent to the initial value • Air cushion: Good

Test Condition

	Magnet type rodless cylinder	Mechanical joint type rodless cylinder
Cylinder tested	Series CY3B	Series MY1B
Bore size	50 mm	
Stroke	500 mm	
Operating direction	Horizontal	Horizontal wall mounting
Operating pressure	0.5 MPa	
Average piston speed	500 mm/s	
Operating frequency	20 c.p.m	
Ambient temperature	Room temperature	
Load mass	1.2 kg	9 kg
Lubrication	Non-lube (Initial lubrication by grease)	

Rodless Cylinders

CY3B ····· 2 P.1165 CY3R ····· 2 P.1165 CY1S ····· 2 P.1189 CY1L ····· 2 P.1201
CY1H ····· 2 P.1213 CY1HT ····· 2 P.1213 MXY ····· 3 P.213 CYP ····· 2 P.1249
CY1F ····· 2 P.1229

Magnet type

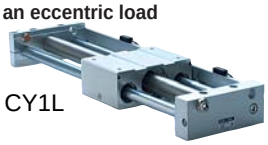
Basic type

Standard model without guide
Used in combination with other guides

Direct mountable
Can be combined with other guides.

For a wide variety of transfer
Slide bearing

Ball bushing bearing
Stable operation of an eccentric load



Linear guide. Excellent load resistance, moment and accuracy

Long strokes, rigidity, and lightweight and compact style with built-in magnet type rodless cylinders on a linear guide.

Clean
Dust generation amount 1/20
(compared with 12-CY1B)

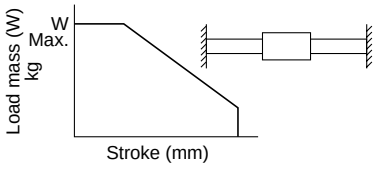
The height and length are reduced by 29% and 31%, respectively.
(compared with CY1H)

Model	Guide	Bore size (mm)	Port size	Stroke (mm)	Max. load (kg) Note 1)	Non-rotating accuracy (±°) Note 2)	Speed (mm/s)	Pressure (MPa)	Cushion J		
									Rubber	Air	Absorber
CY3B	—	6	M3 x 0.5	Up to 300	0.2	—	50 to 500	0.16 to 0.7	0.007 to 5.07	Note)	—
		10	M5 x 0.8	Up to 500	0.4			0.16 to 0.7			
		15		Up to 1000	1			0.16 to 0.7			
		20	1/8	Up to 1500	1.1			0.16 to 0.7			
		25		Up to 3000	1.2			0.15 to 0.7			
		32			1.5			0.14 to 0.7			
		40			2			0.12 to 0.7			
		50	1/4	Up to 5000	2.5			0.12 to 0.7			
		63			3			0.12 to 0.7			
CY3R	—	6	M3 x 0.5	Up to 300	0.2	—	50 to 500	0.16 to 0.7	0.007 to 5.07	Note)	—
		10	M5 x 0.8	Up to 500	0.4			0.16 to 0.7			
		15		Up to 750	1			0.16 to 0.7			
		20	1/8	Up to 1000	1.1			0.16 to 0.7			
		25		Up to 1500	1.2			0.15 to 0.7			
		32			1.5			0.14 to 0.7			
		40	1/4		2			0.12 to 0.7			
		50			2.5			0.12 to 0.7			
		63			3			0.12 to 0.7			
CY1S	Slide bearing	6	M5 x 0.8	Up to 300	1.8	0.09	50 to 400	0.18 to 0.7	0.07 to 2.00	Note)	0.98 to 58.8
		10		Up to 500	3	0.07					
		15		Up to 750	7	0.06					
		20	1/8	Up to 1000	12	0.05					
		25		Up to 1500	20						
		32			30						
		40	1/4		50						
CY1L	Ball bushing bearing	6	M5 x 0.8	Up to 300	1.8	0.03	50 to 500		0.11 to 3.13	Note)	
		10		Up to 500	3	0.02					
		15		Up to 750	7						
		20	1/8	Up to 1000	12						
		25		Up to 1500	20						
		32			30						
		40	1/4		50	0.01					
CY1H	Linear guide (1 axis)	10	M5 x 0.8	Up to 500	4	0.002	70 to 1000	0.2 to 0.7	1.00 to 10.00	Note)	
		15		Up to 750	9						
		20	1/8	Up to 1000	16						
		25		Up to 1200	25						
CY1HT	Linear guide (2 axis)	25	1/8	Up to 1200	25						
		32		Up to 1500	40						
MXY	Linear guide	6	M5 x 0.8	Up to 200	0.6	0.04	50 to 400	0.2 to 0.55	0.018	—	—
		8		Up to 300	1				0.027		
		12		Up to 400	2	0.03			0.055		0.11
CYP	Linear guide	15	M5 x 0.8	Up to 700	1	0.002	50 to 300	0.05 to 0.3	▲	—	—
		32	1/8		5						
CY1F	Linear guide	10	M5 x 0.8	Up to 500	2	0.002	50 to 500	0.2 to 0.7	0.12 to 1.05	—	0.98 to 3.92
		15		Up to 750	5						
		25	1/8	Up to 1200	12						

▲: Available with a special order (Consult SMC.)
Note) Sine rodless cylinder: Available with REA/REB series

Note 1) Maximum load mass

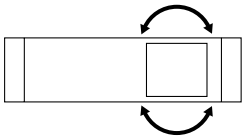
■ **Magnet type/The maximum load mass for the basic type, sliding bearing and ball bearing bushing varies depending on the stroke shown in the graph below. The figures in the above table are for a minimum stroke length.**



Note 2) Non-rotating accuracy

■ **In the case of a linear guide**
Since it is preloaded, the parts tolerance level is 0. The figures in the above table are the displacement angles when 50% of the allowable moment is applied.

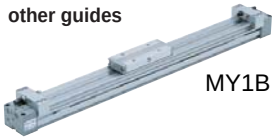
■ **In the case of a sliding bearing, ball bearing bushing**
The figures in the above table are the parts tolerance (the looseness amount with no load)



Mechanical joint type

Basic type

Standard model without guide
Used in combination with other guides



MY1B

The height and total length are reduced by 36% and 30% respectively.
(compared with MY1B)

MY3A

MY3B

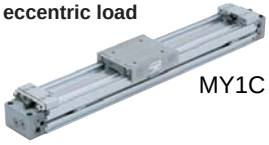
Guide integrated type

For a wide variety of transfer
Slide bearing

MY3M

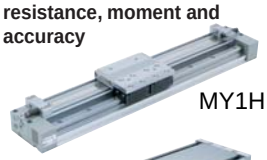
MY1M

Cam follower guide.
Stable actuation against the eccentric load



MY1C

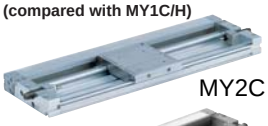
Linear guide. Excellent load resistance, moment and accuracy



MY1H

MY1HT

The height is reduced by 30%.
(compared with MY1C/H)



MY2C

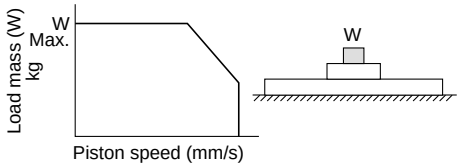
MY2H

MY2HT

Model	Guide	Bore size (mm)	Port size	Stroke (mm)	Max. load (kg) Note 1)	Non-rotating accuracy (±°) Note 2)	Speed (mm/s)	Pressure (MPa)	Cushion J		
									Rubber	Air	Absorber
MY1B	—	10	M5 x 0.8	Up to 3000	5	—	100 to 1000	0.2 to 0.8	0.024	—	0.98
		16			15		100 to 1500	0.1 to 0.8	—	0.6 to 55.5	2.9 to 58.8
		20		Up to 5000	21						
		25	1/8		29						
		32			40						
		40	1/4		53						
		50	3/8		70						
		63			83						
		80	1/2		120						
		100			150						
MY3A	—	16	M5 x 0.8	Up to 3000	6	—	80 to 500	0.15 to 0.8	0.04 to 0.6	—	—
		25	1/8		16						
		40	1/4		40						
		63	3/8		80						
MY3B	—	16	M5 x 0.8		6	—	80 to 800		—	0.6 to 17.3	0.84 to 46.6
		25	1/8		16		80 to 1000				
		40	1/4		40						
		63	3/8		80						
MY3M	Slide bearing (made of resin)	16	M5 x 0.8		18	0.77	80 to 1500	0.15 to 0.7	—		2.9 to 147
		25	1/8		38	0.20					
		40	1/4		84	0.037					
		63	3/8		180	0.0096					
MY1M		16	M5 x 0.8	Up to 3000	18	0.34	100 to 1500	0.15 to 0.8	—	0.6 to 17.3	2.9 to 147
		20		Up to 5000	26	0.16					
		25	1/8		38	0.11					
		32			57	0.042					
		40	1/4		84	0.021					
		50	3/8		120	0.0092					
		63			180	0.0063					
MY1C	Cam follower guide	16	M5 x 0.8	Up to 3000	18	0.072		0.1 to 0.8	—	0.6 to 17.3	2.9 to 147
		20		Up to 5000	25	0.038					
		25	1/8		35	0.022					
		32			49	0.0087					
		40	1/4		68	0.0035					
		50	3/8		93	0.0016					
		63			130	0.0010					
MY1H	Linear guide (1 axis)	10	M5 x 0.8	Up to 1000	6.1	0.29		0.2 to 0.8	0.024	—	0.98 to 58.8
		16			10.8	0.039		0.1 to 0.8	—	0.6 to 6.2	
		20			17.6	0.01					
		25	1/8	Up to 1500	27.5	0.0044					
		32			39.2	0.0021					
		40	1/4		50	0.0017					
MY1HT	Linear guide (2 axis)	50	3/8	Up to 5000	200	0.0004				9.6	58.8
		63			320	0.0002				17.3	220.5
MY2C	Cam follower guide	16	M5 x 0.8	Up to 3000	18	0.024				0.6 to 6.2	2.9 to 58.8
		25	1/8	Up to 5000	35	0.010					
		40	1/4		68	0.0023					
MY2H	Linear guide (1 axis)	16	M5 x 0.8	Up to 1000	15	0.0024					2.9 to 147
		25	1/8	Up to 1500	32	0.004					
		40	1/4		62	0.00128					
MY2HT	Linear guide (2 axis)	16	M5 x 0.8	Up to 1000	20	0.003					2.9 to 147
		25	1/8	Up to 1500	38	0.001					
		40	1/4		80	0.003					

Note 1) Maximum load mass

■ **Magnet type, Mechanical joint type/The maximum load mass of the linear guide and the cam follower guide varies depending on the piston speed shown in the graph below. The figures in the above table are for a minimum piston speed.**



Rodless Cylinders: Option

Magnet type

Model	CY3B									CY3R										CY1S							CY1L							CY1H				CY1HT		CY1F		
Bore size (mm)	6	10	15	20	25	32	40	50	63	6	10	15	20	25	32	40	50	63		6	10	15	20	25	32	40	6	10	15	20	25	32	40	10	15	20	25	25	32	10	15	25
Combination																																										
With lock	—									—										—							—							—				—		—		
With end lock	—									—										—							—							—				—		—		
Actuation																																										
Low speed	◎									▲										○		◎					○		◎					▲				▲		▲		
High speed	●		◎							●		◎								●		○					●		○					●		○		○		●		○
Low friction	—									—										—							—							—				—		—		
Environmentally resistant																																										
Heat resistant	◎									▲										—							—							—				—		—		
Cold resistant	—									—										—							—							—				—		—		
Improved water and oil resistance	▲									▲										▲							—							—				—		—		
Clean	◎									◎										—							—							—				—		—		
Copper-free, Fluorine-free	○		●							○		●								○		◎					○		●					○		●		●		●		
Stainless steel																																										
External parts	▲									▲										▲							▲							—				—		—		
Others																																										
Air-hydro	—		◎							—		◎								—		◎					—		◎					—		○		○		—		○
Floating joint	◎									◎										—							—							—				—		—		
Stroke adjustment	—									—										●							●							●				●		●		

Model and ● : Available with a standard model, Model and ◎ : Available with Made to Order, ○ : Available with a special order A (∗1),
▲ : Available with a special order B (∗2), — : Not available

∗ 1: In the case of being available with simple changes, compared with standard.
∗ 2: This is technically possible, but consult with SMC for dimensions, costs and delivery. For the United States of America (Bore size, Thread size: Inch)

MY1B ····· P.943
MY3A ····· P.1121
MY1H ····· P.943
MY3B ····· P.1121
MY1HT ····· P.943
MY3M ····· P.1121
MY2C ····· P.1085
MY1M ····· P.943
MY2H ····· P.1085
MY1C ····· P.943
MY2HT ····· P.1085

Rodless Cylinders: Option

Mechanical joint type

Model	MY1B										MY3A				MY3B				MY3M			
Bore size (mm)	10	16	20	25	32	40	50	63	80	100	16	25	40	63	16	25	40	63	16	25	40	63
Combination																						
With lock			▲								▲				▲				▲			
With end lock			▲								▲				▲				▲			
Actuation																						
Low speed			○								○				○				○			
High speed			—								—				—				—			
Low friction			—								—				—				—			
Environmentally resistant																						
Heat resistant			—								—				—				—			
Cold resistant			—								—				—				—			
Improved water and oil resistance			▲								▲				▲				▲			
Clean			—								—				—				—			
Copper-free, Fluorine-free			◎								◎				◎				◎			
Stainless steel																						
External parts			—								—				—				—			
Others																						
Air-hydro			—								—				—				—			
Floating joint			●								●				●				▲			
Stroke adjustment			●						▲		▲				●				●			

Model	MY1M							MY1C							MY1H						MY1HT		MY2C			MY2H			MY2HT		
Bore size (mm)	16	20	25	32	40	50	63	16	20	25	32	40	50	63	10	16	20	25	32	40	50	63	16	25	40	16	25	40	16	25	40
Combination																															
With lock			▲							▲							▲				▲		▲			▲			▲		
With end lock			▲							▲					▲		●				▲		▲			▲			▲		
Actuation																															
Low speed			○							○							○				○		○			○			○		
High speed			—							—							—				—		—			—			—		
Low friction			—							—							—				—		—			—			—		
Environmentally resistant																															
Heat resistant			—							—							—				—		—			—			—		
Cold resistant			—							—							—				—		—			—			—		
Improved water and oil resistance			▲							▲							▲				▲		▲			▲			▲		
Clean			—							—							—				—		—			—			—		
Copper-free, Fluorine-free			◎							◎							◎				◎		◎			◎			◎		
Stainless steel																															
External parts			—							—							—				—		—			—			—		
Others																															
Air-hydro			—							—							—				—		—			—			—		
Floating joint			▲							▲							▲				▲		▲			▲			▲		
Stroke adjustment			●							●							●				●		●			●			●		

Model and ● : Available with a standard model, Model and ◎ : Available with Made to Order, ○ : Available with a special order A (∗1),
▲ : Available with a special order B (∗2), — : Not available

∗ 1: In the case of being available with simple changes, compared with standard.
∗ 2: This is technically possible, but consult with SMC for dimensions, costs and delivery. For the United States of America (Bore size, Thread size: Inch)

Basic Characteristics of Cylinders with Guide

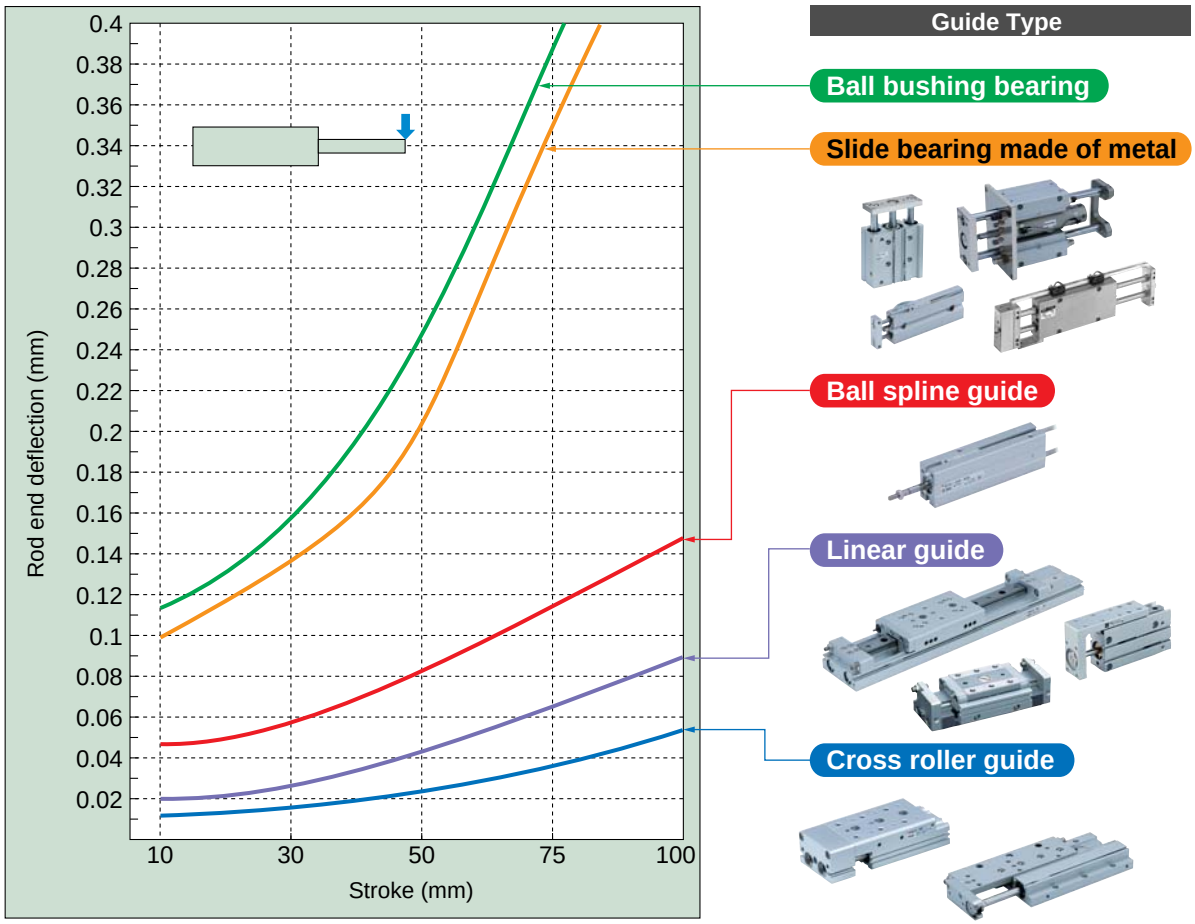
A performance comparison of cylinders with different types of mounting guides is shown below.

Use the figures in the table below as a guide for model selection since they may be different depending on a model or bore size. For details, refer to the individual actuator's catalog.

1 Accuracy

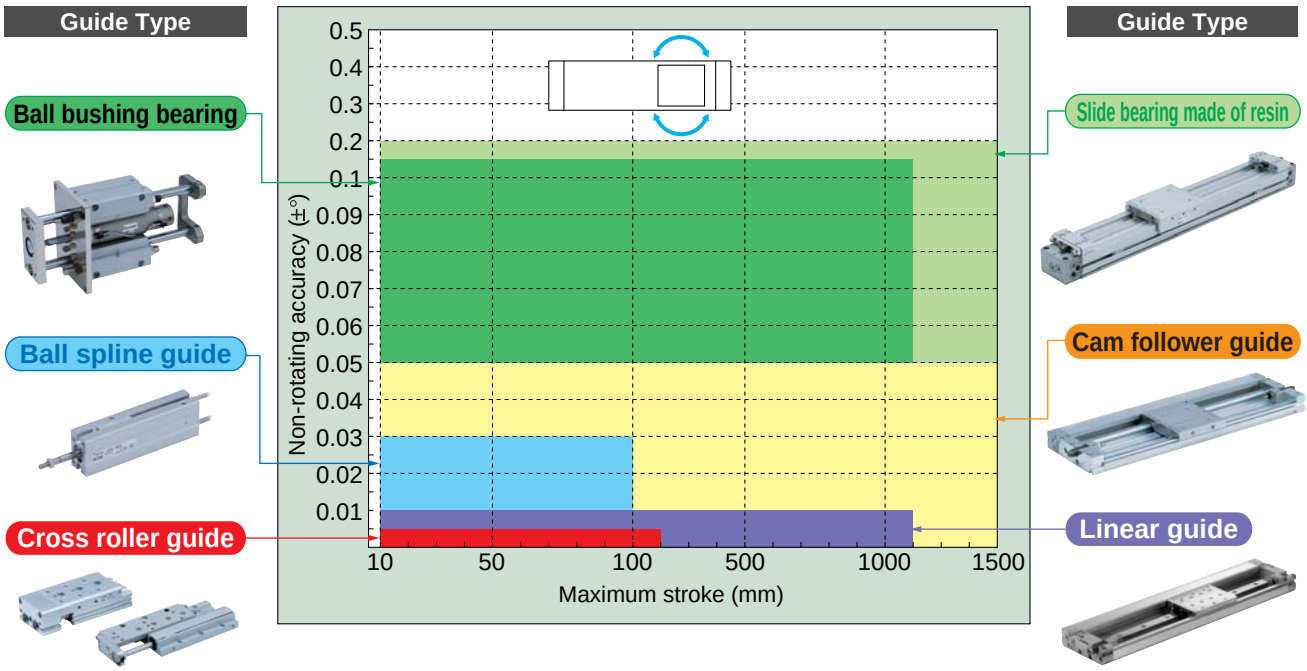
1) Deflection amount at the table or rod end (When the maximum load is applied to the stroke extension end.)

Below graph shows only the tendency since it may be different depending on a model or bore size. Refer to Best Pneumatics for details.



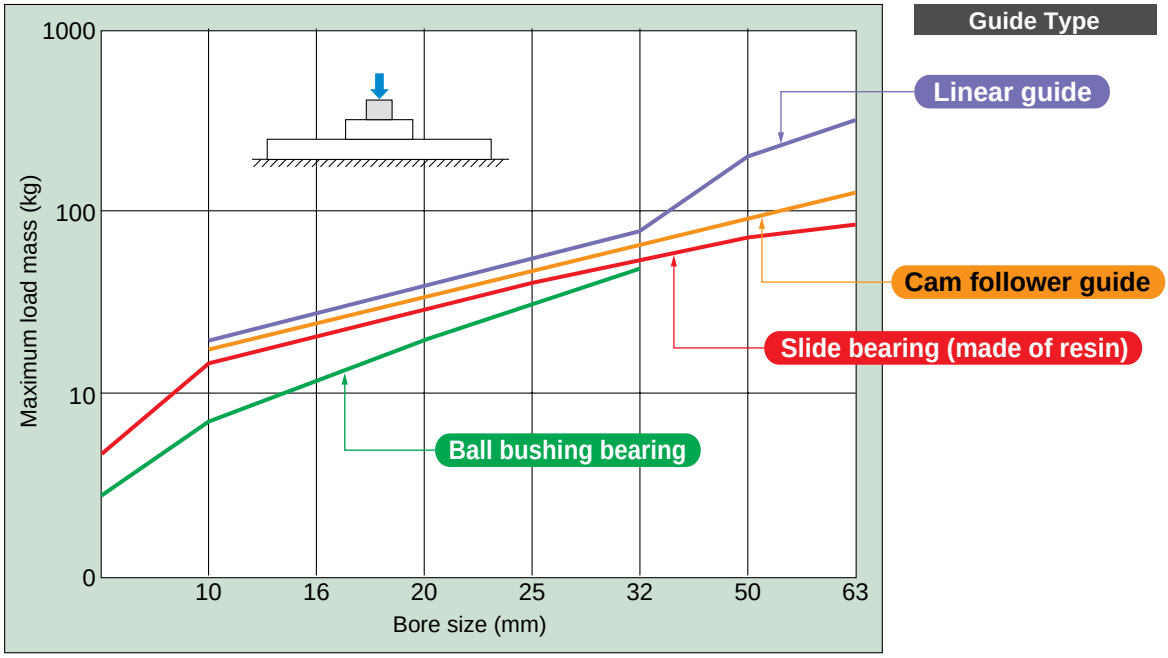
2) Non-rotating accuracy at the table or rod end

Below graph shows only the tendency since it may be different depending on a model or bore size. Refer to Best Pneumatics for details.



2 Load Mass

Below graph shows only the tendency since it may be different depending on a model or bore size. Refer to Best Pneumatics for details.



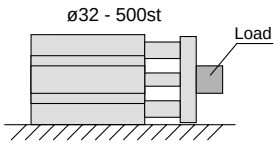
∗ The figures will change depending on the operating speed and the amount of overhang.
For details, refer to pages described to each product model selection.

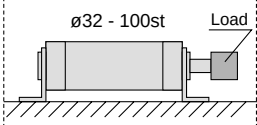
5 Service Life

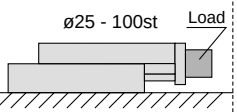
This cylinder service life data is based on the service life test conducted under the test conditions shown below. This does not guarantee the service life under the customers' operating conditions.

Guide type	Slide bearing (Copper alloy)	Ball bushing bearing	Ball spline guide	Linear guide
Cylinder for test	MGGM	MGGL	MTS	MXQ
Traveling distance (number of complete cycles)	3000 km (3 million cycles)		2000 km (10 million cycles)	2000 km (10 million cycles)
Non-rotating accuracy	±0.03 mm or less ±0.04°		±0.05°	±0.005 mm or less

* The figures of non-rotating accuracy is measured when 50% of the allowable torque is applied.
* It is the same as the lubrication.







Test Condition

Guide type	Slide bearing (Copper alloy)	Ball bushing bearing	Ball spline guide	Linear guide
Cylinder for test	MGGM	MGGL	MTS	MXQ
Bore size	ø32		ø32	ø25
Stroke	500 mm		100 mm	100 mm
Operating direction	Horizontal		Horizontal	Vertical, downward
Average piston speed	800 mm/s		800 mm/s	350 mm/s
Operating frequency	18 complete cycles/min		29 complete cycles/min	60 compiete cycles/min
Load mass	2.8 kg		4.3 kg	3.8 kg
Lubrication	Non-lube (Initial lubrication by grease)			

Others

Regarding the other models, consult with SMC.

Cylinders with Guide

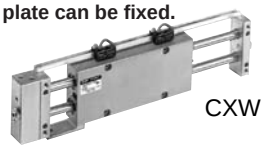
Shaft guide

CXSJ ③P.535 CXS ③P.535 CXW ③P.461 CXT ③P.521 CQM ②P.791
MGJ ③P.255 MGP ③P.263 MGQ ③P.337 MGF ③P.409 MGG ③P.353

2 rods, double thrust

CXSJ

Mounting: Housing and plate can be fixed.



CXW

Table and actuator are combined.

CXT

CQ2 with guide rod

3 to 4 times stronger anti-lateral load (compared with CQ2)

CQM

Compact cylinder with guide

MGJ

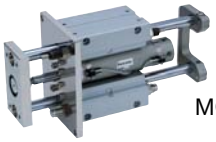
MGP

MGQ

Low profile, large bore size guide rod type

MGF

Basic cylinder and guide rod are combined.

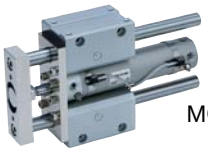


MGG

Model	Guide	Bore size (mm)	Port size	Stroke (mm)	Max. load (kg) Note 1)	Non-rotating accuracy Note 2) Slide	Non-rotating accuracy Note 2) Ball	Speed (mm/s)	Pressure (MPa)	Cushion J Rubber	Cushion J Air	Cushion J Absorber
CXSJ	Aluminum alloy slide bearing • Ball bushing bearing	6 x 2	M3 x 0.5	Up to 100	1.5	0.1	0.1	30 to 800	0.15 to 0.7	0.016 to 0.25	—	—
		10 x 2	M5 x 0.8	Up to 150	4				0.1 to 0.7			
		15 x 2			9			30 to 700				
		20 x 2		Up to 200	15				0.05 to 0.7			
		25 x 2			25			30 to 600				
		32 x 2	1/8		40							
CXS		6 x 2	M5 x 0.8	Up to 100	1.5	0.1	0.1	30 to 300	0.15 to 0.7	0.0023 to 0.25	—	—
		10 x 2		Up to 150	4			30 to 800	0.1 to 0.7			
		15 x 2			9			30 to 700			0.4 to 1	
		20 x 2		Up to 200	15				0.05 to 0.7			
		25 x 2	1/8		25			30 to 600				
		32 x 2			40							
CXW		10 x 2	M5 x 0.8	Up to 100	1	0.09	0.09	30 to 500	0.15 to 1.0	—	—	0.98 to 14.7
		16 x 2		Up to 200	4	0.03	0.03					
		20 x 2			5				0.1 to 1.0			
		25 x 2	1/8		6	0.02	0.02					
		32 x 2			10	0.01	0.01					
CXT	Copper alloy slide bearing • Ball bushing bearing	12	M5 x 0.8	Up to 100	3	0.12	0.05	50 to 500	0.15 to 0.7	0.043 to 0.52	—	2.94 to 58.8
		16			7	0.10	0.04					
		20		Up to 200	12	0.08	0.03					
		25		Up to 300	20	0.07						
		32	1/8		30							
		40			50	0.06						
CQM	Sintered, oil impregnated alloy slide bearing	12	M5 x 0.8	Up to 30	1.3	0.2	—	50 to 500	0.12 to 1.0	0.043 to 4.54	—	—
		16			1.3						▲	
		20		Up to 50	2.6	0.1	—		0.1 to 1.0			
		25			2.6							
		32	1/8	Up to 100	3.5							
		40			4.8							
		50	1/4		6.1			50 to 300				
		63			12							
		80	3/8		17							
		100			23							
MGJ		6	M3 x 0.5	Up to 15	0.08	0.1	—	50 to 500	0.15 to 0.7	0.012	—	—
		10		Up to 20	0.29					0.035		
MGP	Copper alloy slide bearing • Ball bushing bearing	12	M5 x 0.8	Up to 250	1	0.08	0.08	50 to 500	0.12 to 1.0	0.043 to 4.54	—	2.94 to 147
		16			1.8						0.23 to 16.4	
		20	1/8	Up to 400	3	0.07	0.07		0.1 to 1.0			
		25			4.1							
		32			13	0.06	0.06					
		40										
		50	1/4		21	0.05	0.05					
		63										
		80	3/8		23	0.04	0.04					
		100			35							
MGQ		12	M5 x 0.8	Up to 100	3	0.08	0.08	50 to 500	0.12 to 1.0	0.043 to 4.54	▲	▲
		16			4							
		20	1/8	Up to 200	5.5	0.07	0.07		0.1 to 1.0			
		25			7							
		32			20	0.06	0.06					
		40										
		50	1/4		30	0.05	0.05					
		63										
		80	3/8		36	0.04	0.04					
		100			54							
MGF	Special resin slide bearing	40	1/8	Up to 100	13	0.08	—	20 to 200	0.1 to 1.0	0.76	—	—
		63	1/4		32	0.06	—			1.9		
		100			55	0.05	—			4.6		
MGG	Copper alloy slide bearing • Ball bushing bearing	20	1/8	Up to 400	5	0.07	0.06	50 to 1000	0.15 to 1.0	0.28 to 9.9	—	5.88 to 147
		25		Up to 500	6	0.06	0.05					
		32		Up to 600	9							
		40		Up to 800	15	0.05	0.04					
		50	1/4	Up to 1000	25	0.04						
		63		Up to 1100	39		0.03					
		80	3/8	Up to 1200	55			50 to 700				
		100	1/2	Up to 1300	80	0.03	0.02					

▲: Available with a special order (Consult with SMC.)

MGC ····· P.391 MTS ····· P.229 MXF ····· P.133 MXP ····· P.189 MXS ····· P.49 MXJ ····· P.169 MXQ ····· P.87 MXY ····· P.213 MXW ····· P.147 MXH ····· P.15



MGC

Spring rod type which contains the guide function inside.

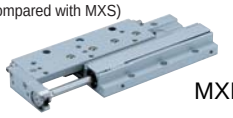
MTS

Model	Guide	Bore size (mm)	Port size	Stroke (mm)	Max. load (kg) Note 1)	Non-rotating accuracy Note 2) Slide	Non-rotating accuracy Note 2) Ball	Speed (mm/s)	Pressure (MPa)	Cushion J Rubber	Cushion J Air	Cushion J Absorber
MGC	Copper alloy slide bearing • Ball bushing bearing	20	M5 x 0.8	Up to 400	4	0.07	0.06	50 to 750	0.15 to 1.0	▲	0.35 to 3.4	—
		25		Up to 500	4.7	0.06	0.05					
		32	1/8	Up to 600	6.1		0.04					
		40		Up to 800	10	0.05						
		50	1/4	Up to 1000	18.5	004						
MTS	Ball bushing bearing	8	M3 x 0.5	Up to 30	0.06	0		50 to 500	0.15 to 0.7	0.02	—	—
		12	M5 x 0.8	Up to 100	0.6	0		50 to 800	0.12 to 0.7	—	0.19 to 2.8	—
		16		Up to 200	0.7							
		20			2				0.1 to 0.7			
		25			2.2							
		32	1/8		6							
		40			10							

▲: Available with a special order (Consult with SMC.)

Cross roller linear guide

The height is reduced by a maximum of 47%
(compared with MXS)



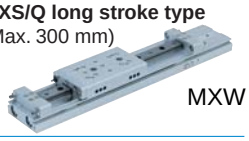
MXF

Table and actuator are combined. Thanks to dual rod construction allows for twice the output force.

MXS

MXQ

MXS/Q long stroke type
(Max. 300 mm)



MXW

Linear guide having an integrated cylinder

MXP

Achieves high precision and rigidity by integrating the front mounting part with the table.

MXJ

Long strokes, rigidity, and lightweight and compact style with built-in magnet type rodless cylinders on a linear guide.

MXY

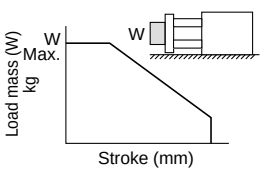
CU with a linear guide

MXH

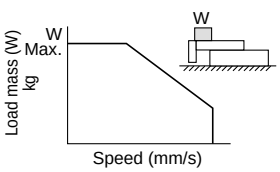
Model	Guide	Bore size (mm)	Port size	Stroke (mm)	Max. load (kg) Note 1)	Non-rotating accuracy Note 2)	Speed (mm/s)	Pressure (MPa)	Cushion J Rubber	Cushion J Air	Cushion J Absorber
MXF	Cross roller	8	M3 x 0.5	Up to 30	0.6	0.03	50 to 500	0.15 to 0.7	0.027	—	—
		12	M5 x 0.8	Up to 50	1	0.03			0.055		
		16		Up to 75	2	0.02			0.11		
		20		Up to 100	4	0.03			0.16		
MXS		6 x 2	M3 x 0.5	Up to 50	0.6	0.02			0.018	—	—
		8 x 2	M5 x 0.8	Up to 75	1	0.02			0.027		0.045
		12 x 2		Up to 100	2	0.02			0.055		0.11
		16 x 2		Up to 125	4	0.02			0.11		0.22
		20 x 2	1/8	Up to 150	6	0.02			0.16		0.32
		25 x 2			9	0.01			0.24		0.48
MXQ	Linear	6 x 2	M5 x 0.8	Up to 50	0.6	0.02			0.018	—	—
		8 x 2		Up to 75	1	0.02			0.027		0.054
		12 x 2		Up to 100	2	0.02			0.055		0.11
		16 x 2		Up to 125	4	0.02			0.11		0.22
		20 x 2	1/8	Up to 150	6	0.03			0.16		0.32
		25 x 2			9	0.03			0.24		0.48
MXW		8 x 2	M5 x 0.8	Up to 150	1.8	0.02			0.041	—	0.082
		12 x 2			4	0.01			0.09		0.18
		16 x 2		Up to 200	7	0.01			0.16		0.32
		20 x 2	1/8	Up to 250	11	0.01			0.255		0.51
		25 x 2		Up to 300	17	0.01			0.39		0.78
MXP		6	M3 x 0.5	Up to 10	0.32	0.05			0.01	—	—
		8	M5 x 0.8	Up to 20	0.75	0.05			0.033		
		10		Up to 20	1.2	0.05			0.045		0.09
		12		Up to 25	1.7	0.05			0.076		0.152
		16		Up to 30	3	0.06			0.135		0.27
MXJ		4	M3 x 0.5	Up to 10	0.1	0.03			0.0031	—	—
		6		Up to 15	0.2	0.03			0.0061		
		8		Up to 20	0.35	0.04			0.011		
MXY		6	M5 x 0.8	Up to 200	0.6	0.04	50 to 400	0.2 to 0.55	0.018	—	—
		8		Up to 300	1	0.04			0.027		
		12		Up to 400	2	0.03			0.055		0.11
MXH		6	M5 x 0.8	Up to 60	0.8	0.03	50 to 500	0.15 to 0.7	0.0125	—	—
		10			1.8	0.03		0.06 to 0.7	0.025		
		16			3.1	0.03			0.05		
		20			5.5	0.03		0.05 to 0.7	0.1		

Note 1) Maximum load mass

■ Shaft guide

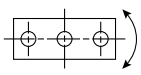


■ Linear guide/Cross roller

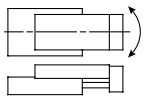


Note 2) Non-rotating accuracy

■ Shaft guide
Displacement angle at no load



■ Linear guide/Cross roller
Displacement angle with the maximum catalog stroke length body and when the 50% of the allowable moment at the rod end position is applied.



Cylinders with Guide: Option

Shaft guide

Model	CXSJ	CXS	CXW	CXT	MGP	MGQ	MGG	MGC	MGJ	MGF
Bore size (mm)	6 10 15 20 25 32	6 10 15 20 25 32	10 16 20 25 32	12 16 20 25 32 40	12 16 20 25 32 40 50 63 80 100	12 16 20 25 32 40 50 63 80 100	20 25 32 40 50 63 80 100	20 25 32 40 50	6 10	40 63 100
Combination										
With lock	—	—	—	— ○	— MLGP	— ▲	◎	MLGC ▲	—	—
With end lock	▲	●	●	— ○	— ●	— ▲	●	▲	—	—
With valve	—	—	—	▲	▲	MVGQ	▲	▲	—	▲
Actuation										
Low speed	◎	◎	◎	◎	◎	◎	◎	◎	○	○
High speed	▲	◎	▲	▲	▲	▲	○	○	—	—
Low friction	▲	▲	▲	—	—	—	—	—	—	—
Environmentally resistant										
Heat resistant	◎	◎	○	○	◎	◎	◎	◎	▲	▲
Cold resistant	○	○	○	▲	▲	▲	▲	▲	▲	▲
Improved water and oil resistance	▲	▲	▲	▲	— ●	▲	▲ ●	▲	—	—
Clean	● ▲	●	▲	○	● ▲	▲	▲	▲	▲	●
Copper-free, Fluorine-free	●	●	●	●	●	●	●	●	○	—
Stainless steel										
Stainless steel specification (-XC6)	◎	◎	▲	▲	◎	▲	◎	◎	▲	▲
Others										
Air-hydro	▲	▲	○	○	▲	◎	● ○	●	—	—
Tandem	▲	▲	—	○	▲	▲	○	○	—	—
Dual stroke	▲	▲	—	○	▲	▲	◎ ○	◎	▲	—
Stroke adjustment	▲	▲	—	○	◎	▲	◎ ○	◎	▲	—

Model and ● : Available with a standard model, Model and ◎ : Available with Made to Order, ○ : Available with a special order A (∗1),
▲ : Available with a special order B (∗2), — : Not available

∗ 1: In the case of being available with simple changes, compared with standard.
∗ 2: This is technically possible, but consult with SMC for dimensions, costs and delivery. For the United States of America (Bore size, Thread size: Inch)

Cylinders with Guide: Option

	Model	CQM										MTS						
	Bore size (mm)	12	16	20	25	32	40	50	63	80	100	8	12	16	20	25	32	40
Combination																		
	With lock			▲										▲				
	With end lock	▲		○								—			●			
	With valve					▲									▲			
Actuation																		
	Low speed					○								—				
	High speed					▲									●			
	Low friction					—								—				
Environmentally resistant																		
	Heat resistant					○								—				
	Cold resistant					○								—				
	Improved water and oil resistance		—				○							—				
	Clean					○								○				
	Copper-free, Fluorine-free					○								●				
Stainless steel																		
	External parts					▲								▲				
Others																		
	Air-hydro	—				○								—				
	Tandem					○								▲				
	Dual stroke					○								▲				
	Stroke adjustment					○								◎				

	Model	MXF					MXS						MXQ						MXW					MXP					MXJ			MXY			MXH			
	Bore size (mm)	8	12	16	20		6	8	12	16	20	25	6	8	12	16	20	25	8	12	16	20	25	6	8	10	12	16	4	6	8	6	8	12	6	10	16	20
Combination																																						
	With lock	—					—						—						—					—					—			—			—			
	With end lock	▲					●						●						▲					—					—			—			—			
	With valve	—					—						—						—					—					—			—			—			
Actuation																																						
	Low speed	▲					▲						▲						▲					▲					—			—			◎			
	High speed	—					—						—						—					—					—			—			▲			
	Low friction	—					—						▲						—					—					—			—			—	▲		
Environmentally resistant																																						
	Heat resistant	—					—						▲						—					▲					—			—			▲			
	Cold resistant	—					—						—						—					—					—			—			▲			
	Improved water and oil resistance	—					—						—						—					—					—			—			▲			
	Clean						●						●						—					● (Except ø8)					●			—			▲			
	Copper-free, Fluorine-free	●					●						●						●					●					●			●			▲			
Stainless steel																																						
	External parts	—					—						—						—					—					—			—			—	▲		
Others																																						
	Air-hydro	▲					▲						▲						▲					—					—			—			—			▲
	Tandem	—					—						—						—					—					—			—			—			
	Dual stroke	—					▲						▲						—					—					—			—			▲			
	Stroke adjustment	—					—						—						—					—					—			—			—	▲		

Model and ● : Available with a standard model, Model and ◎ : Available with Made to Order, ○ : Available with a special order A (∗1),
▲ : Available with a special order B (∗2), — : Not available

∗ 1: In the case of being available with simple changes, compared with standard.
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Rotary Actuators

CRB2 ···· P.45 CRBU2 ·· P.81 CRB1 ···· P.115 CRQ2 ···· P.243 MSUB ···· P.147 CRA1 ···· P.191 MSUA ···· P.147 MSQB ···· P.271 CRJ ····· P.179 MSQA ···· P.271

Style	Rotating parts	Rotating accuracy	Model	Construction	Size	Port size	Torque N·m (Guide at 0.5 MPa) Single	Torque N·m (Guide at 0.5 MPa) Double	Allowable axis load N	Rotating angle 90°	100°	180°	190°	270°	280°	360°	Angle adjustor	Speed adjustment capable time S/90° Minimum	Speed adjustment capable time S/90° Maximum	Pressure MPa Minimum	Pressure MPa Maximum	Mounting	Port location Axial direction	Port location Body side	Auto switch	Back lash
Vane	Axis	Basic type	**CRB2** Round compact Max. 270° capable	Single vane style / Double vane style	10	M3 x 0.5	0.1	0.3	14.7	●	Double vane only	●		●			0° to 230°	0.03	0.3	0.2	0.7	Top mounting, Bottom mounting, With flange	B port, A port	B port, A port	●	None
					15	M5 x 0.8	0.3	0.7	14.7																	
					20		0.7	1.5	24.5								0° to 240°			0.15						
					30	M5 x 0.8	1.8	3.7	29.4									0.04			1					
					40		3.7	7.6	60								230°	0.07	0.5							
			CRBU2 Mountable in 3 directions		10	M3 x 0.5	0.1	0.3	14.7	●	Double vane only	●		●			230°	0.03	0.3	0.2	0.7	Top mounting, Bottom mounting, Lateral mounting	B port, A port	B port, A port	●	None
					15	M5 x 0.8	0.3	0.7	14.7																	
					20		0.7	1.5	24.5								240°			0.15						
					30	M5 x 0.8	1.8	3.7	29.4									0.04			1					
					40		3.7	7.6	60								230°	0.07	0.5							
			CRB1 Max. 280° capable		50	1/8	5.7	12	245	●	◎	●	◎	●	◎			0.1	1	0.15	1	Top mounting, Bottom mounting, Lateral mounting	B port, A port	B port, A port	●	None
					63		11	23	390																	
					80	1/4	18	37	490																	
					100		36	73	588																	
	Table		**MSUB** Can mount a load directly.	Single vane style / Double vane style	1	M3 x 0.5	0.1	0.2	20	●	▲	●					At the rotation end ±5° (S) ±2.5° (D)	0.07	0.3	0.2	0.7	Bottom mounting, Top mounting, Lateral mounting	B port, A port	B port, A port	●	None
					3	M3 x 0.5 M5 x 0.8	0.3	0.6	40											0.15						
					7	M5 x 0.8	0.7	1.4	50												1					
					20		1.8	3.6	60																	
		High precision type	**MSUA** Deflection accuracy of the table face is within 0.03 mm.	Single vane style	1	M3 x 0.5	0.1	—	20	●	▲	●					At the rotation end ±5°	0.07	0.3	0.2	0.7	Bottom mounting, Top mounting, Lateral mounting	B port, A port	B port, A port	●	None
					3	M3 x 0.5 M5 x 0.8	0.3		40											0.15						
					7	M5 x 0.8	0.7		50												1					
					20		1.8		60																	
Rack & Pinion	Axis	Basic type	**CRJ** Compact type of single rack style	In-line single rack style (Pinion, Piston)	05	M3 x 0.5	0.04	—	25	●	●	●	●				At the rotation end ±5°	0.1	0.5	0.15	0.7	Top mounting, Bottom mounting, Lateral mounting	A port, B port	A port, B port	●	None
					1		0.1		30																	
			CRA1	In-line single rack style (Rack, Pinion)	30	M5 x 0.8	1.9	—	29.4		—		—				At the rotation end ±3°		1							None
					50	1/8	9.3		196										2							
					63		17		294	●	●	●	●				0° to 90° 90° to 180°	0.2	3	0.1	1	Top mounting, Bottom mounting, With foot, With flange		B port, A port	●	Within 1°
					80	1/4	32		392										4							
					100	3/8	74		588										5							
			CRQ2 Double rack style Thin and its height 17 to 37 mm.	Parallel double rack style	10	M5 x 0.8		0.3	14.7								At the rotation end ±5°	0.2	0.7	0.15	0.7	Top mounting, Bottom mounting	B port, A port		●	None
					15			0.8	19.6																	
					20	1/8		1.8	49	●		●			●				1	0.1	1					
					30			3.1	78																	
					40			5.3	98																	
	Table	Basic type	**MSQB** A load can be mounted directly. Angle is adjustable steplessly up to 190°	Parallel double rack style	1	M3 x 0.5		0.09	31								0° to 190°	0.2	0.7	0.1	0.7	Top mounting, Bottom mounting, Lateral mounting	B port, A port	B port, A port	●	None
					2			0.2	32																	
					3			0.3	33																	
					7	M5 x 0.8		0.6	54																	
					10			0.9	78																	
					20			1.8	147										1	0.1	1	Top mounting, Bottom mounting	A port, B port	A port, B port		
					30	1/8 M5 x 0.8		2.7	196																	
					50			4.6	314																	
					70			6.8	333										1.5							
					100			10	390										2							
					200			20	543										2.5							
		High precision type	**MSQA** Amount of table movement in the radial and thrust is within 0.01 mm or less.		1	M3 x 0.5		0.09	31								0° to 190°	0.2	0.7	0.1	0.7	Top mounting, Bottom mounting, Lateral mounting	B port, A port	B port, A port	●	None
					2			0.2	32																	
					3			0.3	33																	
					7	M5 x 0.8		0.6	54																	
					10			0.9	86																	
					20			1.8	166										1	0.2 0.1	1	Top mounting, Bottom mounting	A port, B port	A port, B port		
					30	1/8		2.7	233																	
					50	M5 x 0.8		4.6	378																	

● : Standard
▲ : Available with a special order
◎ : Optional

Rotation Rotary Actuators Basic: Option

Model	CRB2					CRBU2					CRB1				MSU					CRJ		CRA1					CRQ2					MSQ							
Size	10	15	20	30	40	10	15	20	30	40	50	63	80	100	1	3	7	20		05	1	30	50	63	80	100	10	15	20	30	40	1	2	3	7	10	20	30	50	70	100	200
Stopping style																																								
Variable angle	● CRB2□U					● CRBU2□U					▲				●					● CRJU		● CRA1□U					●					●								
External stopper	▲					▲					▲				▲					● CRJU		▲					▲					▲				○			▲
Internal absorber	—					—					—				—					—		—	▲				—	▲				—				● MSQ□R			
External absorber	—					—					—				—					—		—	▲				—	▲				—				● MSQ□L, H			▲
Combination																																							
With valve	—					—					● CVRB1				—					—		—	● CVRA1				—					—								
Actuation																																							
Low speed	—					—					—				—					—		▲					● CRQ2X					▲				● MSQX			▲
Intermediate stop	—					—					—				—					—		▲					▲					—				● MSZ			▲
Environmentally resistant																																							
Clean	● 10-CRB1				▲	▲					● 10-			▲	—					▲		● 11-			▲		▲					● 11-								▲
Copper-free, Fluorine-free	● 20-					● 20-					● 20-				●					○		● 20-					●					● 20-								
Copper-free, Fluorine-free and Silicon-free + Low particle generation	● 21-CRB1				▲	▲					● 21-			▲	—					▲		○ 22-			▲		▲					○				● 22-			▲
Heat resistant	—					—					—				—					▲		○ -X7					▲					▲ Note 1)							
Cold resistant	—					—					—				—					▲		▲					▲					▲ Note 1)							
Water resistant	—					—					—				—					▲		▲					▲					▲ Note 1)							
Material																																							
Main parts, Stainless steel	●		▲			●		▲			◎				—					○		○ -X6					●	○ -X6				▲ Note 1)							
Rubber parts FKM	—					—					—				—					○		○ -X16					◎ -XC69					○ Note 2)							
Others																																							
High precision type	—					—					—				● MSUA					—		—					—					● MSQA							○
Air-hydro	—					—					—				—					—		—	● CRA1□H				—					—							

Model and ● : Available with a standard model, Model and ◎ : Available with Made to Order(Optional), ○ : Available with a special order A (Consult with SMC.),
▲ : Available with a special order B (Consult with SMC for costs and delivery.), — : Not available
Note 1) Shock absorber is not available. Note 2) Shock absorber is a special order item

MHZ2 ···· 4 P.373
MHL2 ···· 4 P.473 MDHR3 ·· 4 P.504
MHF2 ···· 4 P.445 MHS4 ···· 4 P.596
MHK2 ···· 4 P.519 MHC2 ···· 4 P.633
MHS2 ···· 4 P.544 MHT2 ···· 4 P.643
MDHR2 ·· 4 P.491 MHY2 ···· 4 P.655
MHS3 ···· 4 P.552 MHW2 ···· 4 P.655

Parallel Opening — 2-finger — Square type / Round type

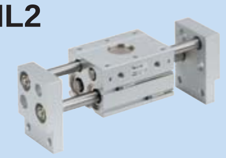
Linear guide MHZ2 (Square type)

Linear guide. With dust cover
Long stroke is also available.

Size	6	10			16			20			25			32	40
Port size	M3 x 0.5	M3 x 0.5			M5 x 0.8										
Gripping force (0.5 MPa) N O.D.	3.3	11			34			42			65			158	254
Gripping force (0.5 MPa) N I. D.	6.1	17			45			66			104			193	318
Note) Finger (mm) Open width	12	15.2	9.7	19.2	20.9	12.6	26.9	26.3	17.2	34.3	33.3	22.8	41.3	48	60
Note) Finger (mm) Closed width	8	11.2	5.7	11.2	14.9	6.6	14.9	16.3	7.2	16.3	19.3	8.8	19.3	26	30
Note) Finger (mm) Stroke	4	4	4	8	6	6	12	10	10	18	14	14	22	22	30
Operating pressure (MPa) Minimum	0.15	0.2			0.1									0.1	0.1
Operating pressure (MPa) Maximum	0.7	0.7												0.7	0.7
Max. operating frequency (cpm)	180	180												60	60
Repeatability (± mm)	0.01	0.01												0.02	0.02

Wide opening MHL2 (Square type)

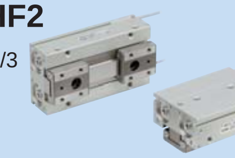
Open/Closed stroke
Max. 200 mm



Size	10			16			20			25			32			40		
Port size	M5 x 0.8												1/8			1/8		
Gripping force (0.5 MPa) N O.D./I.D.	14			45			74			131			228			369		
Note) Finger (mm) Open width	76	118	156	98	170	210	122	222	262	150	282	320	220	318	402	288	406	486
Note) Finger (mm) Closed width	56	78	96	68	110	130	82	142	162	100	182	200	150	198	242	188	246	286
Note) Finger (mm) Stroke	20	40	60	30	60	80	40	80	100	50	100	120	70	120	160	100	160	200
Operating pressure (MPa) Minimum	0.15			0.1														
Operating pressure (MPa) Maximum	0.6																	
Max. operating frequency (cpm)	60 / 40 (Long stroke)												30/20 (Long stroke)					
Repeatability (± mm)	0.1																	

Compact MHF2 (Square type)

Height reduced to 1/3
(compared with MHZ2)



Size	8			12			16			20		
Port size	M3 x 0.5			M5 x 0.8								
Gripping force (0.5 MPa) N O.D./I.D.	19			48			90			141		
Note) Finger (mm) Open width	8	16	32	12	24	48	16	32	64	20	40	80
Note) Finger (mm) Closed width	0	0	0	0	0	0	0	0	0	0	0	0
Note) Finger (mm) Stroke	8	16	32	12	24	48	16	32	64	20	40	80
Operating pressure (MPa) Minimum	0.15			0.1								
Operating pressure (MPa) Maximum	0.7											
Max. operating frequency (cpm)	120 / 60 (Long stroke)											
Repeatability (± mm)	0.05											

Slide guide MHK2 (Square type)

With dust cover,
Long stroke,
Through-hole,
Stainless steel
finger is also available.

Size	12		16		20		25	
Port size	M3 x 0.5		M5 x 0.8					
Gripping force (0.5 MPa) N O.D.	15		31		46		80	
Gripping force (0.5 MPa) N I. D.	16		36		56		86	
Note) Finger (mm) Open width	13	20	20.6	28.6	26	34	33	41
Note) Finger (mm) Closed width	9	9	14.6	14.6	16	16	19	19
Note) Finger (mm) Stroke	4	11	6	14	10	18	14	22
Operating pressure (MPa) Minimum	0.1							
Operating pressure (MPa) Maximum	0.6							
Max. operating frequency (cpm)	120 / 90 (Long stroke)							
Repeatability (± mm)	0.01							

Slide guide MHS2 (Round type)

Wedge cam
construction.
Mass reduced
(compared with MHZ2)

Size	16	20	25	32	40	50	63
Port size	M3 x 0.5	M5 x 0.8					
Gripping force (0.5 MPa) N O.D.	21	37	63	111	177	280	502
Gripping force (0.5 MPa) N I. D.	23	42	71	123	195	306	537
Note) Finger (mm) Open width	14	16	20	24	28	34	46
Note) Finger (mm) Closed width	10	12	14	16	20	22	30
Note) Finger (mm) Stroke	4	4	6	8		12	16
Operating pressure (MPa) Minimum	0.2			0.1			
Operating pressure (MPa) Maximum	0.6						
Max. operating frequency (cpm)	120			60			
Repeatability (± mm)	0.01						

Rotary MDHR2 (Round type)

Cross roller
guide

Size	10	15	20	30
Port size	M3 x 0.5		M5 x 0.8	
Gripping force (0.5 MPa) N O.D.	12	24	33	58
Gripping force (0.5 MPa) N I. D.	12	25	34	59
Note) Finger (mm) Open width	16	22	28	37
Note) Finger (mm) Closed width	10	14	16	19
Note) Finger (mm) Stroke	6	8	12	18
Operating pressure (MPa) Minimum	0.2	0.15		
Operating pressure (MPa) Maximum	0.6			
Max. operating frequency (cpm)	180			
Repeatability (± mm)	0.01			

Parallel Opening — 3-finger Round type / 4-finger Round type

Slide guide MHS3 (3-finger, Round type)

With dust cover, Long stroke,
Through-hole
W/ Center pusher is also available.

Size	16		20		25		32		40		50		63		80		100		125	
Port size	M3 x 0.5		M5 x 0.8												1/8		1/4		3/8	
Gripping force (0.5 MPa) N O.D.	14		25		42		74		118		187		335		500		750		1270	
Gripping force (0.5 MPa) N I. D.	16		28		47		82		130		204		359		525		780		1320	
Note) Finger (mm) Open width	14	27	16	28	20	32	24	44	28	53	34	72	46	84	63	97	80	130	92	160
Note) Finger (mm) Closed width	10	17	12	18	14	20	16	28	20	33	22	44	30	52	43	57	56	82	60	96
Note) Finger (mm) Stroke	4	10	4	10	6	12	8	16	8	20	12	28	16	32	20	40	24	48	32	64
Operating pressure (MPa) Minimum	0.2						0.1													
Operating pressure (MPa) Maximum	0.6																			
Max. operating frequency (cpm)	120						60								30					
Repeatability (± mm)	0.01																			

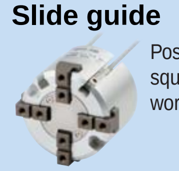
Rotary MDHR3 (3-finger, Round type)

Cross roller guide

Size	10	15
Port size	M3 x 0.5	
Gripping force (0.5 MPa) N O.D.	7	13
Gripping force (0.5 MPa) N I. D.	6.5	12
Note) Finger (mm) Open width	22	27
Note) Finger (mm) Closed width	16	19
Note) Finger (mm) Stroke	6	8
Operating pressure (MPa) Minimum	0.2	0.15
Operating pressure (MPa) Maximum	0.6	
Max. operating frequency (cpm)	180	
Repeatability (± mm)	0.01	

Slide guide MHS4 (4-finger, Round type)

Positioning of a
square-shaped
work.



Size	16	20	25	32	40	50	63
Port size	M3 x 0.5	M5 x 0.8					
Gripping force (0.5 MPa) N O.D.	10	19	31	55	88	140	251
Gripping force (0.5 MPa) N I. D.	12	21	35	61	97	153	268
Note) Finger (mm) Open width	17	19	26	28	32	38	51
Note) Finger (mm) Closed width	13	15	20	20	24	26	35
Note) Finger (mm) Stroke	4		6	8		12	16
Operating pressure (MPa) Minimum	0.2			0.1			
Operating pressure (MPa) Maximum	0.6						
Max. operating frequency (cpm)	120			60			
Repeatability (± mm)	0.01						

Fulcrum Opening — 2-finger — Square type

Standard MHC2

Double piston construction
Gripping force: Large

Toggle MHT2

Can hold a work
even at air-down

Cam 180° MHY2

180° open/closed type

Gear 180° MHW2

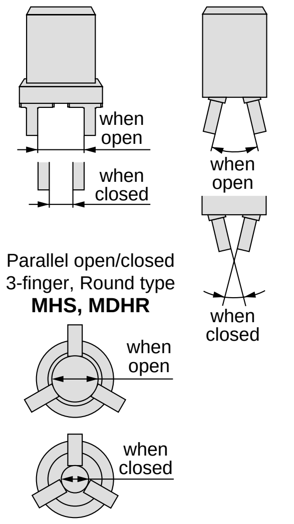
180° open/closed type
Dustproof
spec.

Model	MHC2						MHT2				MHY2				MHW2				
Size	6	7	10	16	20	25	32	40	50	63	10	16	20	25	20	25	32	40	50
Port size	M3 x 0.5			M5 x 0.8			1/8		1/4		M5 x 0.8				M5 x 0.8		1/8		1/4
Gripping force (0.5 MPa)	0.038	0.017	0.10	0.39	0.70	1.36	12.4	36.0	63.0	106	0.16	0.54	1.10	2.28	0.30	0.73	1.61	3.70	8.27
Note) Finger (mm) Open width	30	20	30				28	27	23		180				180				
Note) Finger (mm) Closed width	-10	-7	-10				-3		-2		-3				-5	-6	-5		-4
Note) Finger (mm) Stroke	40	27	40				31	30	25		183				185	186	185		184
Operating pressure (MPa) Minimum	0.15	0.4	0.1				0.1				0.1				0.15				
Operating pressure (MPa) Maximum	0.6	0.6	0.6				0.6				0.6				0.7				
Max. operating frequency (cpm)	180		180				60				60				60		30		
Repeatability (± mm)	0.02		0.01				0.5 (Reference Value)				0.2				0.2				

Note)
Parallel open/closed Square type 2-finger/4-finger, Round type
MHZ, MHL MHF, MHK MHS, MHR

Fulcrum open/closed Square type
MHC, MHT MHY, MHW

Parallel open/closed 3-finger, Round type
MHS, MDHR



Directional Control Valves
Actuators
Air Preparation Equipment
Air Combination
Pressure Control Equipment
Pressure Detection Equipment
INDEX

Gripping Air Grippers Basic: Option

Model	Linear guide MHZ2	Wide opening MHL2	Compact MHF2	Slide guide MHK2	Slide guide MHS2	Rotary MHR2	Slide guide MHS3	Rotary MHR3	Slide guide MHS4	Standard MHC2	Toggle MHT2	Cam 180° MHY2	Gear 180° MHW2
Size	6 10 16 20 25 32 40	10 16 20 25 32 40	8 12 16 20	12 16 20 25	16 20 25 32 40 50 63	10 15 20 30	16 20 25 32 40 50 63 80 100 125	10 15	16 20 25 32 40 50 63	6 7 10 16 20 25	32 40 50 63	10 16 20 25	20 25 32 40 50
Actuation													
Single acting	●	—	▲	●	○	—	○	—	○	●	○	○	○
Low speed	◎	◎	◎	◎	◎	—	◎	—	◎	◎	○	◎	◎
Spring assist	◎	○	○	◎	○	—	◎	—	○	◎ Note 1)	○	○	○
Environmentally resistant													
Heat resistant	◎	◎	◎	◎	◎	—	◎	—	◎	◎	◎	◎	◎
Oil proof	◎	◎	◎	◎	◎	—	◎	—	◎	◎	◎	◎	◎
Cold resistant	○	○	○	○	○	—	○	—	○	○	○	○	○
Clean	●	●	○	○	○	●	○	●	○	—	—	—	—
Copper-free, Fluorine-free	●	◎	◎	◎	◎	●	◎	●	◎	●	◎	◎	◎
Dust cover	●	○	—	●	○	—	●	—	○	—	—	—	—
Finger option													
Tapped in open/close direction	●	●	—	●	—	—	—	—	—	●	●	●	●
Tapped in side face	●	○	—	○	—	—	—	—	—	○	○	○	—
Through-hole	●	○	—	○	—	—	—	—	—	○	○	○	○
Flat type	●	—	●	—	●	●	●	●	●	—	—	—	●
Remarks: Other specific variants	· Body option · For AHC	· With scraper				· For AHC	· Through-hole · With pusher	· For AHC		∗1: Spring assist is not available with MHCM2-7. Single acting only.			

Model and ●: Available with a standard model, Model and ◎: Available with Made to Order, ○: Available with a special order A (∗1), ▲: Available with a special order B (∗2), —: Not available

∗ 1: In the case of being available with simple changes, compared with standard.
∗ 2: This is technically possible, but consult with SMC for dimensions, costs and delivery.

Special Actuation, Specific Functions

High speed, High frequency, Low speed, Low friction

Metal seal cylinder

MQQ/MQM/MQP ····· 3 P.1167

Compact, low friction cylinder

MQQT/Standard type
MQQL/Lateral load resisting type

Lateral load resisting, low friction cylinder

MQQL/Standard type
MQQL□□H/High speed, High frequency type

Low friction, pressure-applying cylinder

MQP

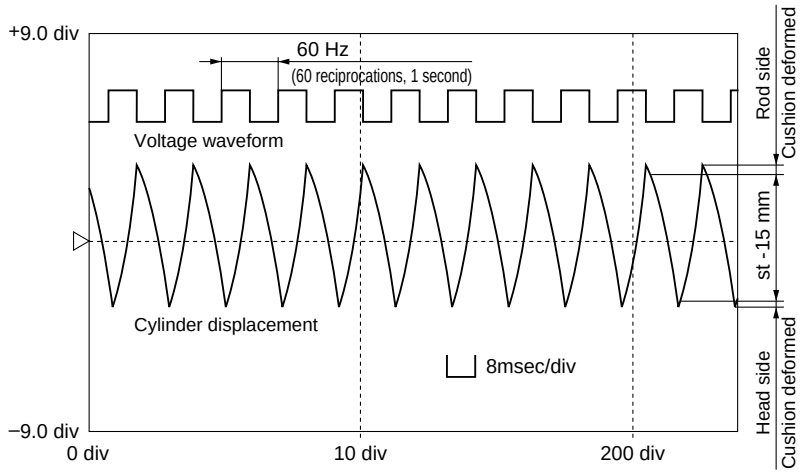
Model	Bore size (mm)	Port size	Stroke (mm)	Speed (mm/s)	Pressure (MPa)	Sliding resistance (N)	Cushion (J)
MQQT	10	M5 x 0.8	Up to 40	0.3 to 300	0.005 to 0.7	0.05	Rubber bumper
	16		Up to 60				
	20						
	25	1/8	Up to 100				
	28						
MQQL	10	M5 x 0.8	Up to 40	0.5 to 500	0.005 to 0.7		
	16		Up to 60				
	20						
	25	1/8	Up to 100				
	28						
MQML	6	M5 x 0.8	Up to 60	0.5 to 1000	0.02 to 0.7		
	10		Up to 100		0.005 to 0.7		
	16						
	20	1/8					
	25						
MQML□□H	10	M5 x 0.8	Up to 100	5 to 3000	0.01 to 0.7		
	16						
	20	1/8					
	25						
MQP	4	M5 x 0.8	10	—	0.001 to 0.7	0.01	—
	6						
	10						
	16						
	20						

Common Specifications

Operating temperature	–10 to 80°C
Lubrication	Non-lube
Life service	1000 km or 100 million cycles

Note) High speed, high frequency actuation

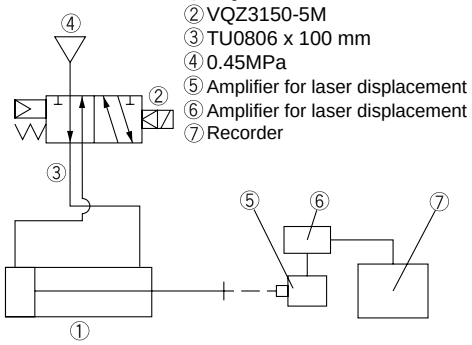
■ **3600 cycles/min (60 cycles/s)**



■ **Measurement Conditions**

Cylinder for test	MQMLB20H-15D
Bore size	ø20
Stroke	15 mm
Solenoid valve for test	VQZ3150-5M
Piping	TU0806 x 100 mm (Between valve and cylinder)
Supply pressure	0.45 MPa
Load	No load
Mounting orientation	Horizontal

■ **Measurement Method**



①MQMLB20H-15D
②VQZ3150-5M
③TU0806 x 100 mm
④0.45MPa
⑤Amplifier for laser displacement
⑥Amplifier for laser displacement
⑦Recorder

	Description	Model	
Impact relaxation	Sign cylinder	REA/REB/REC	3 P.925
Low speed, Low friction	Smooth cylinder	CQSY/CQ2Y/CM2Y/CG1Y/CA2Y	3 P.1043
	Low speed cylinder	CM2X/CG1X/CQSX/CQ2X	3 P.1111
	Low speed rotary actuator	CRQ2X/MSQX	4 P.311
High speed, High frequency, Low speed, Low friction	Metal seal cylinder	MQQ/MQM/MQP	3 P.1167
High speed	High power cylinder	RHC	3 P.1195
3-point stops	3 position cylinder	RZQ	3 P.1217
	3 position rotary table	MSZ	4 P.297
Clamp	Clamp cylinder	CK/MK/CKZN/CKQ/CLK	3 P.1231
Stopper cylinder	Stopper cylinder	RSQ/RSG/RSH	3 P.1369
	Escapement	MIS/MIW	3 P.1415
With measurement function	Stroke reading cylinder	CE1/CE2/ML2	3 P.1435
Double power	Double power cylinder	MGZ	3 P.421
Combined operations	Rotary cylinder (Rotation + Linear)	MRQ	4 P.335
	Rotary gripper (Rotation + Gripping)	MRHQ	4 P.715
Impact relaxation, 3-point/5-point stops	e-Rodless cylinder	E-MY2	8 P.1089
High vacuum	Rodless cylinder for vacuum	CYV	8 P.119