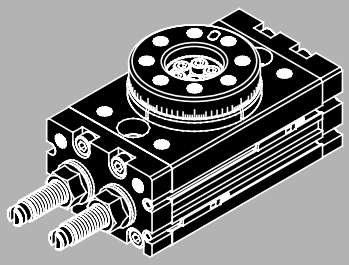
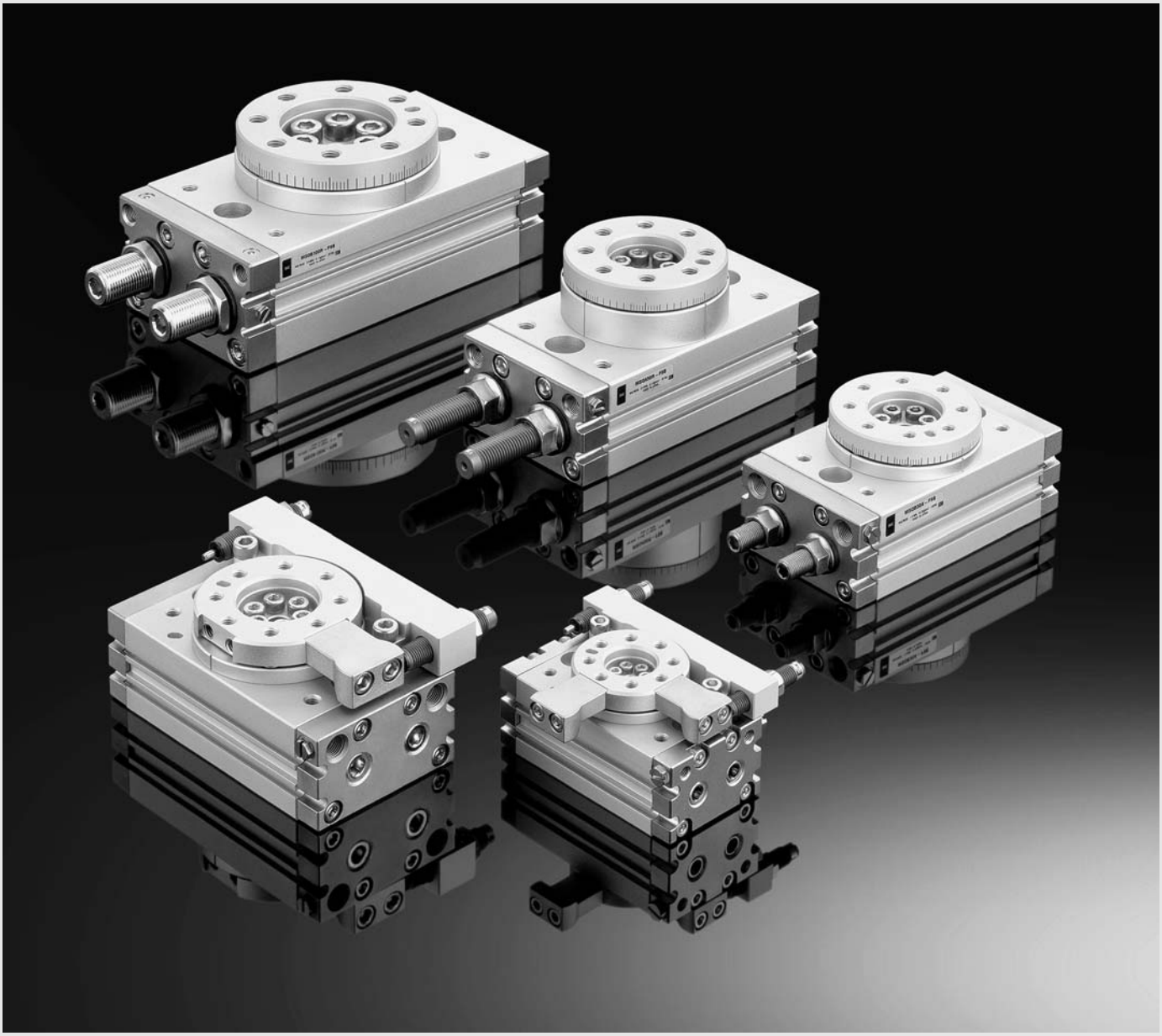


Rotary Table
Series MSQ
Rack-and-Pinion Type/Size: 10, 20, 30, 50, 70, 100, 200

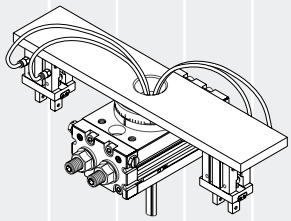


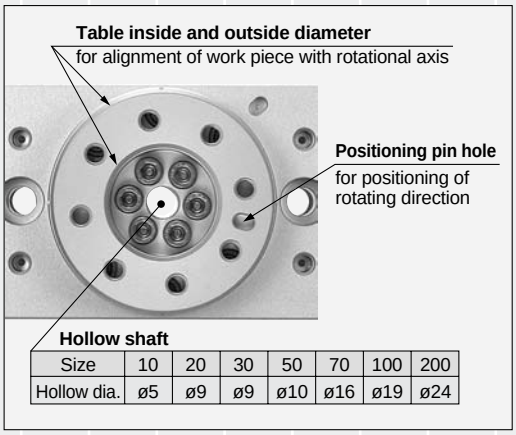
External shock absorber type newly introduced to series

Low profile rotary table unit with red

Easy mounting of work pieces

- **Table I.D./O.D. tolerances**
  Basic type: **MSQB** H9/h9
  High precision type:
  MSQA H8/h8
- **Positioning pin hole**
- **Hollow shaft**
  Accommodates wiring and piping for equipment mounted on the table

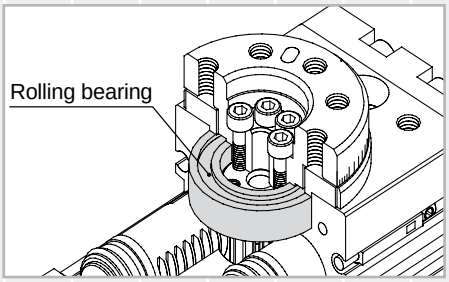




Size	10	20	30	50	70	100	200
Hollow dia.	ø5	ø9	ø9	ø10	ø16	ø19	ø24

Large rolling bearing

3 to 4 times greater shaft load
(Compared to series CRQ)



Angle adjustment range: 0 to 190°

Basic Type
MSQB

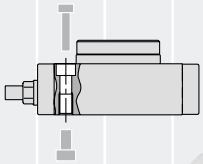
With internal shock absorber

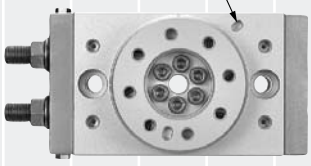
2 to 5 times more kinetic energy
(Compared to adjustment bolt)

Easy mounting of body

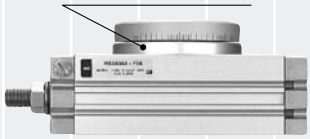
- **Reference dia.: Boss, Hole**
- **Mounting from two directions**
- **Positioning pin hole**

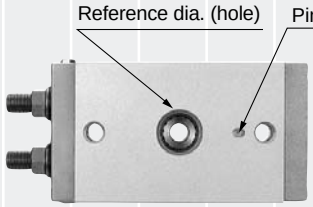
Pin hole also added to sizes 10 through 50





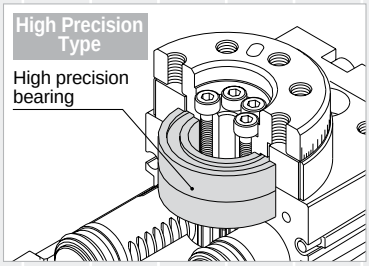
High Precision Type
MSQA





Movement in direction of table's radial thrust: 0.01mm or less

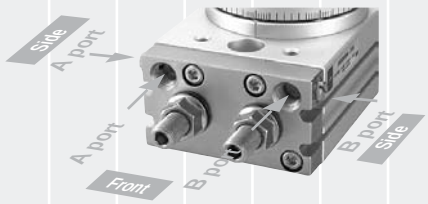
Uses combination angular ball bearings.
Reduced movement in direction of table's radial thrust.



Piping ports on side and end surfaces

Piping positions can be selected to accommodate mounting conditions

Side ports also added to sizes 10 through 50



uced table height

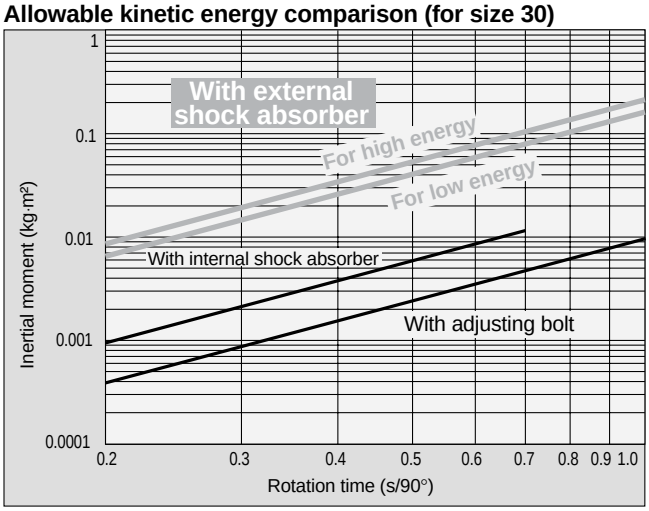
External shock absorber newly introduced to series!

4 to 10 times more allowable kinetic energy

(Compared to internal shock absorber)

Two types of shock absorber are available, for low energy and high energy

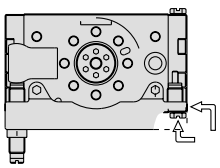
Allowable kinetic energy comparison (for size 30)



Length dimension shortened

Rotation angles: 90°, 180°

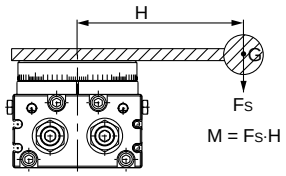
Left/Right symmetric type



Selection Procedure	Formulas	Selection Example

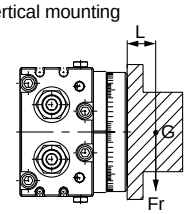
1 Operating conditions

Enumerate the operating conditions according to the mounting position.



M = Fs·H

Vertical mounting



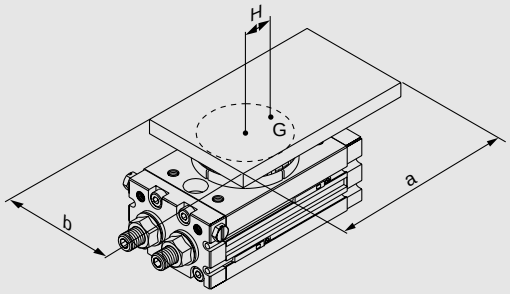
M = Fr·L

Horizontal mounting

Formulas

- **Model used**
- **Operating pressure**
- **Mounting position**
- **Load type**
  - **Ts (N·m)**
  - **Tf (N·m)**
  - **Ta (N·m)**
- **Load configuration**
- **Rotation time t (s)**
- **Rotation**
- **Load mass m (kg)**
- **Distance between centrc 128F3 1 Tf 0.24 05.249 mTf 0.24 05(s)**

Selection Example



Rotary table: MSQB50A, Pressure: 0.5MPa

Mounting position: Vertical, Type of load: Inertial load Ta

Load configuration: 100mm x 60mm (rectangular plate)

Rotation time t: 0.3s, Rotation: 90°

Load mass m: 0.4kg

Distance between central axis and centre of gravity H: 40mm

2 Required torque

Formulas

Effective torque ≥ Ts

Effective torque ≥ (3 to 5) ·Tf

Effective torque ≥ 10·Ta

[redacted]

Selection Example

Inertial load

10 x Ta = 10 x I x $\dot{\omega}$

= 10 x 0.00109 x (2 x (π / 2) / 0.3²)

= 0.380N·m <Effective torque OK

Note) I substitutes for the value for inertial moment.

3 Rotation time

Formulas

0.2 to 1.0s / 90°

Selection Example

0.3s / 90° OK

4 Allowable load

Formulas

Thrust load: m x 9.8 ≤ Allowable load

Moment: m x 9.8 x H ≤ Allowable moment

Allowable load

Selection Example

0.4 x 9.8 = 3.92N < Allowable load OK

0.4 x 9.8 x 0.04=0.157N·m

0.157N·m < Allowable moment OK

5 Inertial moment

Formulas

$I = m \times (a^2 + b^2) / 12 + m \times H^2$

Inertial moment

Selection Example

$I = 0.4 \times (0.10^2 + 0.06^2) / 12 + 0.4 \times 0.04^2$

$= 0.00109 kg \cdot m^2$

6 Kinetic energy

Formulas

1/2 x (I + I_0) x ω^2 ≤Allowable energy

$\omega = 2\theta / t$ (ω: Terminal angular velocity)

θ: Rotation angle (rad)

t: Rotation time (s)

Allowable kinetic energy/Rotation time

Selection Example

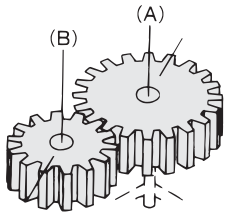
1 / 2 x 0.00109 x (2 x (π / 2) / 0.3)²

= 0.060J < Allowable energy OK

ive To e

: 10 to

wn in the table below.
n the table and loss of accuracy.)

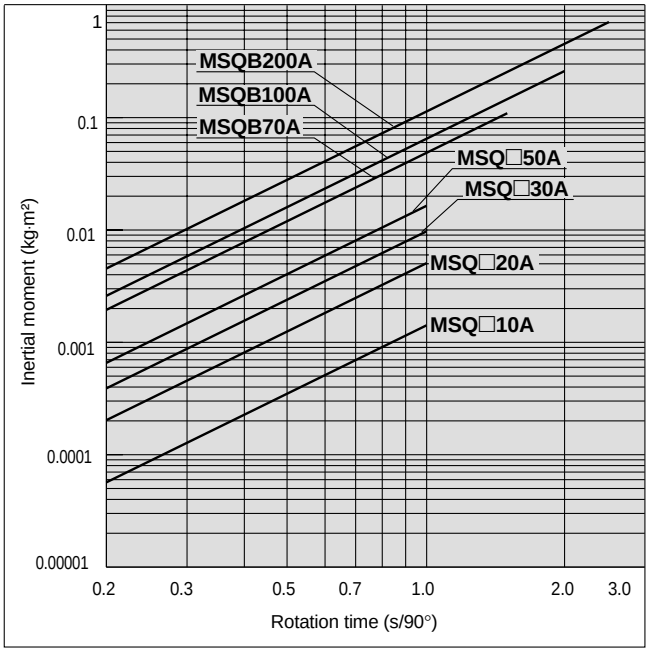

(A)
(B)

Kinetic Energy/Rotation Time

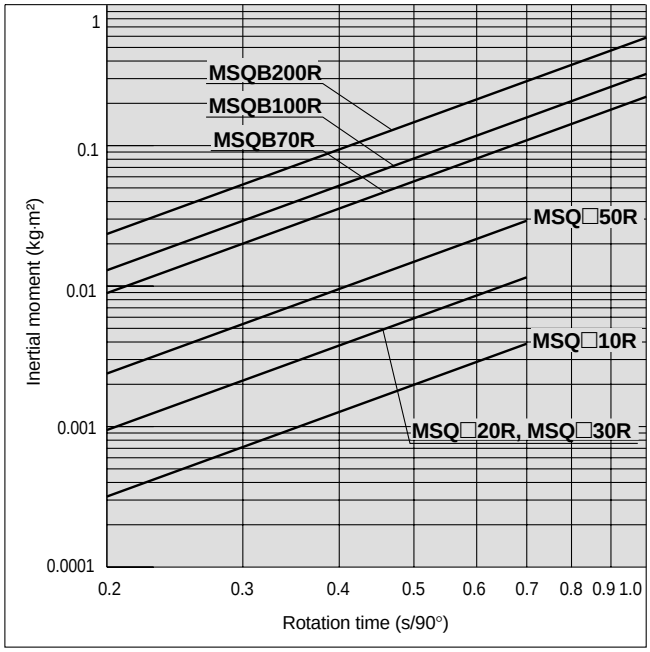
3. Model selection

Select models by applying the inertial moment and rotation time which have been found to the charts below.

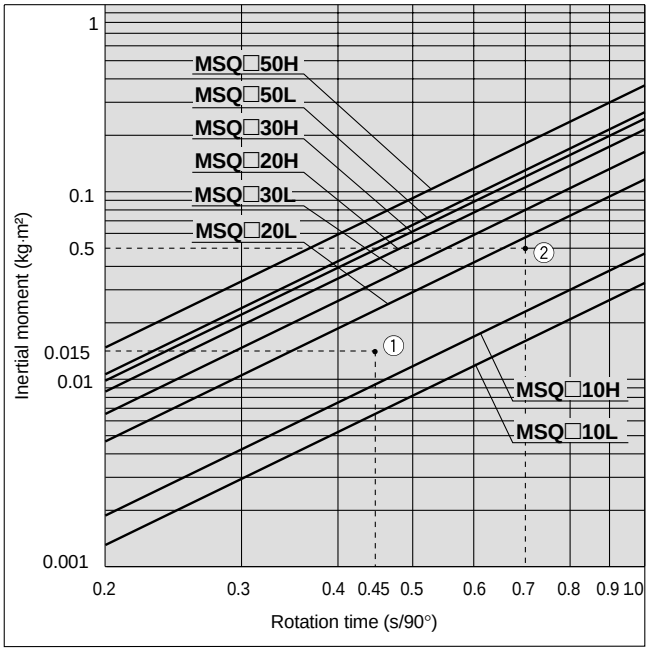
With adjustment bolt



With internal shock absorber



With external shock absorber



1. <Viewing the charts>

- Inertial moment …… 0.015kg·m²
- Rotation time ……. 0.45s/90°

MSQ□20L is selected for the above.

2. <Example calculation>

Load configuration: A cylinder of radius 0.5m and mass 0.4kg

Rotation time: 0.7s/90°

$$I = 0.4 \times \frac{0.5^2}{2} = 0.5\text{kg·m}^2$$

In the inertial moment and rotation time chart, find the intersection of the lines extended from the points corresponding to 0.5kg·m² on the vertical axis (inertial moment) and 0.7s/90° on the horizontal axis (rotation time).
Since the resulting intersection point lines within the MSQ□20L selection range, MSQ□20L can be selected.

Rotary Table
Air Consumption

Air consumption is the volume of air which is expended by the rotary table's reciprocal operation inside the actuator and in the piping between the actuator and the switching valve, etc. This is necessary for selection of a compressor and for calculation of its running cost.

∗ The air consumption (Q_{CR}) required for one reciprocation of the rotary table alone is shown in the table below, and can be used to simplify the calculation.

Formulas

$$Q_{CR} = 2V \times \left(\frac{P + 0.1013}{0.1013}\right) \times 10^{-3}$$

$$Q_{CP} = 2 \times a \times \ell \times \frac{P}{0.1013} \times 10^{-6}$$

$$Q_C = Q_{CR} + Q_{CP}$$

Q_{CR} = Air consumption of rotary table [ℓ (ANR)]

Q_{CP} = Air consumption of tubing or piping [ℓ (ANR)]

V = Internal volume of rotary table [cm^3]

P = Operating pressure [MPa]

ℓ = Length of piping [mm]

a = Internal cross section of piping [mm^2]

Q_C = Air consumption required for one reciprocation of rotary table [ℓ (ANR)]

When selecting a compressor, it is necessary to choose one which has sufficient reserve for the total air consumption of all pneumatic actuators downstream. This is affected by factors such as leakage in piping, consumption by drain valves and pilot valves, etc., and reduction of air volume due to drops in temperature.

Formula

$$Q_{C2} = Q_C \times n \times \text{Number of actuators} \times \text{Reserve factor}$$

Q_{C2} = Compressor discharge flow rate

n = Actuator reciprocations per minute

Internal cross section of tubing and steel piping

Nominal size	O.D. (mm)	I.D. (mm)	Internal cross section a (mm^2)
T□ 0425	4	2.5	4.9
T□ 0604	6	4	12.6
TU 0805	8	5	19.6
T□ 0806	8	6	28.3
1/8B	—	6.5	33.2
T□ 1075	10	7.5	44.2
TU 1208	12	8	50.3
T□ 1209	12	9	63.6
1/4B	—	9.2	66.5
TS 1612	16	12	113
3/8B	—	12.7	127
T□ 1613	16	13	133
1/2B	—	16.1	204
3/4B	—	21.6	366
1B	—	27.6	598

Air Consumption

Air consumption of rotary table: Q_{CR} ℓ/min (ANR)

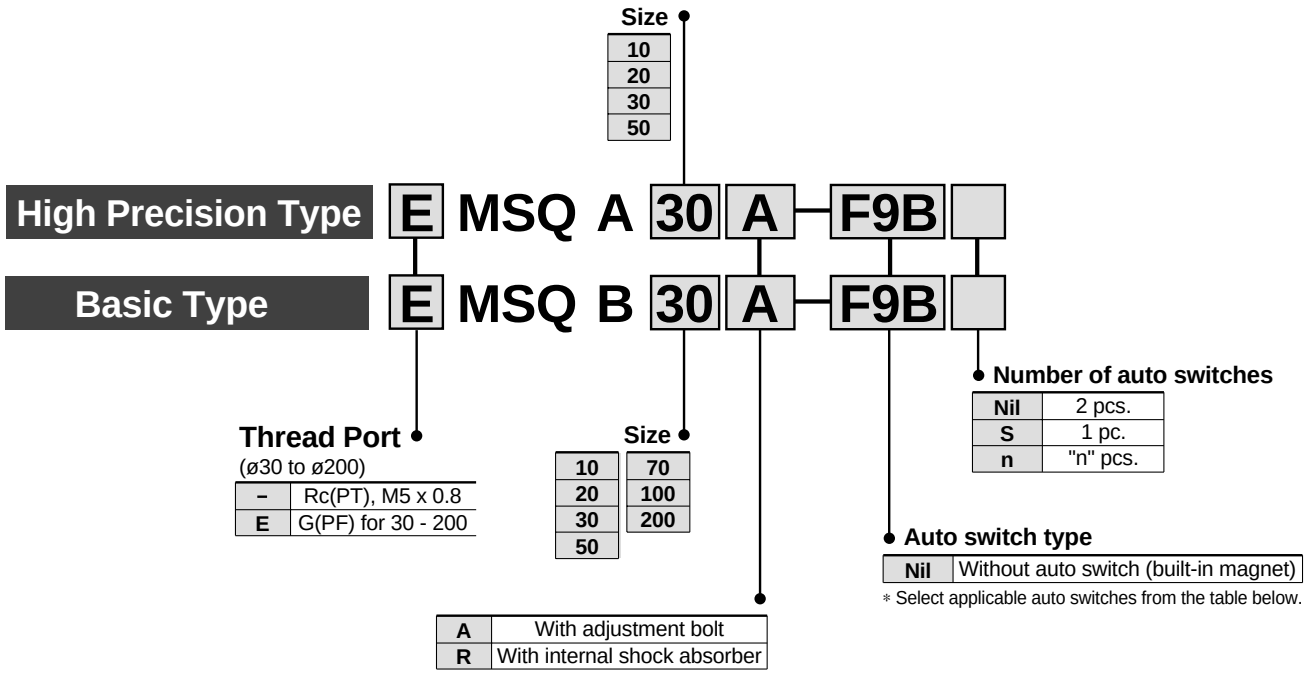
Size	Rotation	Internal volume (cm^3)	Operating pressure (MPa)									
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
10	190°	6.6	0.026	0.039	0.052	0.065	0.078	0.091	0.104	0.117	0.130	0.144
20	190°	13.5	0.054	0.080	0.107	0.134	0.160	0.187	0.214	0.240	0.267	0.294
30	190°	20.1	0.080	0.120	0.159	0.199	0.239	0.278	0.318	0.358	0.397	0.437
50	190°	34.1	0.136	0.203	0.270	0.337	0.405	0.472	0.539	0.607	0.674	0.741
70	190°	50	0.199	0.297	0.396	0.495	0.594	0.692	0.791	0.890	0.988	1.09
100	190°	74.7	0.297	0.444	0.592	0.739	0.887	1.03	1.18	1.33	1.48	1.62
200	190°	145.9	0.580	0.868	1.16	1.44	1.73	2.02	2.31	2.60	2.88	3.17

Rotary Table/Rack-and-Pinion Type

Series MSQ

Size: 10, 20, 30, 50, 70, 100, 200

How to Order

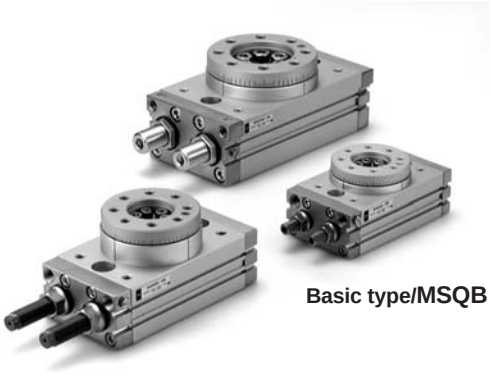


Applicable auto switches

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage			Auto switch model		Lead wire length (m)∗			Applicable load	
					DC		AC	Lead wire direction		0.5 (Nil)	3 (L)	5 (Z)		
								Perpendicular	In-line					
Reed switch	—	Grommet	No	2 wire	24V	5V 12V	100V or less	**A90V**	**A90**	●	●	—	IC circuit	Relay, PLC
			Yes			12V	100V	**A93V**	**A93**	●	●	—	—	
				3 wire (NPN equiv.)	—	5V	—	**A96V**	**A96**	●	●	—	IC circuit	—
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	12V	—	**F9NV**	**F9N**	●	●	—	—	Relay, PLC
				3 wire (PNP)				**F9PV**	**F9P**	●	●	—		
				2 wire				**F9BV**	**F9B**	●	●	—		
	Diagnostic indication (2 colour indicator)			3 wire (NPN)				**F9NWV**	**F9NW**	●	●	○		
				3 wire (PNP)				**F9PWV**	**F9PW**	●	●	○		
				2 wire				**F9BWV**	**F9BW**	●	●	○		

∗ Lead wire length symbols 0.5m ..... Nil (Example) F9NW
3m ..... L F9NWL
5m ..... Z F9NWZ

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



Basic type/MSQB

High precision type/MSQA

Specifications

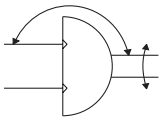
Size		10	20	30	50	70	100	200
Fluid		Air (non-lube)						
Maximum operating pressure	With adjustment bolt	1MPa						
	With internal shock absorber	0.6MPa Note 1)						
Minimum operating pressure	Basic type	0.1MPa						
	High precision type	0.2MPa	0.1MPa			—		
Ambient and fluid temperature		0 to 60°C (with no freezing)						
Cushion	With adjustment bolt	Rubber bumper						
	With internal shock absorber	Shock absorber						
	Shock absorber model	RBA0805-X692	RBA1006-X692		RBA1411-X692	RBA2015-X821		RBA2725-X821
Angle adjustment range		0 to 190° Note 2)						
Maximum rotation		190°						
Cylinder bore size		ø15	ø18	ø21	ø25	ø28	ø32	ø40
Port size	End ported	M5		1/8				
	Side ported	M5						

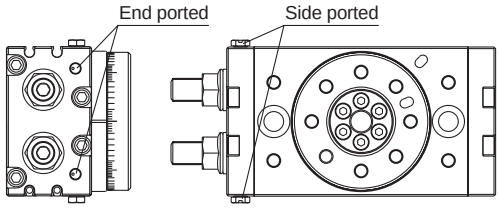
Note 1) The maximum operating pressure of the actuator is restricted by the maximum allowable thrust of the shock absorber.

Note 2) If the rotation with an internal shock absorber is smaller than the values in the table below, the piston stroke becomes smaller than the shock absorber's effective stroke and the energy absorption capacity decreases.

Size	10	20	30	50	70	100	200
Minimum rotation without decrease in energy absorption	52°	43°	40°	60°	71°	62°	82°

JIS symbol





Allowable Kinetic Energy and Rotation Time Adjustment Range

Size	Allowable kinetic energy (J)		Rotation time adjustment range for stable operation (s/90°)	
	With adjustment bolt	With internal shock absorber	With adjustment bolt	With internal shock absorber Note)
10	0.007	0.039	0.2 to 1.0	0.2 to 0.7
20	0.025	0.116		
30	0.048	0.116		
50	0.081	0.294		
70	0.24	1.1	0.2 to 1.5	0.2 to 1.0
100	0.32	1.6	0.2 to 2.0	
200	0.56	2.9	0.2 to 2.5	

Note) Note that the energy absorption capacity of the shock absorber decreases dramatically when a rotary table with internal shock absorber is operated below its minimum speed.

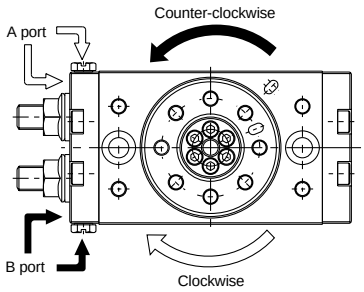
Weights

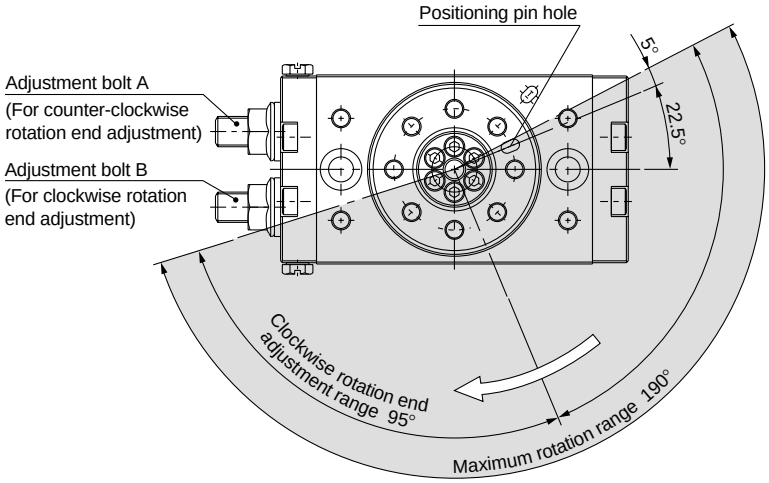
(g)

Size		10	20	30	50	70	100	200
Basic type	With adjustment bolt	530	990	1290	2080	2880	4090	7580
	With internal shock absorber	540	990	1290	2100	2890	4100	7650
High precision type	With adjustment bolt	560	1090	1410	2240	—		
	With internal shock absorber	570	1090	1410	2260			

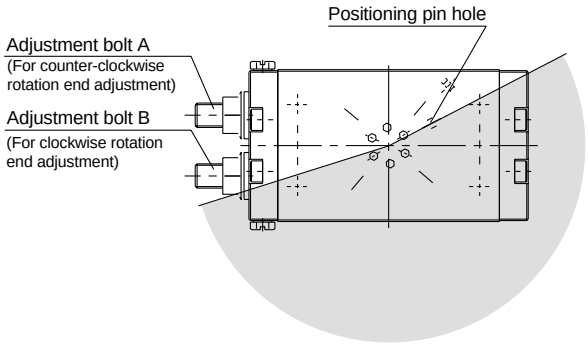
Note) Values above do not include auto switch weights.

Rotating Direction and Rotation

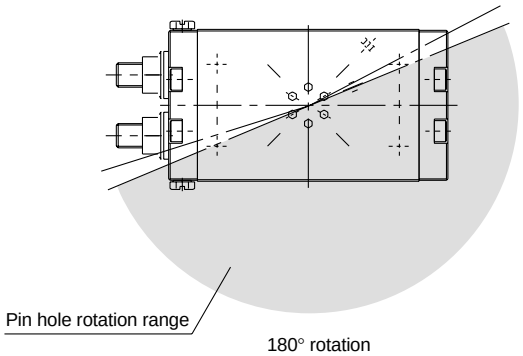




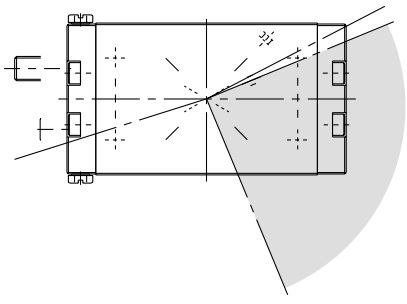
Rotation Range Examples



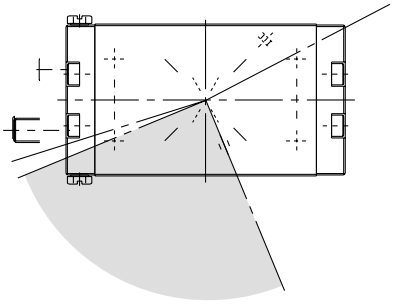
190° (maximum) rotation



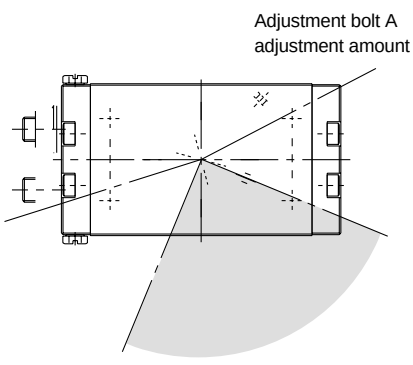
180° rotation



90° rotation



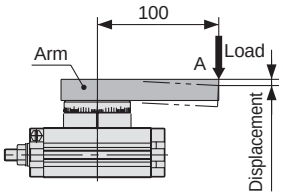
90° rotation



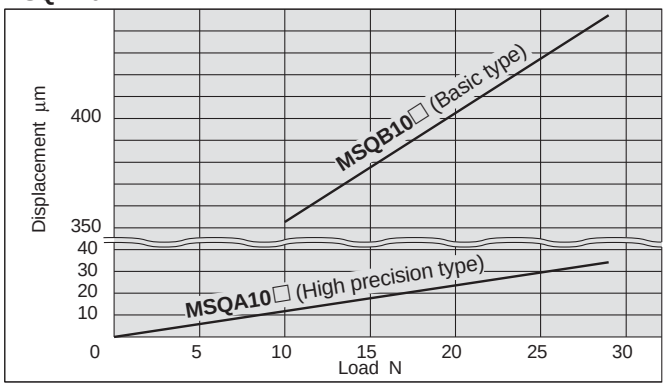
90° rotation

Table Displacement (Reference Values)

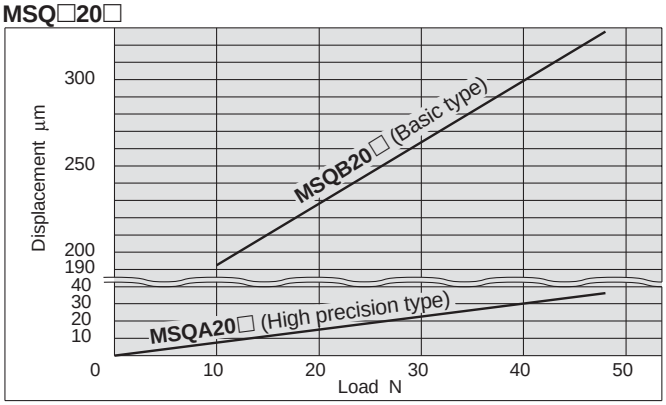
• Displacement at point A when the load is applied to point A, which is 100mm from the centre of rotation.



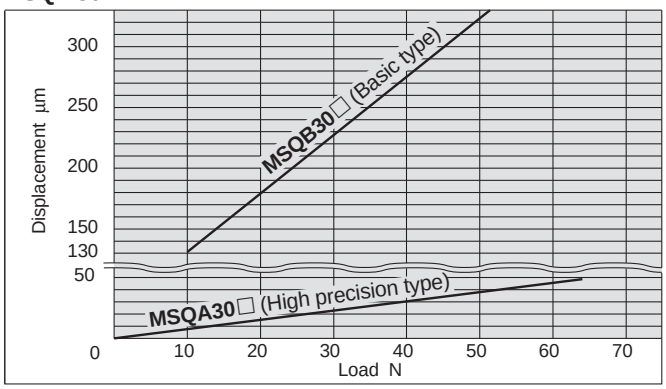
MSQ□10□



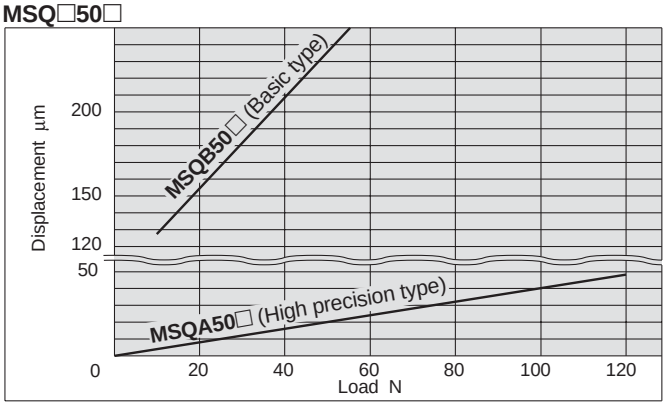
MSQ□20□



MSQ□30□



MSQ□50□



Clean Room Series

Prevents the particulates generated by the bearings from entering the clean room by vacuuming through the vacuum port on the side of the body.

How to Order

11 – MSQ B 10 A – A90 S

- **11** – Clean room series Vacuum type
- **MSQ**
- **B** – Auto switch type
  - **A** High precision type
  - **B** Basic type
- **10** – Size
  - **10**
  - **20**
  - **30**
  - **50**
- **A** – Number of auto switches
  - **A** With adjustment bolt
  - **R** With shock absorber
- **A90** – Auto switch type
- **S**

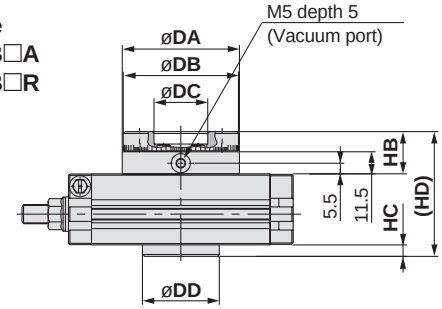
Specifications and Allowable Load

11-MSQA is identical to the high precision type and 11-MSQB is identical to the basic type.

Dimensions

Clean room series does not have empty holes.

Basic type
11-MSQB□A
11-MSQB□R

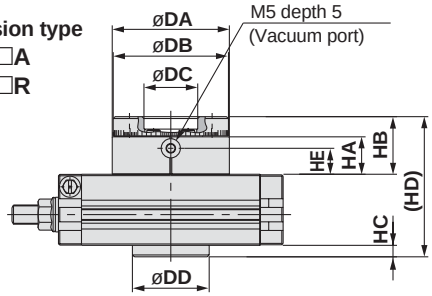


(mm)

Size	**DA** (h9)	**DB** (h9)	**DC** (h9)	**DD** (h9)	**HB**	**HC**	**HD**
10	46	45	20	35	20	5	59
20	61	60	28	40	22	6	65
30	67	65	32	48	22	6	68
50	77	75	35	54	24	7	77

Dimensions other than above are identical to the basic type.

High precision type
11-MSQA□A
11-MSQA□R

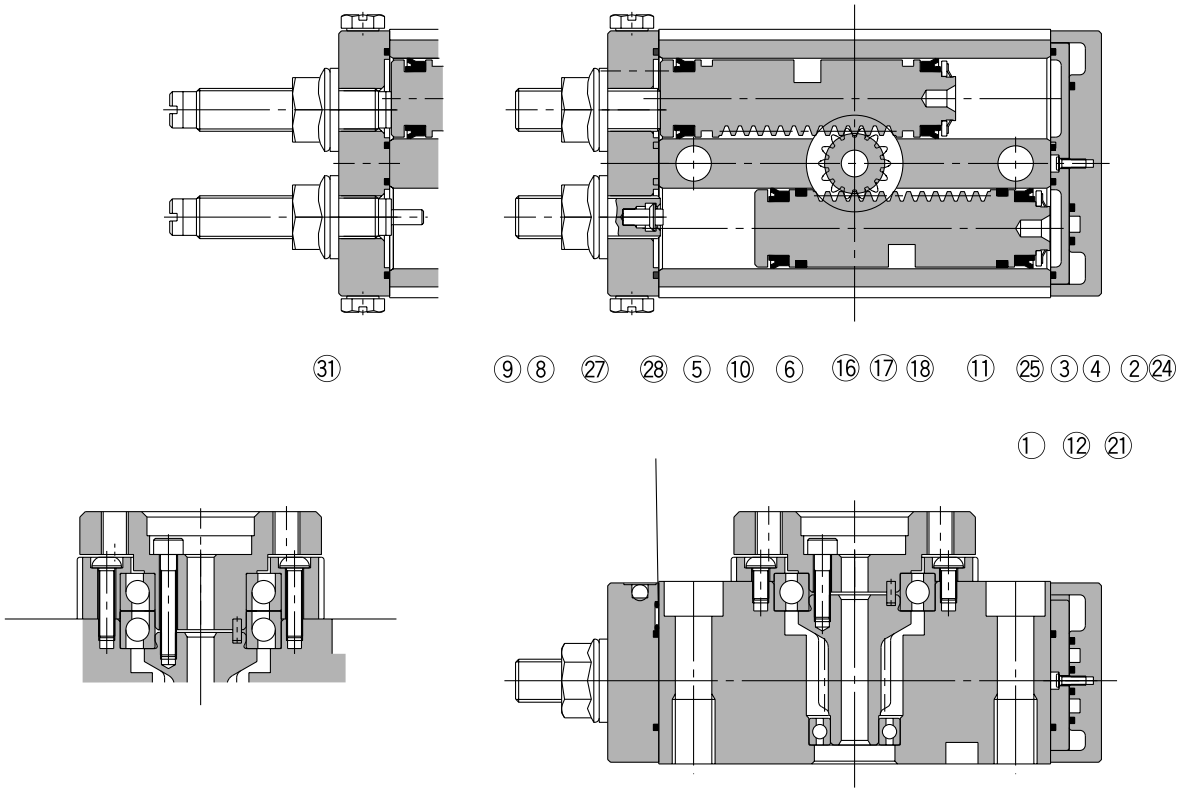


(mm)

Size	**DA** (h8)	**DB** (h8)	**DC** (h8)	**DD** (h8)	**HA**	**HB**	**HC**	**HD**	**HE**
10	46	45	20	35	15.5	24	5	63	9.5
20	61	60	28	40	19.5	30	6	73	13.5
30	67	65	32	48	19.5	30	6	76	13.5
50	77	75	35	54	21.5	34	7	87	15.5

Dimensions other than above are identical to the high precision type.

Construction



Parts list

No.	Description	Material
1	**Body**	Aluminum alloy
2	**Cover**	Aluminum alloy
3	**Plate**	Aluminum alloy
4	**Seal**	NBR
5	**End cover**	Aluminum alloy
6	**Piston**	Stainless steel
7	**Pinion**	Chrome molybdenum steel
8	**Size: 10 to 50**	Steel wire
	Size: 70 to 200	
9	**Adjustment bolt**	Chrome molybdenum steel
10	**Cushion pad**	Rubber
11	**Seal retainer**	Aluminum alloy
12	**Gasket**	NBR
13	**Gasket**	NBR
14	**Table**	Aluminum alloy
15	**Bearing retainer**	Aluminum alloy
16	**Magnet**	Magnetic material
17	**Wear ring**	Resin
18	**Piston seal**	NBR

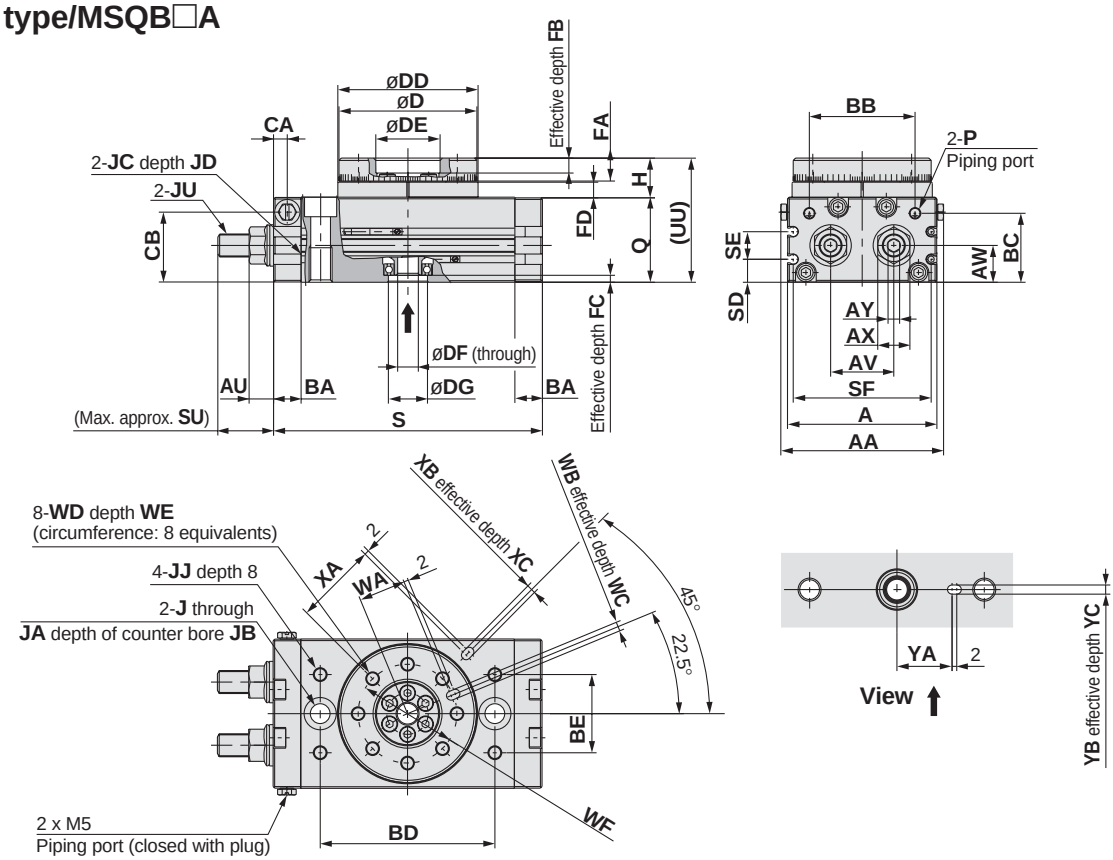
No.	Description		Material
19	**Size: 10 to 50**	**Deep groove ball bearing**	Bearing steel
	Size: 70 to 200	**Needle bearing**	
20	**Basic type**	**Deep groove ball bearing**	Bearing steel
	High precision type	**Angular contact ball bearing**	
21	**Round head no. 0 Philips screw**		Steel wire
22	**Size: 10**	**Round head Philips screw**	Stainless steel
	Size: 20 to 50	**Low head cap screw**	Chrome molybdenum steel
	Size: 70 to 200	**Hexagon socket head cap screw**	
23	**Hexagon socket head cap screw**		Stainless steel
24	**Size: 10 to 50**	**Hexagon socket head cap screw**	Stainless steel
	Size: 70 to 200		Carbon steel
25	**CS type snap ring**		Spring steel
26	**Size: 10 to 50**	**Parallel pin**	Carbon steel
	Size: 70 to 200	**Parallel key**	
27	**Seal washer**		NBR
28	**Plug**		Brass
29	**Size: 70 to 200 only**	**O-ring**	NBR
30	**Size: 70 to 200 only**	**Steel ball**	Stainless steel
31	**Shock absorber**		—

Replacement parts

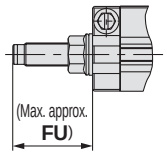
Description	Kit no.							Note
	10	**20**	**30**	**50**	**70**	**100**	**200**	
Seal kit	P523010-5	P523020-5	P523030-5	P523040-5	P391050-5	P391060-5	P391070-5	A set of above numbers ④, ⑫, ⑬, ⑰, ⑱ and ㉗

Dimensions/Size 10, 20, 30, 50

Basic type/MSQB□A



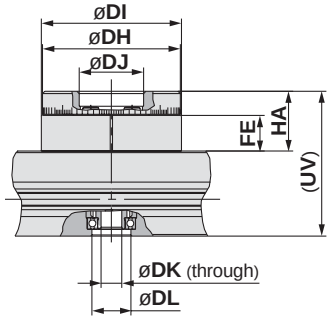
With internal shock absorber
MSQA□R
MSQB□R



(mm)

Size	FU
10	31.5
20	34.7
30	34.7
50	51.7

High precision type
MSQA□A/With adjustment bolt
MSQA□R/With internal shock absorber



(mm)

Size	DH	DI	DJ	DK	DL	FE	HA	UV
10	45h8	46h8	20H8	5	15H8	10	18.5	52.5
20	60h8	61h8	28H8	9	17H8	15.5	26	63
30	65h8	67h8	32H8	9	22H8	16.5	27	67
50	75h8	77h8	35H8	10	26H8	17.5	30	76

(mm)

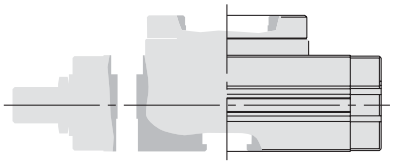
Size	AA	A	AU	AV	AW	AX	AY	BA	BB	BC	BD	BE	CA	CB	D	DD	DE	DF	DG	FA	FB	FC	FD	H	J	JA	JB
10	55.4	50	8.6	20	15.5	12	4	9.5	34.5	27.8	60	27	4.5	28.5	45h9	46h9	20H9	5	15H9	8	4	3	4.5	13	6.8	11	6.5
20	70.8	65	10.6	27.5	16	14	5	12	46	30	76	34	6	30.5	60h9	61h9	28H9	9	17H9	10	6	2.5	6.5	17	8.6	14	8.5
30	75.4	70	10.6	29	18.5	14	5	12	50	32	84	37	6.5	33.5	65h9	67h9	32H9	9	22H9	10	4.5	3	6.5	17	8.6	14	8.5
50	85.4	80	14	38	22	19	6	15.5	63	37.5	100	50	10	37.5	75h9	77h9	35H9	10	26H9	12	5	3	7.5	20	10.5	18	10.5

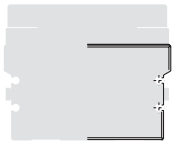
(mm)

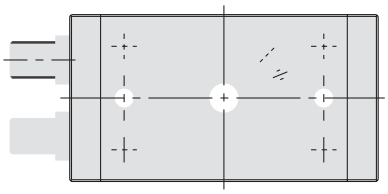
Size	JC	JD	JJ	JU	P	Q	S	SD	SE	SF	SU	UU	WA	WB	WC	WD	WE	WF	XA	XB	XC	YA	YB	YC
10	M8	12	M5 x 0.8	M8 x 1	M5 x 0.8	34	92	9	13	45	17.7	47	15	3H9	3.5	M5 x 0.8	8	32	27	3H9	3.5	19	3H9	3.5
20	M10	15	M6 x 1	M10 x 1	M5 x 0.8	37	117	10	12	60	25	54	20.5	4H9	4.5	M6 x 1	10	43	36	4H9	4.5	24	4H9	4.5
30	M10	15	M6 x 1	M10 x 1	1/8	40	127	11.5	14	65	25	57	23	4H9	4.5	M6 x 1	10	48	39	4H9	4.5	28	4H9	4.5
50	M12	18	M8 x 1.25	M14 x 1.5	1/8	46	152	14.5	15	75	31.4	66	26.5	5H9	5.5	M8 x 1.25	12	55	45	5H9	5.5	33	5H9	5.5

Dimensions/Size 70, 100, 200

Basic type/MSQB□A







(mm)

Size	FU
70	55.4
100	55.5
200	74.7

(mm)

Size	AA	AB	A	AV	AW	AX	AY	BA	BB	BC	BD	BE	CB	D	DD	DE	DF	DG	FA	FB	FC	FD	H	J	JA	JB
70	90	92	84	42	25.5	27	8	17	75	44.5	110	57	36	88h9	90h9	46H9	16	22H9	12.5	5	3.5	9	22	10.4	17.5	10.5
100	101	102	95	50	29.5	27	8	17	85	50.5	130	66	42	98h9	100h9	56H9	19	24H9	14.5	6	3.5	12	27	10.4	17.5	10.5
200	119	120	113	60	36.5	36	10	24	103	65.5	150	80	57	116h9	118h9	64H9	24	32H9	16.5	9	5.5	15	32	14.2	20	12.5

Size	JC	JD	JJ	JK	JU	Q	S	SD	SF	SU	UU	WA	WB	WC	WD	WE	WF	XA	XB	XC	YA	YB	YC
70	M12	18	M8	10	M20 x 1.5	53	170	18	79	34.2	75	32.5	5H9	5.5	M8	12.5	67	54	5H9	3.5	39	5H9	3.5
100	M12	18	M8	10	M20 x 1.5	59	189	22	90	34.3	86	37.5	6H9	6.5	M10	14.5	77	59	6H9	4.5	49	6H9	4.5
200	M16	25	M12	13	M27 x 1.5	74	240	29	108	40.2	106	44	8H9	8.5	M12	16.5	90	69	8H9	4.5	54	8H9	6.5

How to Order

MSQ B 10 L 2 – F9B S

Number of auto switches

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

Auto switch type

Nil	Without auto switch (built-in magnet)

∗ Select applicable auto switches from the table below.

A	High precision type
B	Basic type

Size

10
20
30
50

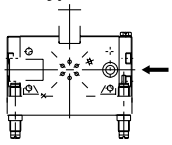
Shock absorber type

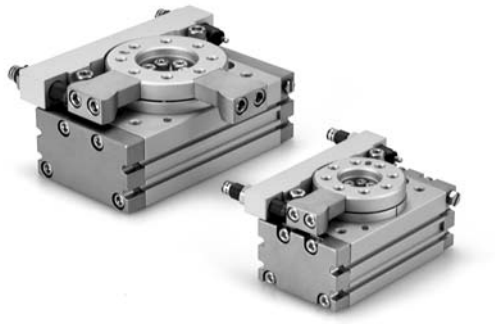
L	Shock absorber for low energy
H	Shock absorber for high energy

Connecting port position and rotation

2	Standard type	180°
3		90°
4	Symmetric type	180°
5		90°

Refer to the table to the right.

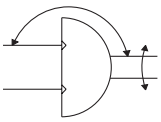
		Rotation	
		180°	90°
		2: Standard type, 180°	**3: Standard type, 90°**
		4: Symmetric type, 180°	**5: Symmetric type, 90°** 

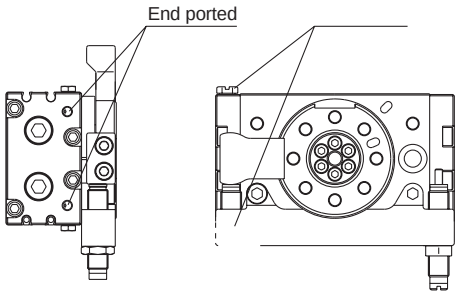


Specifications

Size		10	20	30	50
Fluid		Air (non-lube)			
Max. operating pressure		1MPa			
Min. operating pressure		0.2MPa			
Ambient and fluid temperature		0 to 60°C (with no freezing)			
Cushion		Shock absorber			
Shock absorber type	For low energy	RB0805	RB1006		RB1411
	For high energy	RB0806	RB1007		RB1412
Rotation		90°, 180°			
Angle adjustment range		Each rotation end ±3°			
Cylinder bore size		ø15	ø18	ø21	ø25
Port size	End ported	M5		1/8	
	Side ported	M5			

JIS symbol





Allowable Kinetic Energy and Rotation Time Adjustment Range

Size	Allowable kinetic energy (J)		Rotation time adjustment range for stable operation (S/90°)
	Shock absorber for low energy	Shock absorber for high energy	
10	0.161	0.231	0.2 to 1.0 Note)
20	0.574	1.06	
30	0.805	1.21	
50	1.31	1.82	

Size	10	20	30	50
For low energy	7.1°	6.9°	6.2°	9.6°
For high energy	8.6°	8.0°	7.3°	10.5°

Weights

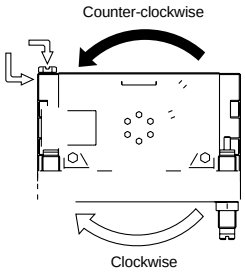
(g)

Size		10	20	30	50
Basic type	90° specification	630	1200	1520	2480
	180° specification	600	1140	1450	2370
High precision type	90° specification	700	1390	1750	2810
	180° specification	670	1340	1680	2690

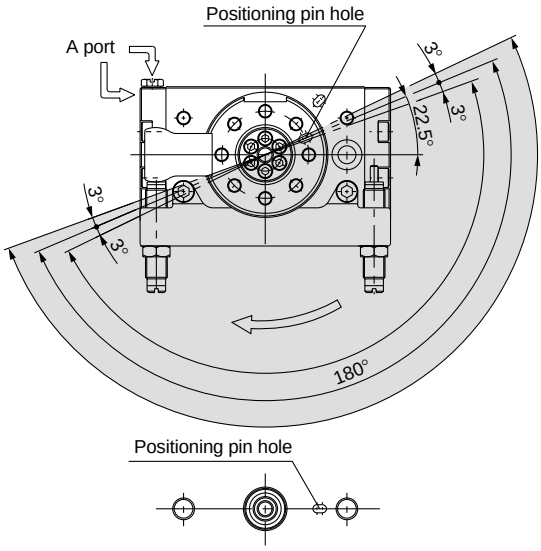
Note) Values above do not include auto switch weights.

Rotating Direction and Rotation

Standard type

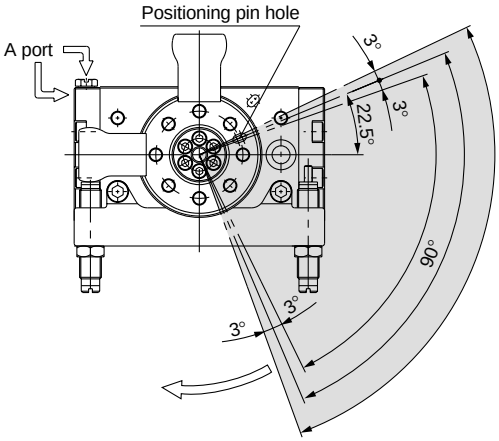


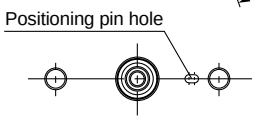
For 180°



Position of bottom positioning hole

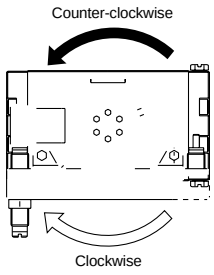
For 90°



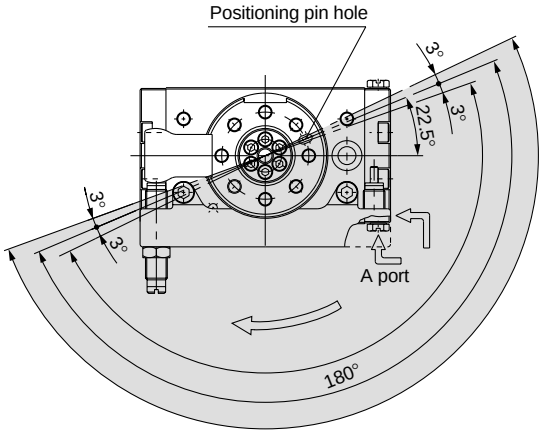


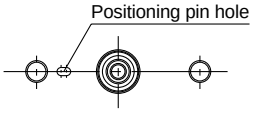
Position of bottom positioning hole

Symmetric type



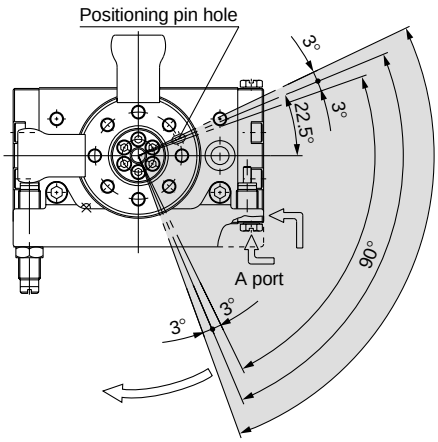
For 180°

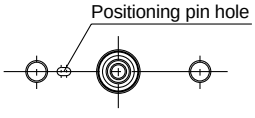




Position of bottom positioning hole

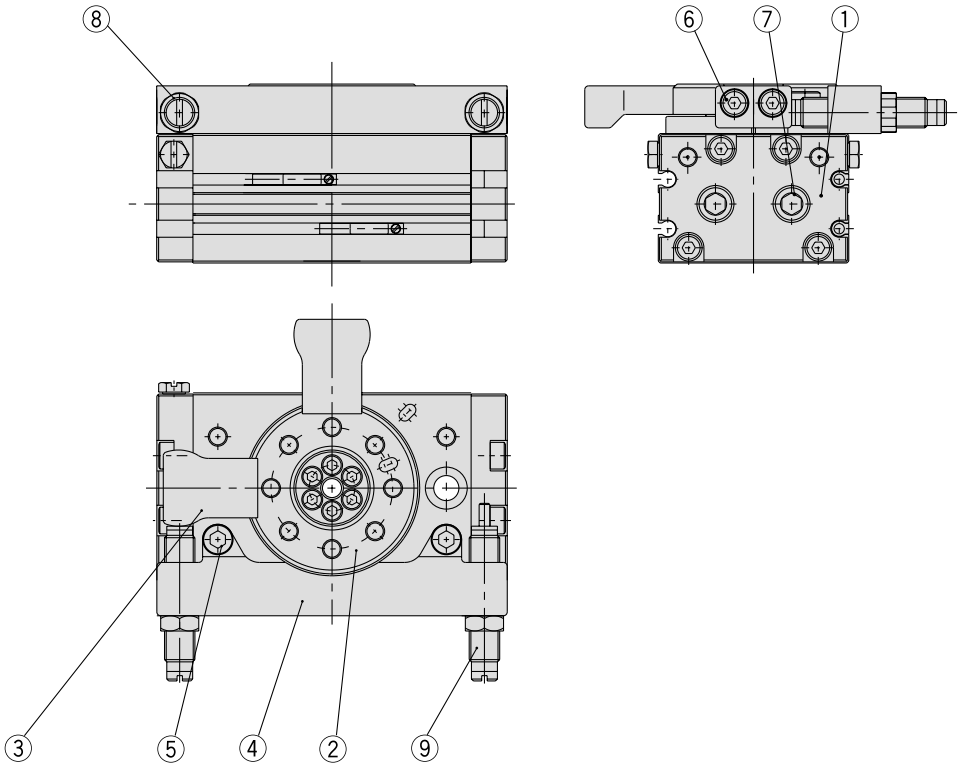
For 90°





Position of bottom positioning hole

Parts Descriptions



Parts list

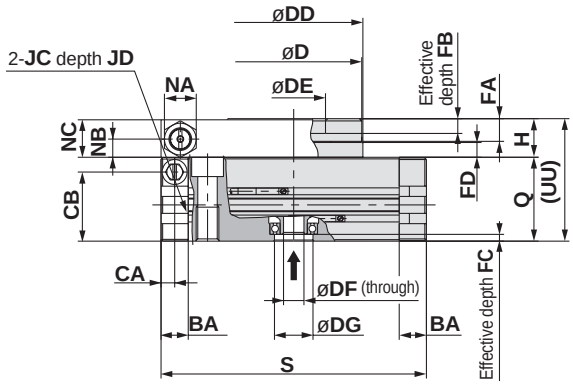
No.	Description	Material
1	**End cover**	Aluminum alloy
2	**Table**	Aluminum alloy
3	**Arm**	Chrome molybdenum steel
4	**Shock absorber holder**	Aluminum alloy
5	**Hexagon socket head cap screw**	Stainless steel
6	**Hexagon socket head cap screw**	Stainless steel
7	**Taper plug**	Steel wire
8	**Hexagon nut**	Steel wire
9	**Shock absorber**	—

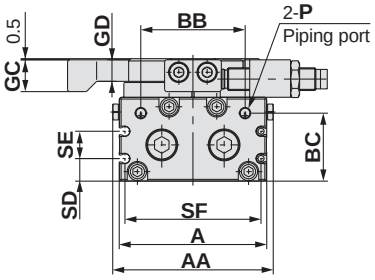
Replacement parts

Description	Kit no.				Note
	10	**20**	**30**	**50**	
Seal kit	P523010-6	P523020-6	P523030-6	P523040-6	Seal washer ㉗ is removed from the kit contents described on page 1.7-13.

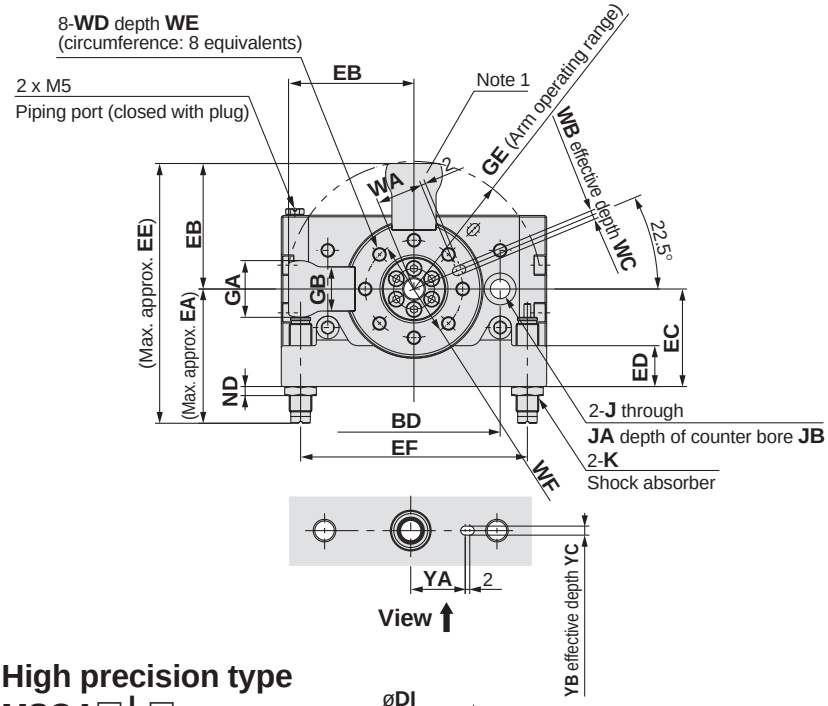
Dimensions/With External Shock Absorber Size 10, 20, 30, 50

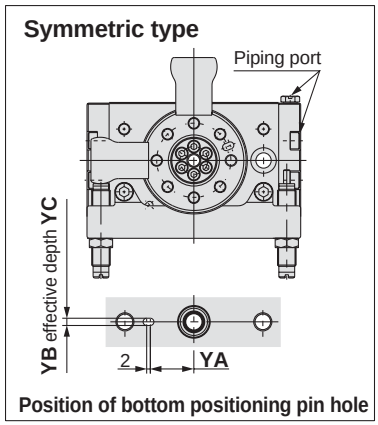
Basic type/MSQB□L/H□



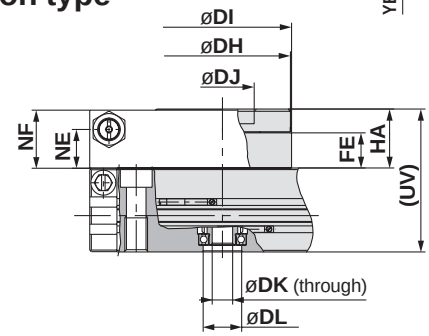


Note 1) This part is not available with 180° specification.





High precision type MSQA□L/H□



(mm)

Size	DH	DI	DJ	DK	DL	FE	HA	NE	NF	UV
10	45	46	20H8	5	15H8	10	18.5	11	18	52.5
20	60	61	28H8	9	17H8	15.5	26	17	25.5	63
30	65	67	32H8	9	22H8	16.5	27	18	26.5	67
50	75	77	35H8	10	26H8	17.5	30	18.5	29.5	76

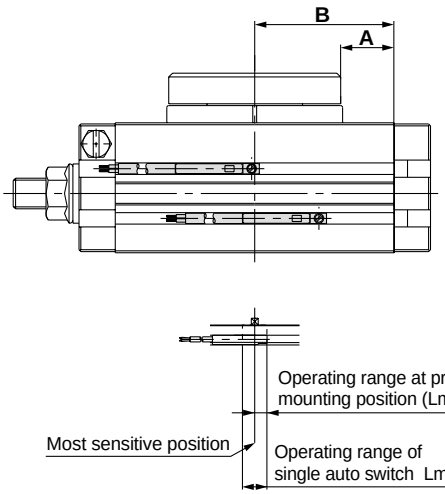
(mm)

Size	AA	A	BA	BB	BC	BD	CA	CB	D	DD	DE	DF	DG	EA	EB	EC	ED	EE	EF	FA	FB	FC	FD	GA	GB	GC	GD	GE	H
10	55.4	50	9.5	34.5	27.8	60	4.5	28.5	46	46	20H9	5	15H9	53	44.3	33.5	14	97.3	80	8	4	3	4.5	20	15.6	11	7.5	45.2	13
20	70.8	65	12	46	30	76	6	30.5	60	61	28H9	9	17H9	61.9	55.3	43	18	117.2	100	10	6	2.5	6.5	25	19.5	14	9.5	56.4	17
30	75.4	70	12	50	32	84	6.5	33.5	65	67	32H9	9	22H9	62.1	60.3	46	19.5	122.4	110	10	4.5	3	6.5	27	21.5	14	9.5	61.5	17
50	85.4	80	15.5	63	37.5	100	10	37.5	75	77	35H9	10	26H9	86.8	71.4	56	22	158.2	130	12	5	3	7.5	32	28	18	11.5	72.9	20

(mm)

Size	J	JA	JB	JC	JD	K	NA	NB	NC	ND	P	Q	S	SD	SE	SF	UU	WA	WB	WC	WD	WE	WF	YA	YB	YC
10	6.8	11	6.5	M8	12	M8 x 1	10	5.5	12.5	4	M5	34	92	9	13	45	47	15	3H9	3.5	M5	8	32	19	3H9	3.5
20	8.6	14	8.5	M10	15	M10 x 1	14	8	16.5	4	M5	37	117	10	12	60	54	20.5	4H9	4.5	M6	10	43	24	4H9	4.5
30	8.6	14	8.5	M10	15	M10 x 1	14	8	16.5	4	1/8	40	127	11.5	14	65	57	23	4H9	4.5	M6	10	48	28	4H9	4.5
50	10.5	18	10.5	M12	18	M14 x 1.5	19	8.5	19.5	6	1/8	46	152	14.5	15	75	66	26.5	5H9	5.5	M8	12	55	33	5H9	5.5

Proper Auto Switch Mounting Position at Rotation End



Size	Rotation	Reed switch				Solid state switch			
		A	B	Rotation range θm	Actuation range	A	B	Rotation range θm	Actuation range
10	190°	17	36	90°	10°	21	40	90°	10°
20	190°	23	50	80°	10°	27	54	80°	10°
30	190°	27	66	65°	10°	31	60	65°	10°
50	190°	33	68	50°	10°	37	72	50°	10°
70	190°	37	78	45°	10°	41	82	45°	10°
100	190°	44	91	40°	10°	48	95	40°	10°
200	190°	57	115	35°	10°	61	119	35°	10°

Rotation range θm: Value of the operating range Lm of a single auto switch converted to an axial rotation range.
Actuation range: Value of auto switch hysteresis converted to an angle.

Series MSQ
Rotary Table Precautions

Be sure to read before handling.

Design

⚠ Warning

1. In case of load variations, lifting/lowering operations or changes in frictional resistance, employ a safety design which allows for these factors.

Increases in operating speed can cause human injury as well as damage to equipment and machinery.

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

If a stationary object and moving parts of a cylinder are in close proximity, human injury may occur. Design the structure to avoid contact with the human body.

3. Make secure connections so that stationary parts and connecting parts do not become loose.

Particularly when operation frequency is high or a rotary actuator is used in a location with excessive vibration, employ a secure method of connection.

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

When a driven object is operated at high speed or the load is heavy, the rotary actuator's cushion may not be able to absorb the impact. Therefore, install a deceleration circuit before the cushion or 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/or human injury.

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 air pressure, electricity or hydraulics, etc.

7. When a speed controller is mounted on an exhaust throttle, employ a safety design which considers residual pressure.

If the air supply side is pressurized when there is no residual pressure on the exhaust side, operation will be abnormally fast and this can cause human injury as well as damage to equipment and machinery.

8. Consider emergency stops.

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

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

Design the machinery so that human injury or equipment damage will not occur upon restart of operation. When the rotary actuator has to be reset at the starting position, install safe manual control equipment.

Design

⚠ Warning

10. Do not use the product as a shock absorbing mechanism.

If abnormal pressure or leakage occurs, there may be a drastic loss of deceleration effectiveness, leading to a danger of human injury as well as damage to equipment and machinery.

Selection

⚠ Warning

1. Keep the speed setting within the product's allowable energy value.

Operation with the kinetic energy of the load exceeding the allowable value can cause damage to the product, leading to human injury as well as damage to equipment and machinery.

2. Provide a shock absorbing mechanism when kinetic energy applied to the product exceeds the allowable value.

Operation exceeding the allowable kinetic energy can cause damage to the product and lead to human injury and damage to equipment and machinery.

3. Do not perform stops or holding operations by containing air pressure inside the product.

If intermediate stops are performed by containing air with a directional control valve when the product does not have an external stopping mechanism, the stopping position may not be held due to leakage, etc. This can cause human injury and damage to equipment and machinery.

⚠ Caution

1. Do not operate the product at low speeds which are below the prescribed speed adjustment range.

If operated at low speeds below the speed adjustment range, this may cause sticking and slipping or stopping of operation.

2. Do not apply external torque which exceeds the product's rated output.

If external force is applied which exceeds the product's rated output, the product can be damaged.

3. Rotation end holding torque for double piston type

With double piston type products, if the internal piston is stopped by contact with the angle adjustment screw or cover, the holding torque at the rotation end is half the value of effective output.

4. When repeatability of the rotation angle is required, the load should be directly stopped externally.

The initial rotation angle may vary even in products equipped with angle adjustment.

5. Avoid operation with oil hydraulics.

Operation with oil hydraulics can cause damage to the product.

Mounting

⚠ Warning

1. When angle adjustment is performed while applying pressure, make advance preparations to keep equipment from rotating any more than necessary.

When adjustment is performed with pressure applied, there is a possibility of rotation and dropping during adjustment depending on the mounting position of the equipment, etc. This can cause human injury and damage to equipment and machinery.

2. Do not loosen the angle adjustment screw above the adjustment range.

If the angle adjustment screw is loosened above the adjustment range, it may come out causing human injury and damage to equipment and machinery.

3. Do not allow external magnetism close to the product.

Since the auto switches used are types sensitive to magnetism, external magnetism in close proximity to the product can cause malfunction leading to human injury and damage to equipment and machinery.

4. Do not perform additional machining on the product.

Additional machining of the product can result in insufficient strength and cause damage to the product leading to human injury and damage to equipment and machinery.

5. Do not enlarge the fixed throttle on the piping port by reworking, etc.

If the bore is enlarged, rotation speed and impact force will increase, which can cause damage to the product leading to human injury and damage to equipment and machinery.

6. When using a shaft coupling, use one with a sufficient degree of freedom.

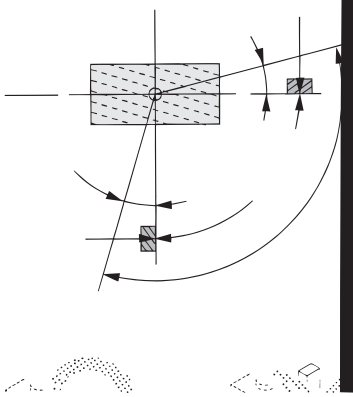
If a shaft coupling is used which does not have a sufficient degree of freedom, twisting will occur due to eccentricity, and this can cause malfunction and product damage leading to human injury and damage to equipment and machinery.

7. Do not apply loads to the rotary table exceeding the values shown on features page 4.

If loads exceeding the allowable values are applied to the product, this can cause malfunction and product damage leading to human injury and damage to equipment and machinery.

Precautions when using external stopp

When the kinetic energy generated by th
value of the actuator, an external shoc
must be provided to absorb the energy.
mounting external stoppers is explained i



⚠ Caution

Series MSQ
Rotary Table Precautions

Be sure to read before handling.

Rotation Adjustment

⚠ Caution

1. As a standard feature, the rotary table is quipped with a rotation adjustment screw (adjustment bolt or shock absorber) that can be used to adjust the rotation. The table below shows rotation adjustment per single rotation of the rotation adjustment screw.

With adjustment bolt, With internal shock absorber

Size	Rotation adjustment per single rotation of rotation adjustment screw
10	10.2°
20	7.2°
30	6.5°
50	8.2°
70	7.0°
100	6.1°
200	4.9°

With external shock absorber

Size	Rotation adjustment per single rotation of rotation adjustment screw
10	1.4°
20	1.1°
30	1.1°
50	1.3°

The rotation adjustment range for the external shock absorber is ±3° at each rotation end. When adjusted beyond this range, note that the shock absorber's durability may decrease.

2. Series MSQ is equipped with a rubber bumper or shock absorber. Therefore, perform rotation adjustment in the pressurized condition (minimum operating pressure: 0.1MPa or more for adjustment bolt and internal shock absorber types, and 0.2MPa or more for external shock absorber type).

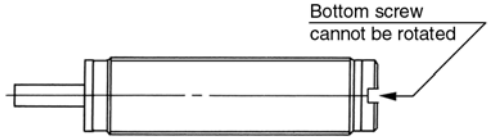
Shock Absorber

⚠ Caution

1. Refer to the table below for tightening torques of the shock absorber setting nut.

Size	**10**	**20**	**30**	**50**	**70**	**100**	**200**
Tightening torque	1.67	3.14		10.8	23.5		62.8

2. Never rotate the bottom screw of the shock absorber. (It is not an adjustment screw.) This may cause oil leakage.



3. When rotation of the rotary table with internal shock absorber is set at a value smaller than the values below, the piston stroke becomes smaller than the shock absorber's effective stroke and energy absorption capacity decreases.

Size	**10**	**20**	**30**	**50**	**70**	**100**	**200**
Minimum rotation without energy absorption capacity decrease	52°	43°	40°	60°	71°	62°	82°

Shock Absorber

4. Shock absorbers are consumable parts.
When a decrease in energy absorption capacity is noticed, it must be replaced.

With internal shock absorber

Size	Shock absorber model
10	RBA0805-X692
20	RBA1006-X692
30	
50	RBA1411-X692
70	RBA2015-X821
100	
200	RBA2725-X821

With external shock absorber

Size	Type	Shock absorber model
10	For low energy	RB0805
	For high energy	RB0806
20	For low energy	RB1006
	For high energy	RB1007
30	For low energy	RB1006
	For high energy	RB1007
50	For low energy	RB1411
	For high energy	RB1412

External Shock Absorber

⚠ Caution

The threaded orifices shown below are not connecting ports. Never remove the plugs as this will cause malfunction.