

Rotary Table/ Rack & Pinion Type

RoHS

Size: 10, 20, 30, 50

Height

Max. **28%** reduction^{*1} 54 mm → **39 mm**

Weight

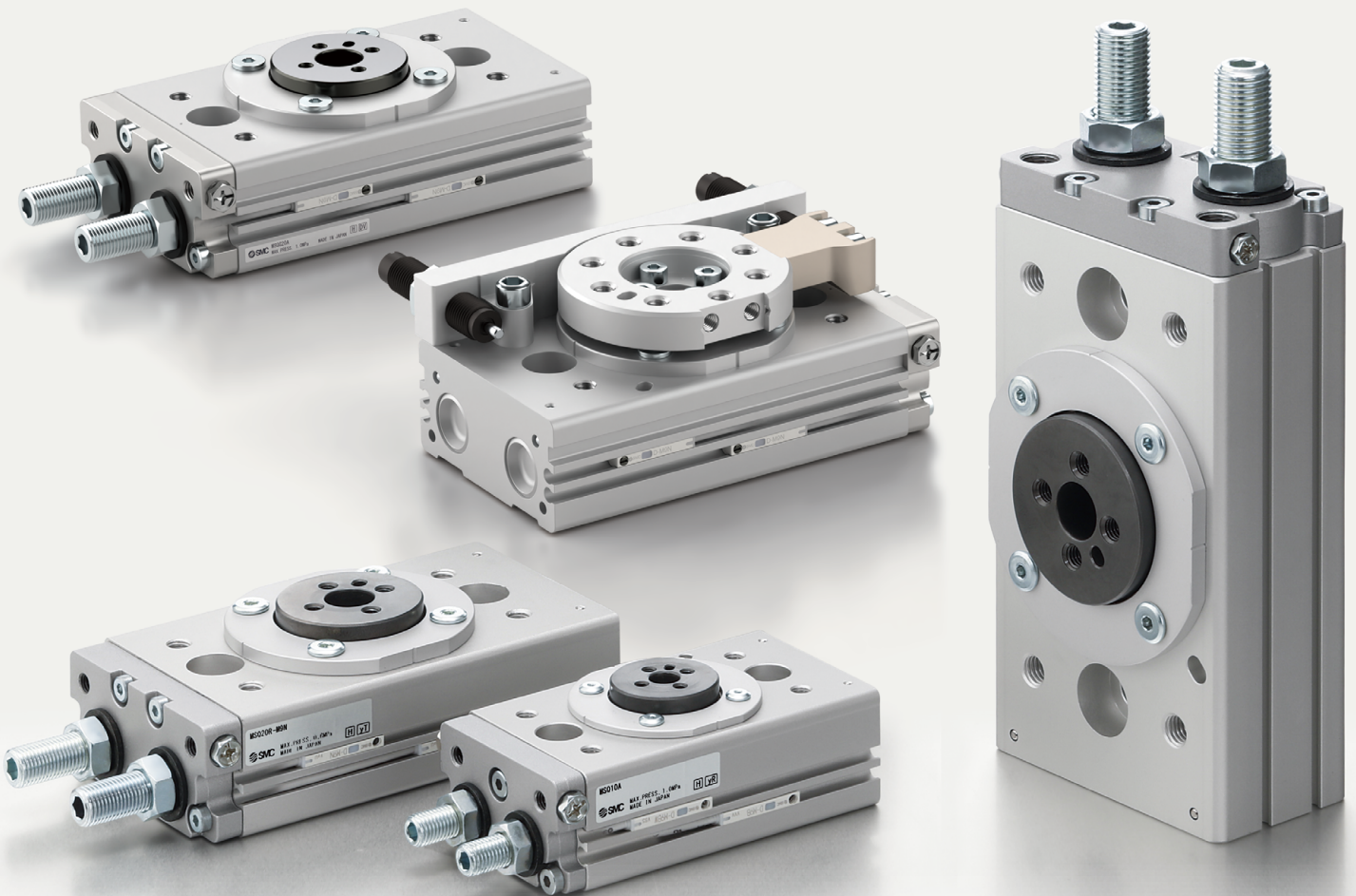
Max. **28%** reduction^{*1} 940 g → **680 g**

*1 Compared with the existing model (MSQ20)

New

High-Precision Type/MSQG Series

Same dimensions as the basic type, with improved rigidity and precision



MSQ Series

SMC

CAT.ES20-256D

Compact and lightweight

New MSQG high-precision type: Same dimensions as the MSQ basic type
 Reduced height and weight compared with the existing MSQA high-precision type

Reduced Height

<High-Precision Type>				<Basic Type>			
Size	New MSQG (H ₁)	MSQA (H ₂)	Reduction rate [%]	Size	MSQ (H ₁)	MSQB (H ₂)	Reduction rate [%]
10	35.5	52.5	32	10	35.5	47	24
20	39	63	38	20	39	54	28
30	46	67	31	30	46	57	19
50	51.5	76	32	50	51.5	66	22

Reduced Weight

<High-Precision Type>				<Basic Type>			
Size	New MSQG	MSQA	Reduction rate [%]	Size	MSQ	MSQB	Reduction rate [%]
10	395	530	25	10	375	500	25
20	695	1040	33	20	680	940	28
30	950	1350	30	30	930	1230	24
50	1555	2150	28	50	1500	1990	25

* For the MSQG□A (With cushion pad)

Existing model
 High-precision type/MSQA
 Basic type/MSQB

New High-precision type/MSQG
 Basic type/MSQ



Improved workability

The end ports and the angle adjustment mechanisms are located on the same surface.

End ports

Angle adjustment mechanism
 (Cushion pad, Bumper)

Side port
 (Same for the opposite side, With plug)

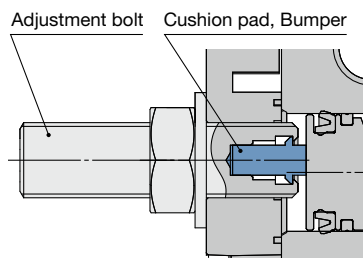


5 types of cushions are available.

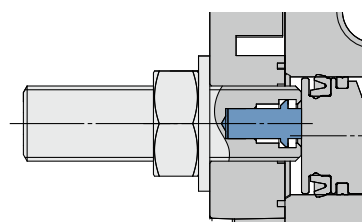
Cushion pad, bumper construction

When impact is absorbed

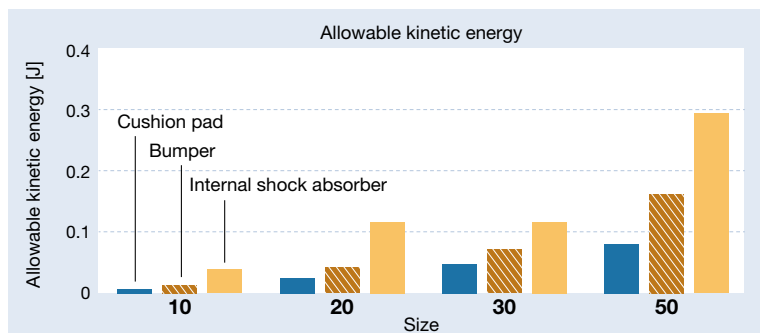
When stopped at the end surface



Initially, the cushion pad or the bumper absorbs the impact.



The cushion pad or the bumper enters and stops at the adjustment bolt end surface.



Internal shock absorber

* Refer to page 2 for the external shock absorber.



Bumper

The max. allowable kinetic energy is up to 2 times higher than that of the cushion pad.



Internal shock absorber

The max. allowable kinetic energy is up to 5 times higher than that of the cushion pad.



Cushion pad

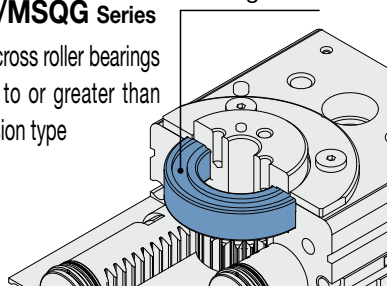
Reduces the metal noise that occurs when the piston stops

High precision and high rigidity

New High-Precision Type/MSQG Series

Improved precision and rigidity due to cross roller bearings
Ensured precision and rigidity equal to or greater than those of the existing MSQA high-precision type

Cross roller bearing



Small auto switches mountable on both side surfaces

Allowable load increased by 20%

	New High-precision type MSQG	Existing model High-precision type MSQA
Allowable load F _{sa} [N]	236	197
Allowable load F _r [N]	199	166
Allowable moment load M [N·m]	5.8	4.8

* Comparison using size 20 **Details: p. 7**

The adjustable rotation time range is expanded.

Can be used at lower speeds compared with the existing model

MSQ(G) 0.2 to 2.0 s/90°

MSQ_B^A 0.2 to 1.0 s/90° (Existing model)

* For the MSQ□_D^A (With cushion pad/bumper)

Details: p. 6

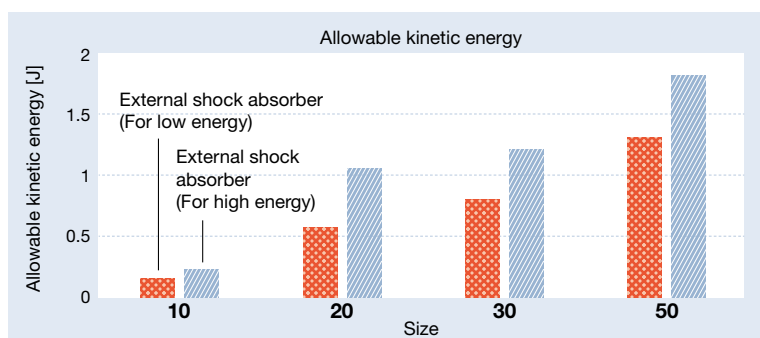
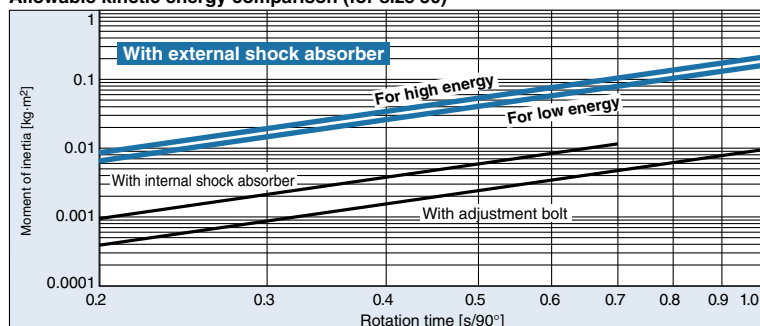
With external shock absorber

4 to 10 times more allowable kinetic energy

(Compared with the internal shock absorber type)

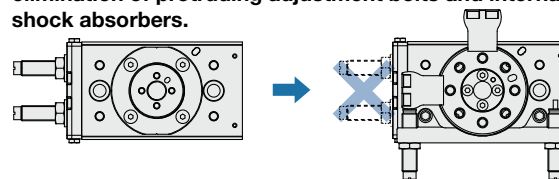
2 types of shock absorbers are available: 1 for low energy and 1 for high energy.

Allowable kinetic energy comparison (for size 30)



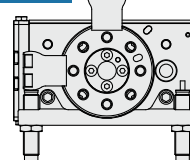
Total length shortened

The lengthwise mounting space is reduced due to the elimination of protruding adjustment bolts and internal shock absorbers.

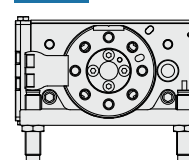


Rotating angle: 90°, 180°

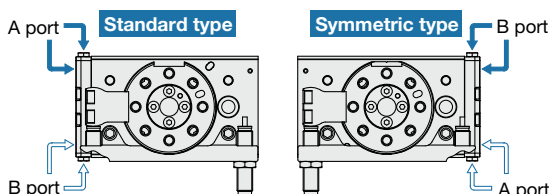
90°



180°

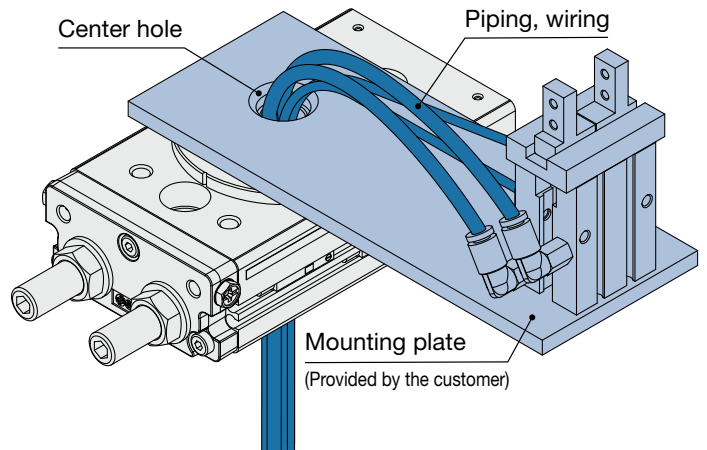
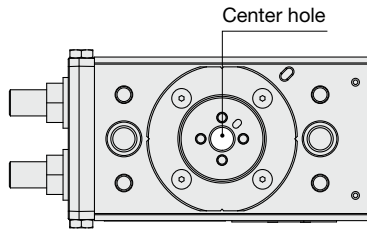


Left / Right symmetric type



Enlarged center hole diameter for piping

Size	[mm]	
	New High-precision type/MSQG Basic type/MSQ	Existing model High-precision type/MSQA Basic type/MSQB
10	ø7	ø6
20	ø12	ø9
30	ø13	ø12
50	ø14	ø13



Ensured mounting interchangeability with existing products

- With table
Same load mounting dimensions
- Interchangeable mounting type (Made to order)
Same load mounting dimensions and mounting height

Details: p. 15, 22

■ With cushion pad/bumper/internal shock absorber

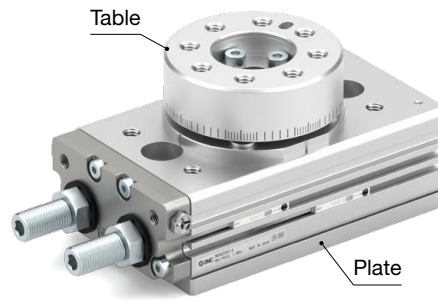
	With table	Interchangeable mounting type (With table and plate)
Basic type	●	●
High-precision type	●	●

■ With external shock absorber

	Interchangeable mounting type (With plate)
Basic type	●
High-precision type	●



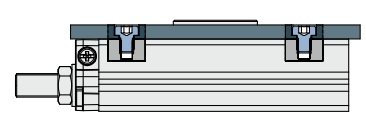
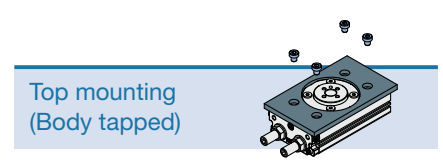
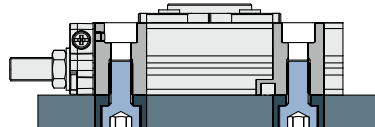
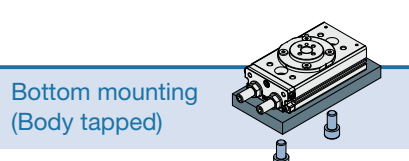
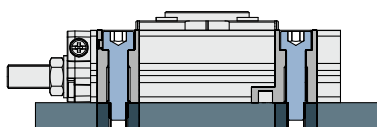
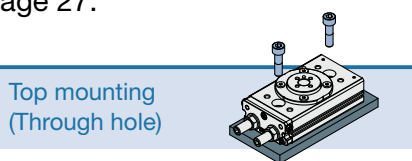
Basic type with table



High-precision, interchangeable mounting type (Made to order)

Select from 3 mounting methods.

Mounting dimensions are interchangeable with the existing MSQ series model. For mounting, refer to page 27.



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Rotary Table/Rack & Pinion Type *MSQ Series*



With Cushion Pad/Bumper/Internal Shock Absorber

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●Made to Order

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●Made to Order

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Rotary Table/Rack & Pinion Type With Cushion Pad/Bumper/Internal Shock Absorber

MSQ Series

Size: 10, 20, 30, 50



How to Order

Basic type MSQ **10** **A** **T** - **M9BW** -

High-precision type MSQG **10** **A** **T** - **M9BW** -

Size

10
20
30
50

Made to order
Interchangeable mounting type (p. 6)

Port type

End port type	Size
Nil	M5
Nil	Rc1/8
-XF	G1/8
-XN	NPT1/8
-XT	NPTF1/8

* Side ports are all M5.
For details, refer to the specifications on page 6.

Number of auto switches

Nil	2
S	1
n	n

Auto switch

Nil	Without auto switch (Built-in magnet)
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* For applicable auto switches, refer to the table below.

Nil	Without table
T	With table

Options:

A	Cushion pad	
D	Bumper	
R	Internal shock absorber	

* Workpiece mounting compatible with existing products
For details, refer to page 15.

Applicable Auto Switches/Refer to the Web Catalog for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length [m]				Pre-wired connector	Applicable load		
					DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)				
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9PV	M9P	●	●	●	○	○		
				2-wire				M9BV	M9B	●	●	●	○	○		
				3-wire (NPN)				M9NVV	M9NV	●	●	●	○	○		
				3-wire (PNP)				M9PVV	M9PV	●	●	●	○	○		
				2-wire				M9BVV	M9BV	●	●	●	○	○		
	Water resistant (2-color indicator)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NAV*1	M9NA*1	○	○	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9PAV*1	M9PA*1	○	○	●	○	○		
				2-wire				M9BAV*1	M9BA*1	○	○	●	○	○		
Reed auto switch	—	Grommet	Yes	3-wire (NPN equiv.)	24 V	5 V	—	A96V	A96	●	●	●	●	○	IC circuit	—
				2-wire				100 V	A93V	A93	●	●	●	●	○*2	—
			No	2-wire	24 V	12 V	100 V or less	A90V	A90	●	●	●	●	○*2	IC circuit	—

*1 Although it is possible to mount water-resistant type auto switches, note that the rotary actuator itself is not of water-resistant construction.
*2 The load voltage used is 24 VDC.
* Lead wire length symbols: 0.5 m..... Nil (Example) M9NV
1 m..... M (Example) M9NVV
3 m..... L (Example) M9NVLL
5 m..... Z (Example) M9NVZZ
* Auto switches marked with a "○" are produced upon receipt of order.
* For details on auto switches with pre-wired connectors, refer to the Web Catalog.

* Auto switches are shipped together with the product but do not come assembled.



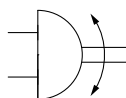
Rotary Table/Rack & Pinion Type **MSQ Series**

With Cushion Pad/Bumper/Internal Shock Absorber

Specifications



Symbol



Made to Order
(For details, refer to page 15.)

Symbol	Specifications
-A	Interchangeable mounting type

Refer to page 25 for models with auto switches.

· Auto Switch Proper Mounting Position
(at Rotation End Detection)

Size		10	20	30	50
Fluid		Air (Non-lube)			
Max. operating pressure	Cushion pad	1 MPa			
	Bumper	0.6 MPa* ¹			
	Internal shock absorber	0.1 MPa* ²			
Min. operating pressure		0.1 MPa* ²			
Ambient and fluid temperatures		0 to 60°C (No freezing)			
Cushion	Cushion pad* ³	Rubber bumper			
	Bumper	Shock absorber			
	Internal shock absorber	Shock absorber			
Angle adjustment range* ⁴		0 to 190°* ⁵			
Max. rotating angle* ⁴		190°			
Cylinder bore size		ø13	ø16	ø20	ø22
Port size	End port	M5 x 0.8		Rc1/8, G1/8, NPT1/8, NPTF1/8	
	Side port	M5 x 0.8			

*1 The max. operating pressure of the actuator is restricted by the max. allowable thrust of the shock absorber.

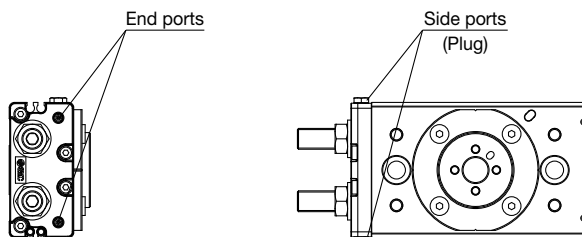
*2 Refer to page 26 for the min. operating pressure with a bumper.

*3 Reduces noise when the piston and adjustment bolt collide.

*4 For details, refer to pages 9 and 10.

*5 If the rotating angle of the type with an internal shock absorber is set below the value in the table below, the piston stroke will be smaller than the shock absorber's effective stroke, resulting in decreased energy absorption ability.

Size	10	20	30	50
Min. rotating angle that will not result in decrease of the energy absorption ability	40°	35°	35°	47°



Allowable Kinetic Energy and Rotation Time Adjustment Range

Size	Allowable kinetic energy [J]* ¹			Adjustable range of rotation time safe in operation [s/90°]		
	Cushion pad	Bumper	Internal shock absorber	Cushion pad	Bumper	Internal shock absorber* ²
10	0.007	0.014	0.039	0.2 to 2.0* ³		0.2 to 0.7
20	0.025	0.042	0.116			
30	0.048	0.072	0.116			
50	0.081	0.162	0.294			

*1 If operated so that the kinetic energy exceeds the allowable value, damage to the internal parts or product failure may result. Please pay special attention to the kinetic energy levels when designing and during operation to avoid exceeding the allowable limit.

*2 If the rotation time of the type with an internal shock absorber is set longer than the time shown in the table above, the energy absorption ability of the shock absorber will greatly decrease.

*3 When using the high-precision type at a speed below 1.0 s/90°, use a pressure of 0.3 MPa or more.

Weight

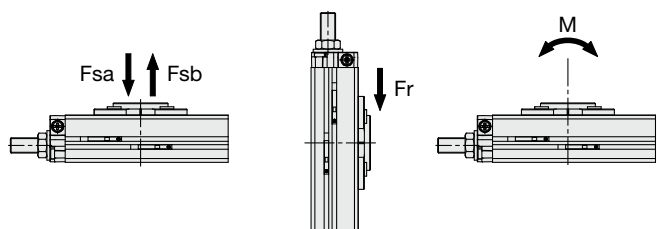
Size		10	20	30	50
Basic type	Cushion pad	375	680	930	1500
	Bumper				
	Internal shock absorber				
High-precision type	Cushion pad	395	695	950	1555
	Bumper				
	Internal shock absorber				

* The values above do not include the auto switch weight.

* For the type with a table, add the weight in the table below.

Size	10	20	30	50
With table	30	65	80	135

Allowable Load



Basic Type

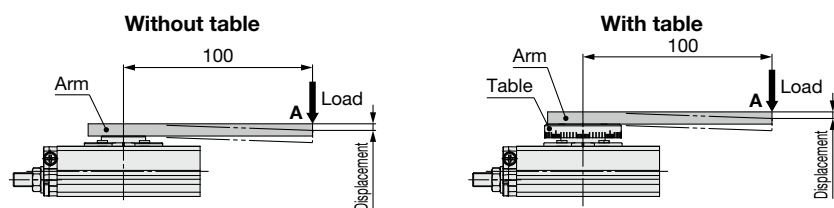
Size	Load direction			
	Fsa [N]	Fsb [N]	Fr [N]	M [N·m]
10	78	74	78	2.4
20	137	137	147	4.0
30	363	197	196	5.3
50	451	296	314	9.7

High-Precision Type

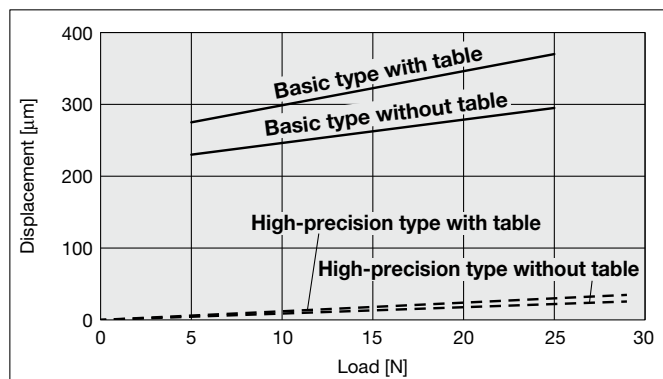
Size	Load direction			
	Fsa [N]	Fsb [N]	Fr [N]	M [N·m]
10	128	74	103	3.5
20	236	137	199	5.8
30	478	197	280	7.7
50	620	296	454	13.2

Table Displacement (Reference values)

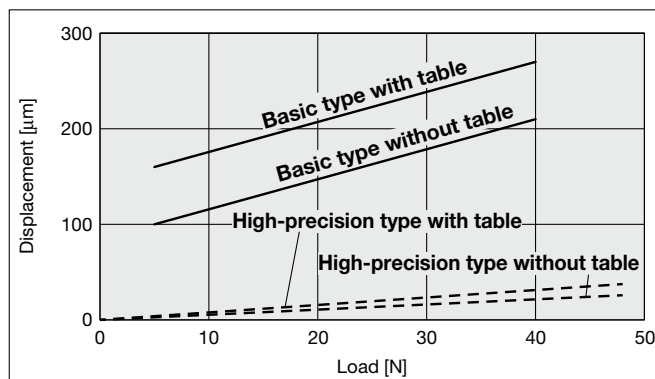
The following graphs show the displacement at point A, which is 100 mm away from the center of rotation, where the load is applied. Refer to the displacement for "with table" for the external shock absorber specification.



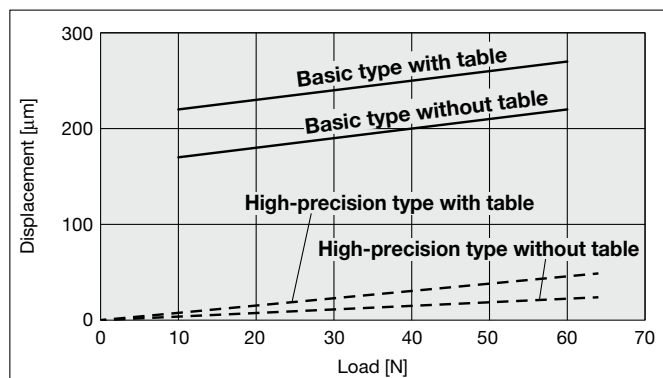
Size 10



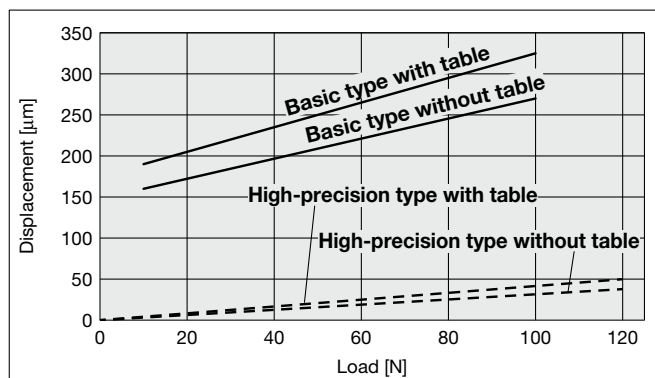
Size 20



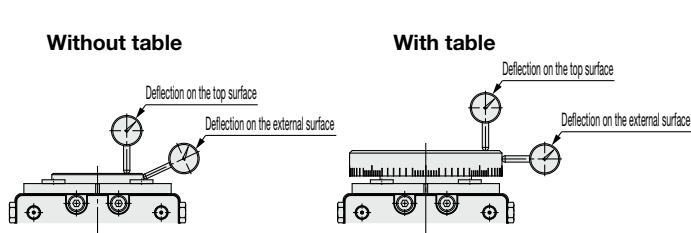
Size 30



Size 50



Deflection Accuracy: Displacement at 180° Rotation (Guide)

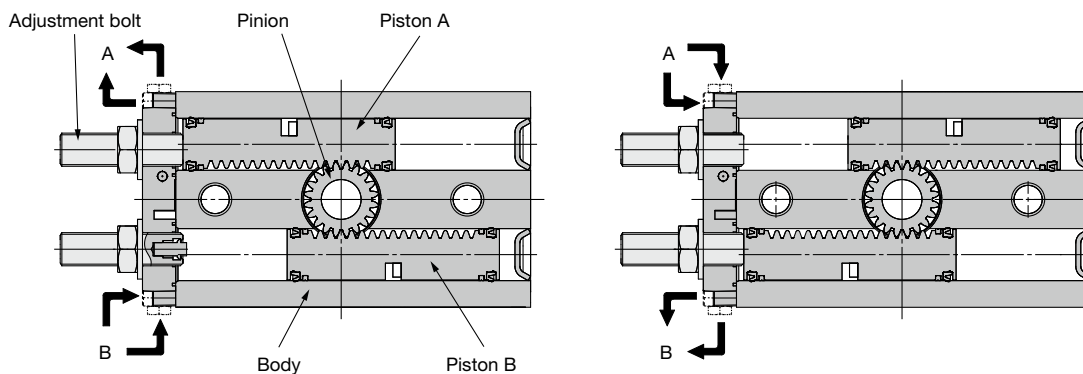


[mm]

Measured part	Basic type/ MSQ		High-precision type/ MSQG	
	Without table	With table	Without table	With table
Deflection on the top surface	0.1		0.03	0.06
Deflection on the external surface				

The values in the table are actual values and not guaranteed values.

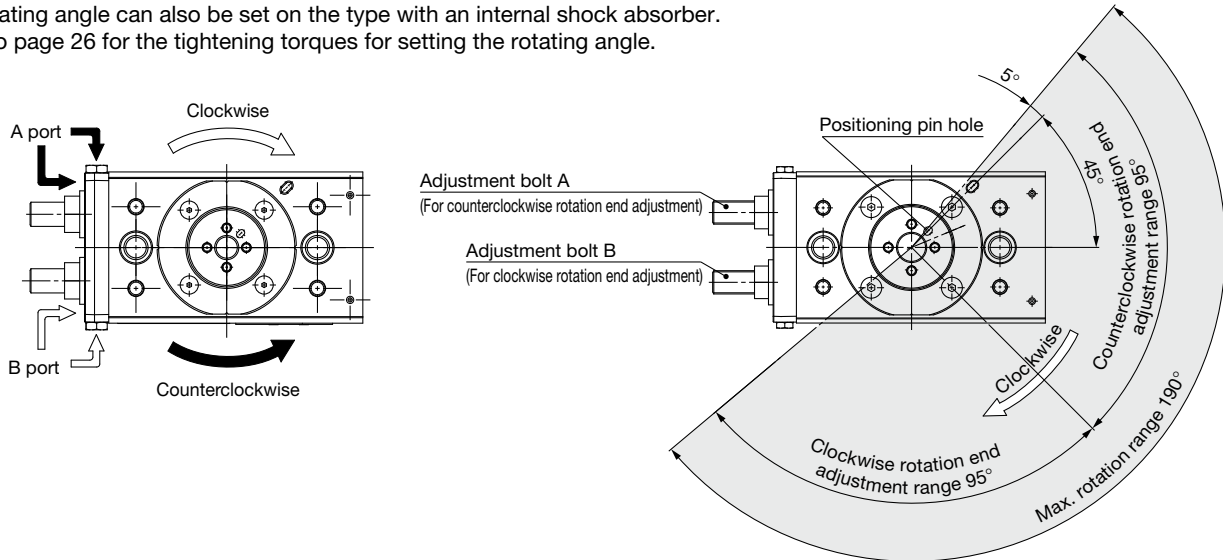
Working Principle



1. It consists of a rack that slides in 2 parallel cylinders, 2 pistons that are integrated with the rack, and a pinion.
2. The air that is supplied from port B pushes the left side of piston A; at the same time, it passes through the air passage of the body, pushing the right side of piston B, thus creating in the shaft an amount of torque that is equivalent to 2 pistons.
3. The air in the exhaust chamber discharges via port A and rotates clockwise.
4. The pinion stops when piston B comes in contact with the adjustment bolt and stops.
5. Similarly, when air is supplied from port A, it rotates counterclockwise.

Rotation Direction and Rotating Angle

- The rotary table turns in the counterclockwise direction where the A port is pressurized, and in the clockwise direction when the B port is pressurized. (Please note that the rotation direction is different from the existing MSQ.)
- By adjusting the adjustment bolt, the rotation end can be set within the ranges shown in the drawing.
- The rotating angle can also be set on the type with an internal shock absorber.
- Refer to page 26 for the tightening torques for setting the rotating angle.

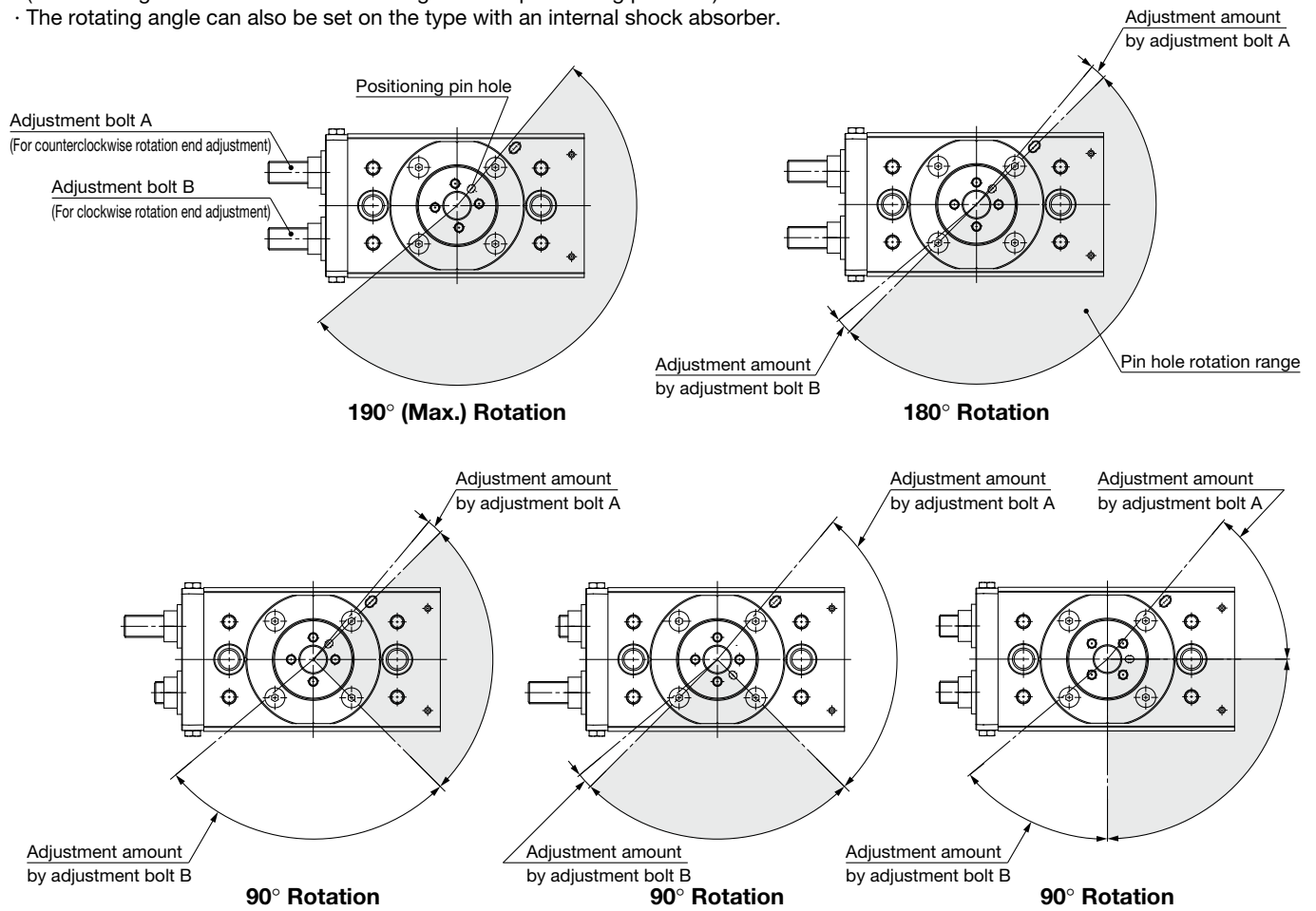


With Cushion Pad/Bumper/Internal Shock Absorber

Size	Adjustment angle per rotation of adjustment bolt
10	8.0°
20	5.7°
30	5.7°
50	6.4°

Rotating Angle Range Examples

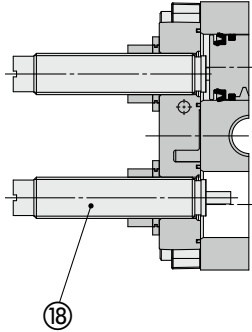
- Various rotation ranges are possible as shown in the drawings below using adjustment bolts A and B.
 (The drawings also show the rotation ranges of the positioning pin hole.)
- The rotating angle can also be set on the type with an internal shock absorber.



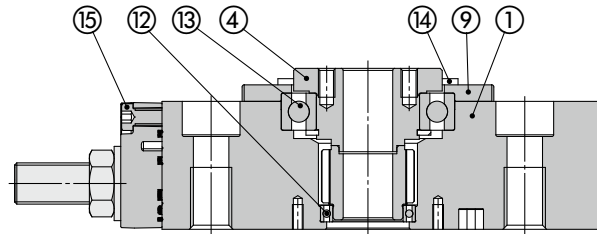
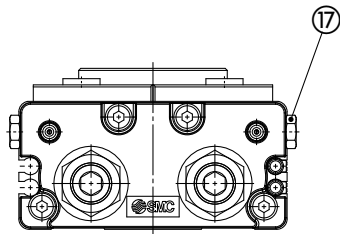
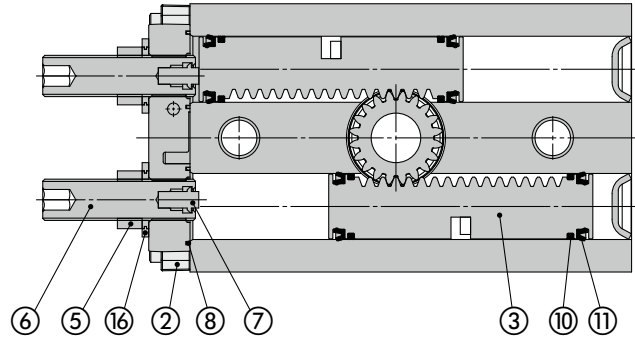
MSQ Series

Construction

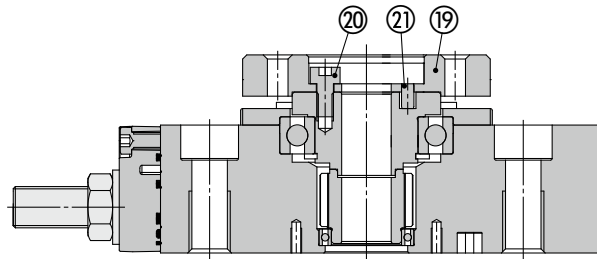
MSQ□□R□
(Internal shock absorber)



MSQ□□A□ (Cushion pad)
MSQ□□D□ (Bumper)



MSQ□□□T (With table)



Component Parts

No.	Description	
1	Body	
2	End cover	
3	Piston	
4	Table pinion	
5	Compact hexagon nut	
6	Adjustment bolt	
7	Cushion pad	
	Bumper	
8	Gasket	
9	Bearing retainer	
10	Wear ring	
11	Piston seal	
12	Bearing	
13	Bearing	Basic type
	Cross roller bearing	High-precision type
14	Hexagon socket super thin head cap screw	
15	Hexagon socket thin head cap screw	
16	Seal washer	
17	M5 plug assembly	
18	Shock absorber	
19	Table	With table
20	Hexagon socket head cap screw	With table
21	Parallel pin	With table

* The component parts cannot be shipped individually.

Caution

The piston material differs between the types with a cushion pad, a bumper, and an internal absorber. Do not install a shock absorber on a product with a cushion pad or bumper as this may damage the piston.

Replacement Parts

Seal Kit

Size	Part no.	Contents
		Description (Qty.)
10	P891010-5	⑧Gasket (1)
20	P891020-5	⑩Wear ring (4)
30	P891030-5	⑪Piston seal (4)
50	P891040-5	⑬Seal washer (2)

A grease pack (10 g) is included. Order with the following part number when only the grease pack is needed.

Grease pack part number: GR-L-010 (10 g)

* Not applicable, as the high-precision type cannot be disassembled

Adjustment Bolt Assembly (Cushion Pad)

Size	Part no.	Contents
		Description (Qty.)
10	P391010-3	⑥Adjustment bolt (1) ⑦Cushion pad (1)
20	P391020-3	
30		
50	P391040-3	

Two sets are required for each product.

Adjustment Bolt Assembly (Bumper)

Size	Part no.	Contents
		Description (Qty.)
10	P891010-3	⑥Adjustment bolt (1) ⑦Bumper (1)
20	P891020-3	
30		
50	P891040-3	

Two sets are required for each product.

Shock Absorber (Internal Shock Absorber)

Size	Part no.
10	RBA0805-X692
20	RBA1006-X692
30	
50	RBA1411-X692

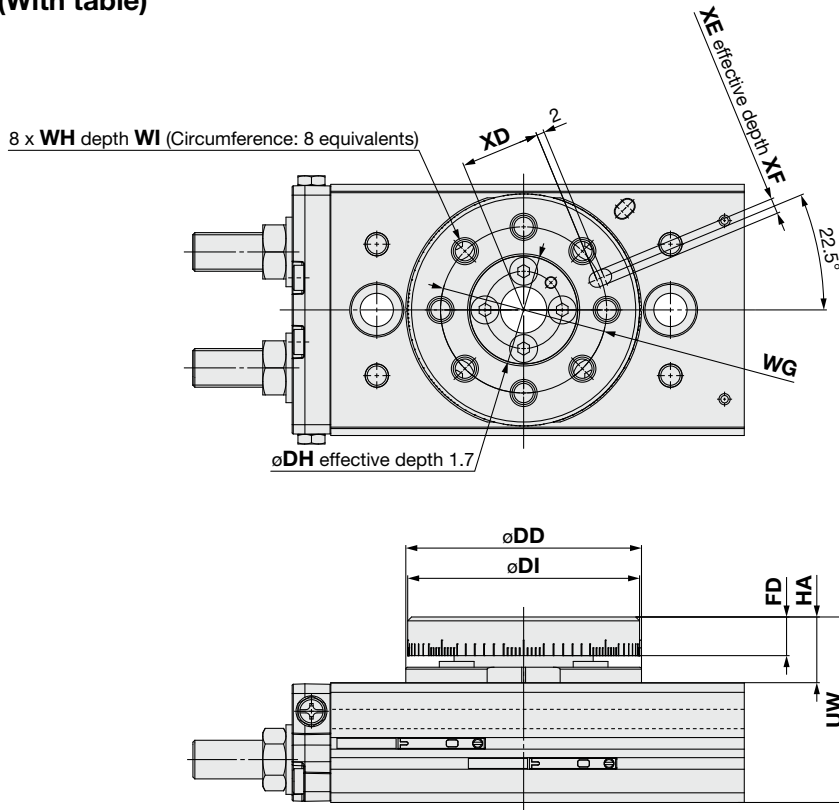
Two units are required for each product.

Table Unit for the Basic Type

Size	Part no.	Contents
		Description (Qty.)
10	P891010-51	⑰Table (1) ⑱Parallel pin (1) ⑳Hexagon socket head cap screw (4)
20	P891020-51	
30	P891030-51	
50	P891040-51	

Dimensions: Basic Type/High-Precision Type, Sizes **10, 20, 30, 50**

MSQ□□□T (With table)



[mm]

Size	DH*1	DI*1	FD	HA	UW	WG	WH	WI	XD	XE	XF
10	20H9	45h9	8	13	42.5	32	M5 x 0.8	8	15	3H9	3.5
20	28H9	60h9	10	17	48	43	M6 x 1	10	20.5	4H9	4.5
30	32H9	65h9	10	17	55	48	M6 x 1	10	23	4H9	4.5
50	35H9	75h9	12.5	20	63	55	M8 x 1.25	12.5	26.5	5H9	5.5

*1 The high-precision type has a tolerance of h8 or H8.

MSQ Series / With Cushion Pad/Bumper/Internal Shock Absorber Made to Order

Please contact SMC for detailed dimensions, specifications, and delivery times.



1 Interchangeable Mounting Type

Symbol

-A

Interchangeable mounting with the existing MSQB basic type/MSQA high-precision type
Cannot be combined with the MSQ□□□T with a table.

How to Order

Standard model no.

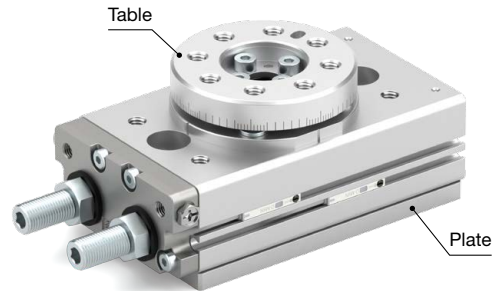
-A

● Made to order

A Interchangeable mounting type

- * The table and plate are assembled before shipment.
 - * The table and plate can be ordered separately.
- For details, refer to the tables below.

Basic type/ MSQ



Table

Plate

Part Numbers of Interchangeable Parts

Table Unit for the Basic Type

Size	Part no.	Contents
		Description (Qty.)
10	P891010-51	
20	P891020-51	· Table (1)
30	P891030-51	· Parallel pin (1)
50	P891040-51	· Hexagon socket head cap screw (4)

- * The table of the high-precision type is press-fitted into the product body and therefore cannot be ordered separately.
- * While the table of the basic type can be mounted to the high-precision type, note that the deflection accuracy values shown on page 8 will not apply.

High-precision type/ MSQG



Plate

Plate Unit

Size	Part no.	Contents
		Description (Qty.)
10	P891010-52	
20	P891020-52	· Plate (1)
30	P891030-52	· Cross recessed head machine screw for precision instruments (2)
50	P891040-52	

⚠ Caution

- To position the product, use the knock pin holes on the body instead of the through holes that are empty in the plate.
- * Refer to page 26 for the tightening torque of the interchangeable parts.

Weight

For the interchangeable mounting type, add the additional weight in the table below to the basic type/high-precision type weight (page 6).

[g]

Size	10	20	30	50
Basic type	70	160	120	220
High-precision type	90	225	200	320

Changes

As the table has been standardized, the MSQ basic type made to order specifications have been changed as follows.

Before Change

Symbol	Description
-A	With interchangeable table and plate
-B	With interchangeable table
-C	With interchangeable plate



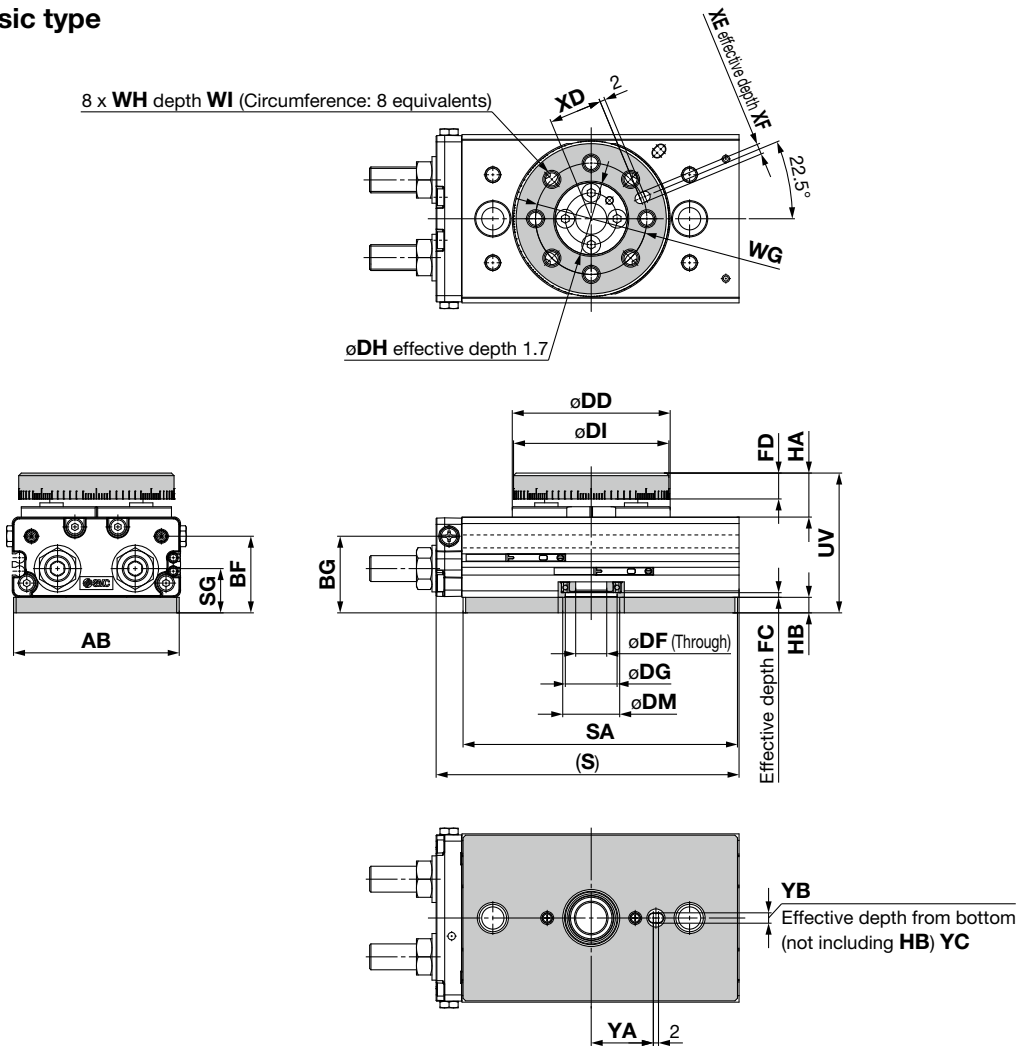
After Change

Symbol	Description
-A	Interchangeable mounting type

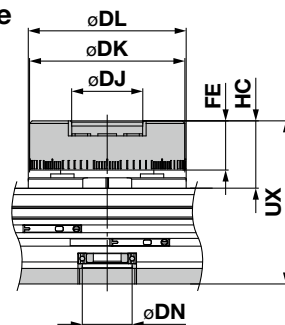
- “-B: with interchangeable table” and “-C: with interchangeable plate” are to be discontinued.
 - If a type with an interchangeable table is required, select “T: with table” on the “How to Order” page for the basic type on page 5.
 - If a type with an interchangeable plate is required, order the plate unit above separately.
- There are no changes to other specifications or dimensions.
For details on the model before changes, refer to page 29.

Dimensions * Dimensions other than those shown below are the same as those of the basic type and the high-precision type. Refer to page 13.

Basic type



High-precision type



	[mm]						
Size	DJ	DK	DL	DN	FE	HC	UX
10	20H8	45h8	46h8	12H8	13.5	18.5	52.5
20	28H8	60h8	61h8	20H8	19	26	63
30	32H8	65h8	67h8	20H8	20	27	67
50	35H8	75h8	77h8	21H8	22.5	30	76

	[mm]												
Size	AB	BF	BG	DD	DF	DG	DH	DI	DM	FC	FD	HA	HB
10	49	26.7	26.7	46h9	7	12H9	20H9	45h9	14	1.3	8	13	4.5
20	64	29.6	29.6	61h9	12	20H9	28H9	60h9	22	1.3	10	17	6
30	69	32	33	67h9	13	20H9	32H9	65h9	22	2.3	10	17	2
50	79	38	38	77h9	14	21H9	35H9	75h9	23	2.7	12.5	20	3

	[mm]												
Size	S	SA	SG	UV	WG	WH	WI	XD	XE	XF	YA	YB	YC
10	92	83	14.3	47	32	M5 x 0.8	8	15	3H9	3.5	19	3H9	3.5
20	117	106	17.1	54	43	M6 x 1	10	20.5	4H9	4.5	24	4H9	4.5
30	127	114	15.8	57	48	M6 x 1	10	23	4H9	4.5	28	4H9	4.5
50	152	139	20.5	66	55	M8 x 1.25	12.5	26.5	5H9	5.5	33	5H9	5.5

Rotary Table/Rack & Pinion Type With External Shock Absorber

MSQ Series

Size: 10, 20, 30, 50

How to Order

Basic type MSQ 10 L 2 - M9BW [] [] - []

High-precision type MSQG 10 L 2 - M9BW [] [] - []

Size

10
20
30
50

Shock absorber type

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

Port location/Rotation

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

Refer to the table to the right.

Auto switch

Nil	Without auto switch (Built-in magnet)
-----	---------------------------------------

* For applicable auto switches, refer to the table below.

Number of auto switches

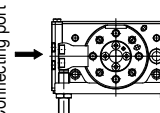
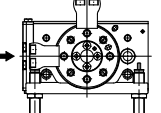
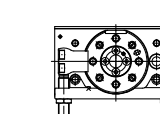
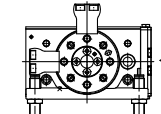
Nil	2
S	1
n	n

Port type

End port type		Size
Nil	M5	10, 20
Nil	Rc1/8	30, 50
-XF	G1/8	
-XN	NPT1/8	
-XT	NPTF1/8	

* Side ports are all M5.
For details, refer to the specifications on page 18.

Port location/Rotation

		Rotation	
		180°	90°
Connecting port position	Standard type	2: Standard type, 180° 	3: Standard type, 90° 
	Symmetric type	4: Symmetric type, 180° 	5: Symmetric type, 90° 

Applicable Auto Switches/Refer to the Web Catalog for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length [m]					Pre-wired connector	Applicable load	
					DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)				
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC	
				3-wire (PNP)					●	●	●	○				
				2-wire	12 V				●	●	●	○				
				3-wire (NPN)	5 V, 12 V				●	●	●	○				
				3-wire (PNP)					●	●	●	○				
	Diagnostic indication (2-color indicator)			2-wire	12 V				●	●	●	○				
				3-wire (NPN)	5 V, 12 V				○	○	●	○				
				3-wire (PNP)					○	○	●	○				
				2-wire	12 V				○	○	●	○				
				Water resistant (2-color indicator)	3-wire (NPN)				5 V, 12 V	○	○	●				○
3-wire (PNP)	○	○	●	○												
2-wire	12 V	○	○	●	○											
Reed auto switch	—	Grommet	Yes	3-wire (NPN equiv.)	—	5 V	—	A96V	A96	●	●	●	●	○	IC circuit	—
				2-wire	24 V	12 V	100 V	A93V	A93	●	●	●	●	○*2	—	Relay, PLC
			No	2-wire	24 V	12 V	100 V or less	A90V	A90	●	●	●	●	○*2	IC circuit	Relay, PLC

*1 Although it is possible to mount water-resistant type auto switches, note that the rotary actuator itself is not of water-resistant construction.

*2 The load voltage used is 24 VDC.

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

* Auto switches marked with a "○" are produced upon receipt of order.

* For details on auto switches with pre-wired connectors, refer to the Web Catalog.

* Auto switches are shipped together with the product but do not come assembled.

Rotary Table/Rack & Pinion Type **MSQ Series** With External Shock Absorber



Specifications

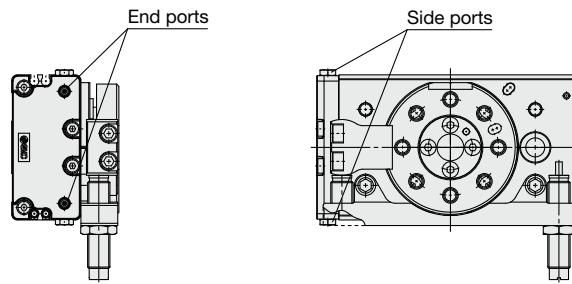
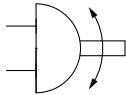
Size		10	20	30	50
Fluid		Air (Non-lube)			
Max. operating pressure		1 MPa			
Min. operating pressure		0.2 MPa			
Ambient and fluid temperatures		0 to 60°C(No freezing)			
Cushion		Shock absorber			
Shock absorber type	For low energy	RB0805	RB1006	RB1411	
	For high energy	RB0806	RB1007	RB1412	
Rotation		90°, 180°			
Angle adjustment range*1		Each rotation end ±3°			
Cylinder bore size		ø13	ø16	ø20	ø22
Port size	End port	M5 x 0.8		Rc1/8, G1/8, NPT1/8, NPTF1/8	
	Side port	M5 x 0.8			

*1 For details, refer to page 19.

The service life of the shock absorber may be different from the rotary table body depending on the operating conditions.

Refer to Specific Product Precautions for the suitable replacement period.

Symbol



Made to Order
(For details, refer to pages 22 to 24.)

Symbol	Specifications
-A	Interchangeable mounting type
-X232	With external stopper

Refer to page 25 for models with auto switches.

· Auto Switch Proper Mounting Position
(at Rotation End Detection)

Refer to pages 7 and 8 for the allowable load, table displacement, deflection accuracy, and working principle.

Allowable Kinetic Energy and Rotation Time Adjustment Range

Size	Allowable kinetic energy [J]*1		Adjustable range of rotation time safe in operation [s/90°]
	Shock absorber for low energy	Shock absorber for high energy	
10	0.161	0.231	0.2 to 2.0*2, *3
20	0.574	1.060	
30	0.805	1.210	
50	1.310	1.820	

*1 If operated so that the kinetic energy exceeds the allowable value, damage to the internal parts or product failure may result. Please pay special attention to the kinetic energy levels when designing and during operation to avoid exceeding the allowable limit.

*2 Values above indicate the time between the start of rotation and the deceleration caused by the shock absorber. Although the time required by the rotary table to reach the rotation end after deceleration differs depending on the operating conditions (inertial moment of the load, rotation speed, and operating pressure), approximately 0.2 to 2 seconds are required. The range of angles within which the shock absorber operates is between the rotation end and the values shown below.

Size	10	20	30	50
For low energy	7.3°	7.1°	6.4°	9.6°
For high energy	8.8°	8.3°	7.5°	10.5°

*3 When using the high-precision type at a speed below 1.0 s/90°, use a pressure of 0.3 MPa or more.

Weight

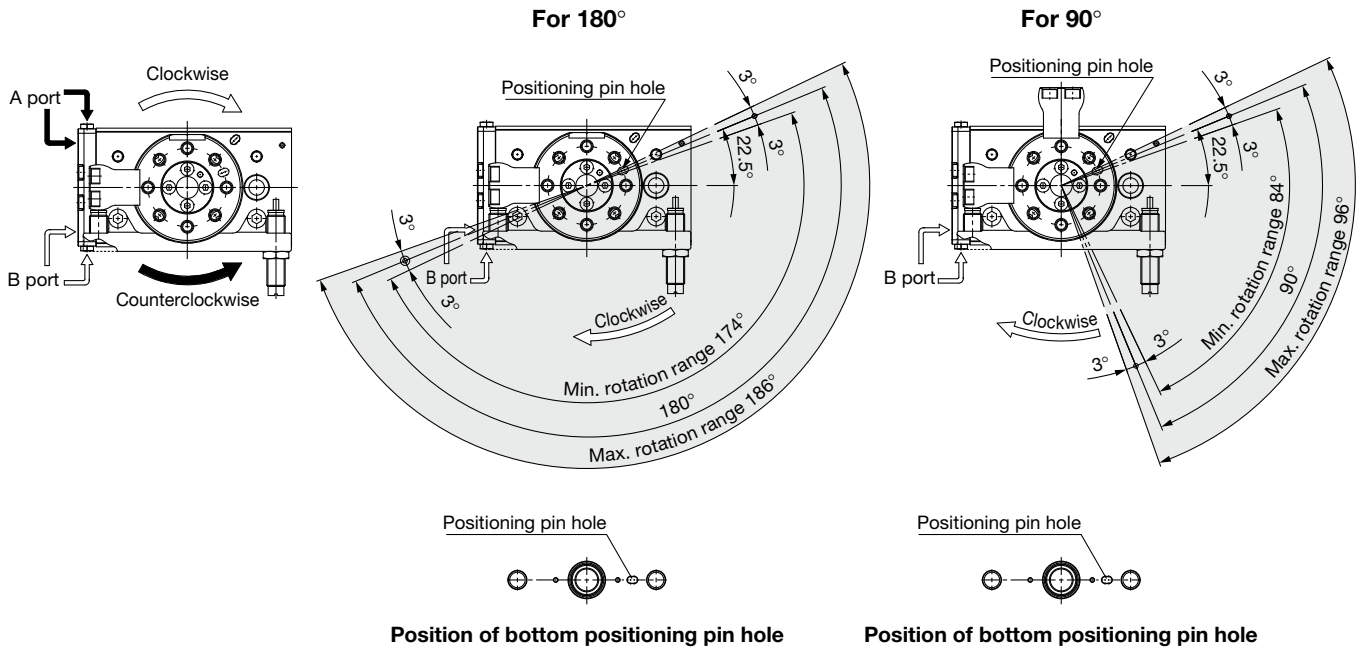
Size		10	20	30	50
Basic type	90°	480	910	1,205	2,000
	180°	455	860	1,145	1,880
High-precision type	90°	495	905	1,200	2,000
	180°	470	855	1,145	1,880

* The values above do not include the auto switch weight.

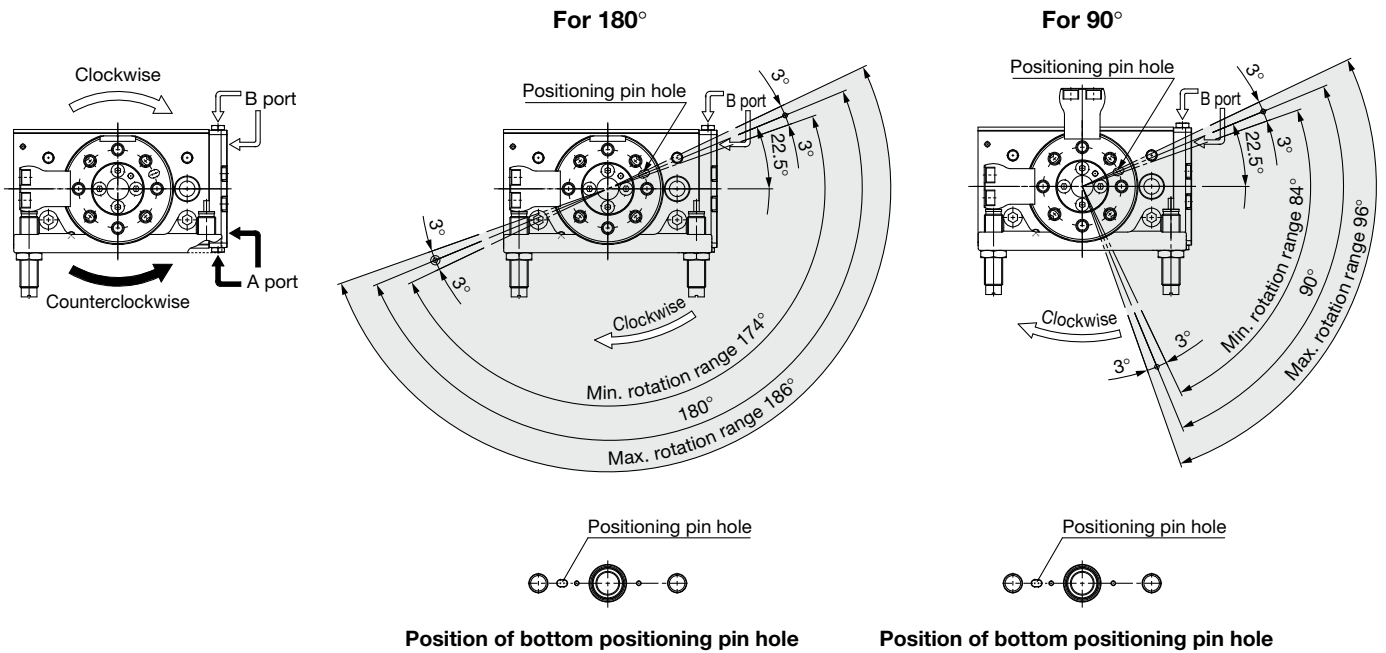
Rotation Direction and Rotating Angle

- The rotary table turns in the counterclockwise direction when the A port is pressurized, and in the clockwise direction when the B port is pressurized.
- By adjusting the shock absorber, the rotation end can be set within the range shown in the drawing.

Standard type



Symmetric type



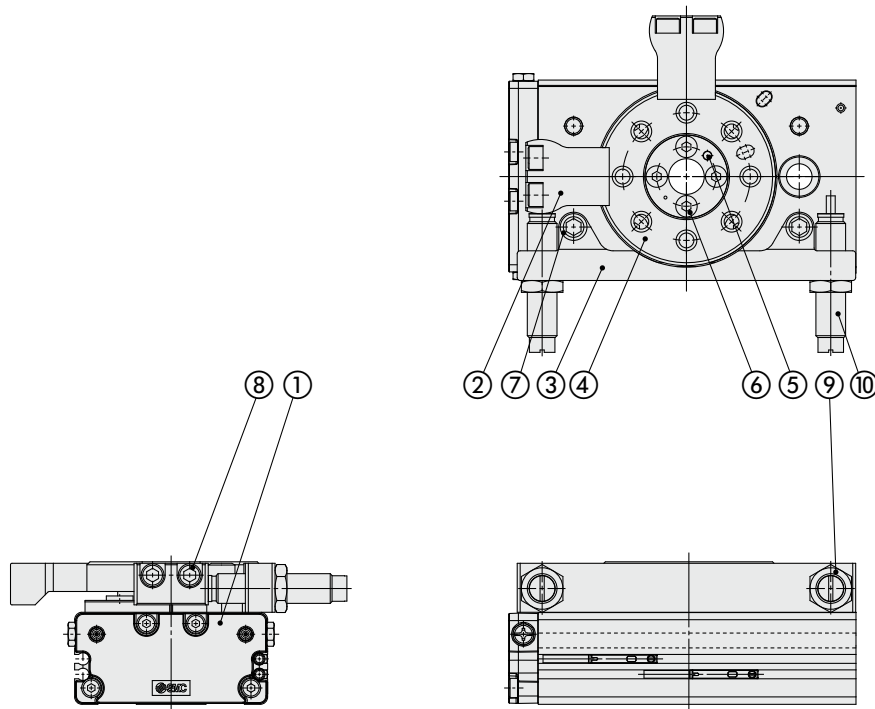
With external shock absorber

Size	Adjustment angle per rotation of angle adjustment screw
10	1.5°
20	1.2°
30	1.1°
50	1.3°

The rotation adjustment range for the external shock absorber is $\pm 3^\circ$ at each rotation end. When adjusted beyond this range, note that the shock absorber's durability may decrease.

- * · The drawings show the rotation range for the top positioning pin hole of the table.
- The pin hole position in the drawing shows the counterclockwise rotation end when the shock absorbers are tightened equally and the rotation is adjusted to 180° and 90°.

Construction



Component Parts

No.	Description
1	End cover
2	Arm
3	Shock absorber holder
4	Table for external shock absorber
5	Parallel pin
6	Hexagon socket head cap screw
7	Hexagon socket head cap screw
8	Hexagon socket head cap screw
9	Hexagon nut
10	Shock absorber

* The component parts cannot be shipped individually.

Replacement Parts/Seal Kit

Size	Part no.	Contents
		Description (Qty.)
10	P891010-10	
20	P891020-10	⑧ Gasket (1)*1
30	P891030-10	⑩ Wear ring (4)*1
50	P891040-10	⑪ Piston seal (4)*1

A grease pack (10 g) is included. Order with the following part number when only the grease pack is needed.

Grease pack part number: GR-L-010 (10 g)

*1 Parts ⑧, ⑩, and ⑪ are the component part numbers shown in the construction on page 11.

* Not applicable, as the high-precision type cannot be disassembled

Shock Absorber (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

MSQ Series / With External Shock Absorber Made to Order

Please contact SMC for detailed dimensions, specifications, and delivery times.



Symbol

1 Interchangeable Mounting Type

-A

Interchangeable mounting with the existing MSQB basic type/MSQA high-precision type with an external shock absorber

How to Order

Standard model no. **-A**

-A

● **Made to order**

A Interchangeable mounting type

* The plate is assembled before shipment.

* The plate can be ordered separately.
For details, refer to the table below.

Basic type/ MSQ□_H



Plate

Part Numbers of Interchangeable Parts

Plate Unit

Size	Part no.	Contents
		Description (Qty.)
10	P891010-52	· Plate (1) · Cross recessed head machine screw for precision instruments (2)
20	P891020-52	
30	P891030-52	
50	P891040-52	

High-precision type/ MSQ□_H



Plate

Weight

For the interchangeable mounting type, add the additional weight in the table below to the basic type/high-precision type weight (page 18).

[g]

Size	10	20	30	50
Basic type	40	100	40	90
High-precision type	60	160	120	180

⚠ Caution

- To position the product, use the knock pin holes on the body instead of the through holes that are empty in the plate.
- * Refer to page 26 for the tightening torque of the interchangeable parts.

■ Changes

The basic type with an external shock absorber made to order specifications have been changed as follows.

Before Change

Symbol	Description
-C	With interchangeable plate



After Change

Symbol	Description
-A	Interchangeable mounting type

“-C: with interchangeable plate” is to be discontinued.

If a type with an interchangeable plate is required, select “-A: interchangeable mounting type”.

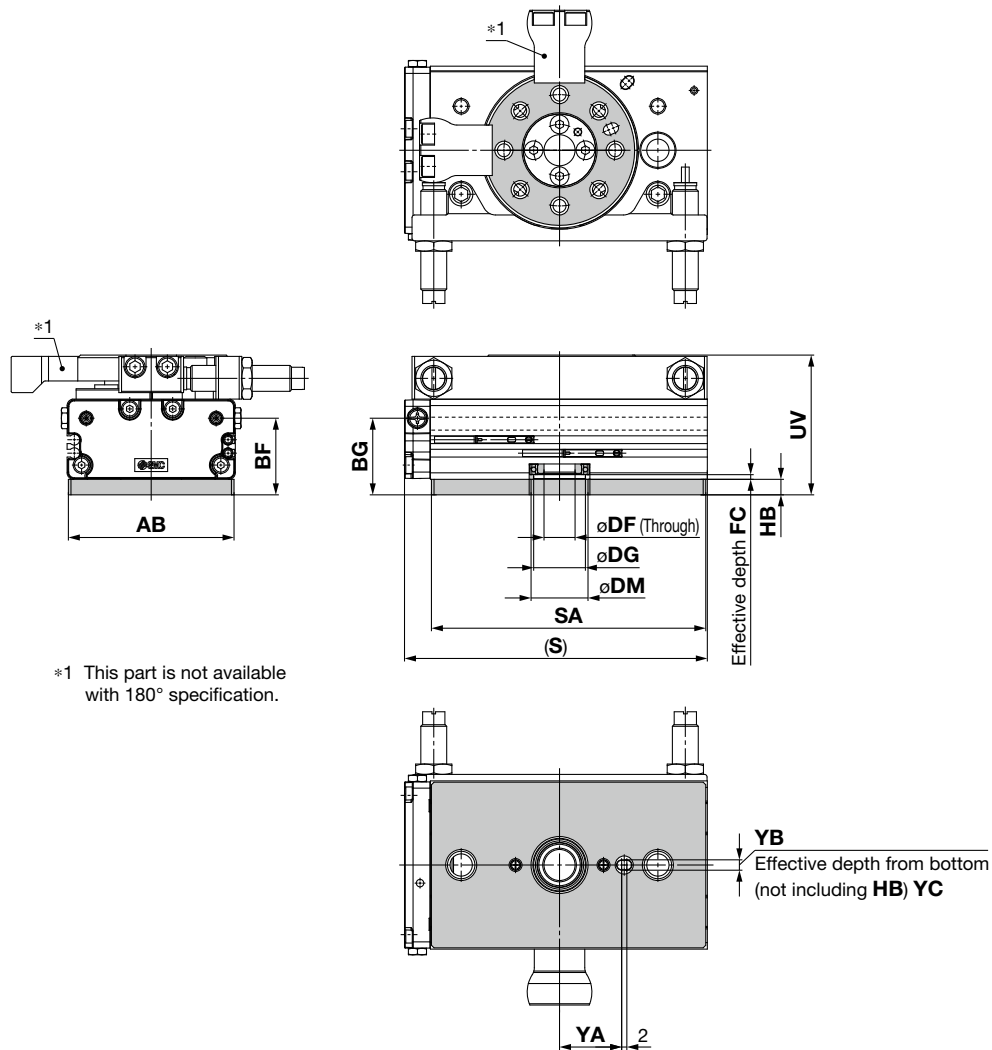
There are no changes to other specifications or dimensions.

For details on the model before changes, refer to page 30.

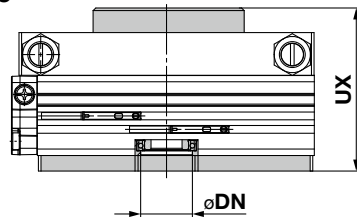
MSQ Series

Dimensions * Dimensions other than those shown below are the same as those of the basic type and the high-precision type. Refer to page 21.

Basic type



High-precision type



Size	DN	UX
10	12H8	52.5
20	20H8	63
30	20H8	67
50	21H8	76

Size	AB	BF	BG	DF	DG	DM	FC	HB	S	SA	UV	YA	YB	YC
10	49	26.7	26.7	7	12H9	14	1.3	4.5	92	83	47	19	3H9	3.5
20	64	29.6	29.6	12	20H9	22	1.3	6	117	106	54	24	4H9	4.5
30	69	32	33	13	20H9	22	2.3	2	127	114	57	28	4H9	4.5
50	79	38	38	14	21H9	23	2.7	3	152	139	66	33	5H9	5.5

2 With External Stopper

By reducing the effective stroke of the shock absorber, the absorption time will be reduced, enabling the cycle time to be improved.

How to Order

MSQ G 10 L 2 - M9BW - A - X232

Specification

Nil	Basic type
G	High-precision type

Size

10
20
30
50

Shock absorber type

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

Port location/Rotation

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

Auto switch

Nil	Without auto switch (Built-in magnet)
-----	---------------------------------------

* For applicable auto switches, refer to page 17.

With external stopper

Interchangeable mounting type

Nil	None
A	Interchangeable mounting type

Port type

End port type	Size
Nil	M5
Nil	Rc1/8
-XF	G1/8
-XN	NPT1/8
-XT	NPTF1/8

* Side ports are all M5. For details, refer to the specifications on page 18.

Number of auto switches

Nil	2
S	1
n	n

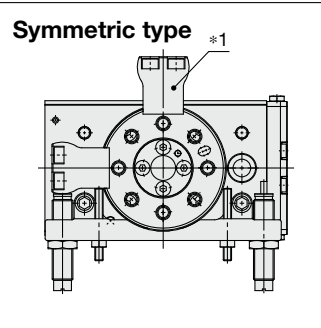
Specifications

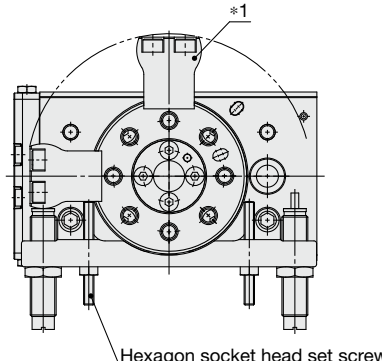
Size	Allowable kinetic energy [J]	
	Shock absorber for low energy	Shock absorber for high energy
10	0.161	0.231
20	0.574	1.060
30	0.805	1.210
50	1.310	1.820

- * The allowable kinetic energy indicated in the table is the value for the case where the full stroke of the shock absorber is used. Note that if the effective stroke of the shock absorber is shortened using the hexagon socket head set screw, the allowable energy will be lower than the value in the table.
- * If you wish to adjust the stroke of the shock absorber in order to reduce the cycle time, first set the shock absorber to the position where the shock absorber is to be used in the full stroke, then while observing the operating condition of the product, gradually adjust the stroke in the direction such that the effective stroke decreases.
- * The shock absorber is a consumable part. If there are signs, such as the bounding of the shock absorber at the motion end point, that the energy absorption performance of the shock absorber has deteriorated, readjust the position of the shock absorber so as to increase its effective stroke. If bounding still occurs even when the full stroke is used, it is necessary to replace the shock absorber with a new one.

Dimensions

Symmetric type

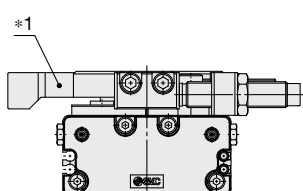




Hexagon socket head set screw

Effective stroke

Shock absorber



EG

NG

Size	EG	NG
10	47.4	4.5
20	62	4.5
30	67.6	4.8
50	80	7

[mm]

*1 This part is not available with 180° specification.

* Dimensions other than the above are the same as standard.

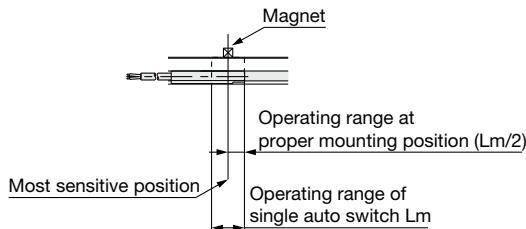
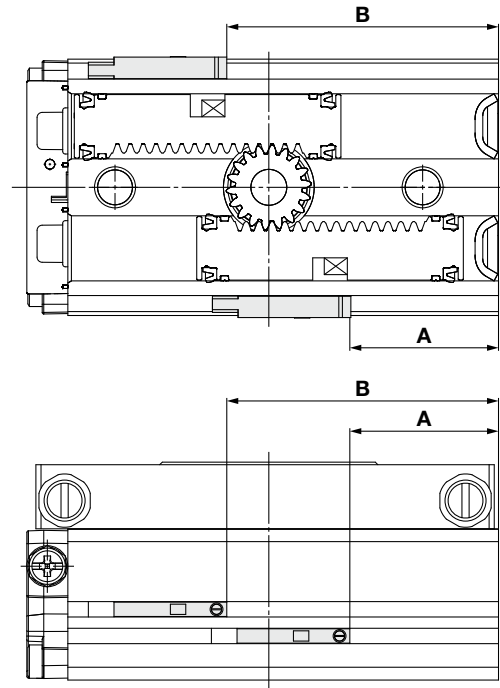
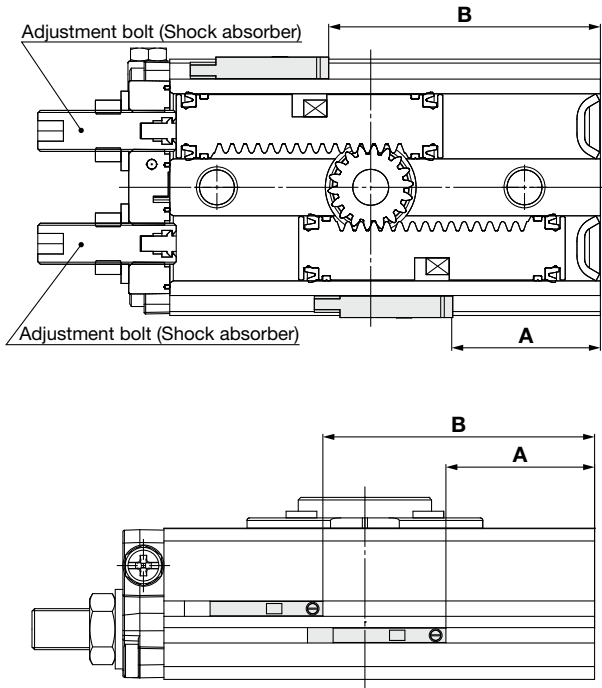
MSQ Series Auto Switch Mounting

Auto Switch Proper Mounting Position (at Rotation End Detection)

Basic type, High-precision type

With cushion pad/bumper/internal shock absorber

With external shock absorber



[mm]

Size	Rotating angle	Solid state auto switch D-M9□(V), D-M9□W(V)				Reed auto switch D-A9□, D-A9□V			
		A	B	Operating angle θ m	Hysteresis angle	A	B	Operating angle θ m	Hysteresis angle
10	180°	26 to 29	49 to 51	27°	3°	22 to 25	45 to 47	50°	4°
20	180°	34 to 37	66 to 68	21°	2°	30 to 33	62 to 64	42°	4°
30	180°	39 to 41	70 to 73	24°	2°	35 to 37	66 to 69	44°	4°
50	180°	46 to 48	88 to 91	19°	2°	42 to 44	84 to 87	31°	3°

Operating angle θ m: Value of the operating range Lm of a single auto switch converted to an axial rotating angle

Hysteresis angle : Value of auto switch hysteresis converted to an angle

* : Since the values in the table above are provided as a guideline only, they cannot be guaranteed. Adjust the auto switch after confirming the operating conditions in the actual setting.

· The values in the table above are the positions when the adjustment bolts (shock absorbers) are tightened in the same amount and adjusted to 180°.

· For the tightening torque of the set screw of the auto switch, refer to the operation manual of each auto switch.



MSQ Series Specific Product Precautions 1

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For rotary actuator and auto switch precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website.

Speed Adjustment

Warning

1. To make a speed adjustment, gradually adjust starting from the low-speed end.

If the speed adjustment is performed from the high-speed end, damage to the product may result. This could pose a hazard to humans or damage the machinery and equipment.

Caution

1. When operating at a high speed with a large load, a large amount of energy is applied to the actuator, which can result in damage. Calculate the appropriate operation time by referencing the model selection procedure in the Web Catalog.
2. Do not machine the fixed orifice of the port to enlarge its size. If the fixed orifice size is enlarged, the actuator operating speed and impact force will increase, resulting in damage.
3. When using the product at the max. speed (around 0.2 s/90°), set the supply pressure to 0.3 MPa or more.
4. When using the high-precision type at a speed below 1.0 s/90°, use a supply pressure of 0.3 MPa or more.

Lubrication

Caution

1. Use the product without lubrication.

This product is lubricated with grease at the factory, and further lubrication will result in a failure to meet the product's specifications.

Effective Torque

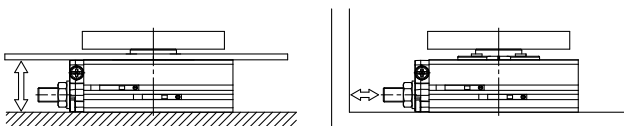
Caution

1. The effective torque at the end of the rotation is half the effective torque generated during rotation. This is because one of the pistons of the double rack mechanism determines the angle by coming into contact with an adjustment bolt or shock absorber at the rotating end. (Excludes the external shock absorber option)

Rotating Angle Adjustment

Caution

1. As a standard feature, the rotary table is equipped with an angle adjustment mechanism (adjustment bolt or shock absorber) that can be used to adjust the rotating angle. Refer to the following pages for the rotation direction and rotating angle.
MSQ10 to 50 → p. 9
With cushion pad/bumper/internal shock absorber → p. 10
With external shock absorber → p. 19
2. It might be difficult to adjust the angle using a tool due to the installation location of the product.
If a special tool is required, refer to the operation manual.



Rotating Angle Adjustment

Caution

3. Consider the full compression force when adjusting the rotating angle with bumper specifications.

You can use the bumper without fully compressing it, but if you need accuracy at the rotating end, consider the following methods:
1. Use at a min. operating pressure of 0.3 MPa or higher.
2. Use an external stopper (shock absorber) separate from this product.

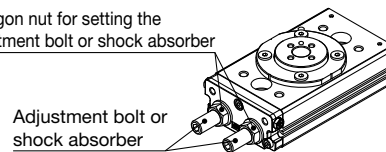
The table below shows the angle at which the piston hits the bumper and compresses it completely. Note that the angle should only be used as a guide.

Size	Angle
10	16°
20	12°
30	12°
50	15°

Tightening Torque

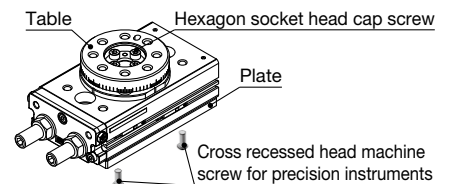
1. Tighten the adjustment bolt or the hexagon nut for setting the shock absorber with the tightening torque shown in the table below.

Hexagon nut for setting the adjustment bolt or shock absorber



Size	Proper tightening torque [N·m]
10	1.00 to 1.67
20	1.88 to 3.14
30	
50	6.48 to 10.8

2. Tighten the screw for setting the table and plate with the tightening torque shown in the table below.



Size	Proper tightening torque [N·m]	
	Screw for table setting	Screw for plate setting
10	1.1 to 3.1	0.4 to 0.5
20	2.9 to 4.9	
30	4.9 to 6.9	
50	7.4 to 9.8	

* Refer to the operation manual for assembly procedures.

Kinetic Energy Absorption

Caution

1. This product has 3 types of cushion: a cushion pad, a bumper, and a shock absorber. They are not meant to achieve a smooth stopping operation but to absorb the load's kinetic energy and prevent damage to the product. If the load has to be stopped smoothly, a shock absorber of the optimum size meeting the operating requirements must be installed externally.



MSQ Series

Specific Product Precautions 2

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For rotary actuator and auto switch precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website.

Mounting

⚠ Caution

1. When mounting the body, use screws of the appropriate length.

• Basic type/High-precision type

1. Top mounting (Through hole)

Size	L1		L2	
	Screw	Length [mm]	Pin [mm]	Effective depth [mm]
10	M6 x 1	23.5	ø3	3.5
20	M8 x 1.25	22.5	ø4	4.5
30	M8 x 1.25	29.5	ø4	4.5
50	M10 x 1.5	32.5	ø5	5.5

2. Bottom mounting (Body tapped)

Size	L2		L3	
	Pin [mm]	Effective depth [mm]	Screw	Max. screw-in depth [mm]
10	ø3	3.5	M8 x 1.25	12
20	ø4	4.5	M10 x 1.5	15
30	ø4	4.5	M10 x 1.5	15
50	ø5	5.5	M12 x 1.75	18

3. Top mounting (Body tapped)

Size	L4		L5	L6
	Screw	Max. screw-in depth [mm]	Height [mm]	Counterbore depth [mm]
10	M5 x 0.8	6	6	3.9
20	M6 x 1	6	8	4.5
30	M6 x 1	6	8	4.5
50	M8 x 1.25	8	8.5	5.6

• Interchangeable mounting type

4. Top mounting (Through hole)

Size	L7		L8		L10
	Screw	Length [mm]	Pin [mm]	Depth*1 [mm]	Plate thickness [mm]
10	M6 x 1	28	ø3	8	4.5
20	M8 x 1.25	28.5	ø4	10.5	6
30	M8 x 1.25	31.5	ø4	6.5	2
50	M10 x 1.5	35.5	ø5	8.5	3

*1 The effective depth of the pin is the depth found by subtracting the plate thickness (L10) from the L8 depth.

* Refer to page 26 for the tightening torque of the interchangeable parts.

5. Bottom mounting (Body tapped)

Size	L8		L9		L10
	Pin [mm]	Depth*1 [mm]	Screw	Max. screw-in depth [mm]	Plate thickness [mm]
10	ø3	8	M8 x 1.25	16.5	4.5
20	ø4	10.5	M10 x 1.5	21	6
30	ø4	6.5	M10 x 1.5	17	2
50	ø5	8.5	M12 x 1.75	21	3

*1 The effective depth of the pin is the depth found by subtracting the plate thickness (L10) from the L8 depth.

* Refer to page 26 for the tightening torque of the interchangeable parts.



MSQ Series

Specific Product Precautions 3

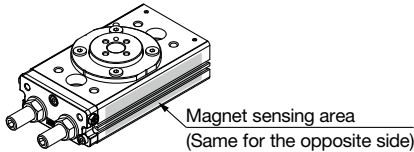
Be sure to read this before handling the products. Refer to the back cover for safety instructions. For rotary actuator and auto switch precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website.

Mounting

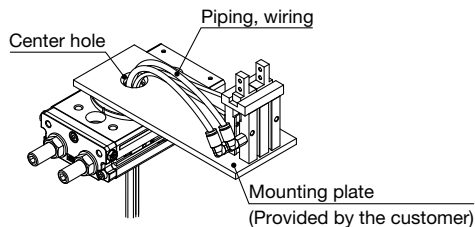
⚠ Caution

1. Keep away from objects which are influenced by magnets.

Since this product has a built-in magnet, do not allow close contact with magnetic disks, cards, or tapes. Data may be erased.



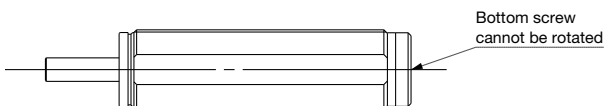
2. When using the center hole for piping, take care that the tube O.D., auto switch lead wire, etc., do not contact the mounting plate.



Shock Absorber

⚠ Caution

1. Never rotate the bottom screw of the shock absorber. (It is not an adjustment screw.) Failure to do so may result in oil leakage.



Service Life and Replacement Period of Shock Absorber

⚠ Caution

1. Shock absorbers are consumable parts.

When a decrease in energy absorption capacity is noticed, it must be replaced.

Allowable operation time under the specifications set in this catalog is 1 million.

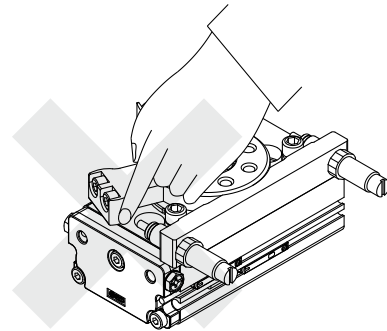
* Specified service life (suitable replacement period) is the value at room temperature (20 to 25°C). The period may vary depending on the temperature and other conditions. In some cases, the absorber may need to be replaced before the allowable operation time above.

External Shock Absorber

⚠ Warning

1. Never place your hands or fingers between the arm and the shock absorber.

Be very careful to prevent your hands or fingers from getting caught in the gap between the arm and the shock absorber when air is applied.



⚠ Caution

Abrasion powder may be generated from the part where the shock absorber collides with the arm. Do not use the product in a place where abrasion powder may affect adversely.

Maintenance and Inspection

The high-precision type cannot be disassembled, as some of the components are press-fitted into the product body.

MSQ Series / With Cushion Pad/Bumper/Internal Shock Absorber

Made to Order



Please contact SMC for detailed dimensions, specifications, and delivery times.

1 With Interchangeable Table and Plate

Symbol
-A, -B, -C

How to Order

Standard model no. - **A**

Made to order

A	With interchangeable table and plate	* The interchangeable table and plate can be ordered separately. For details, refer to the tables below.
B	With interchangeable table	
C	With interchangeable plate	* The interchangeable table and plate are assembled before shipment.

Part Numbers of Interchangeable Parts

Interchangeable A Unit (With Interchangeable Table and Plate)

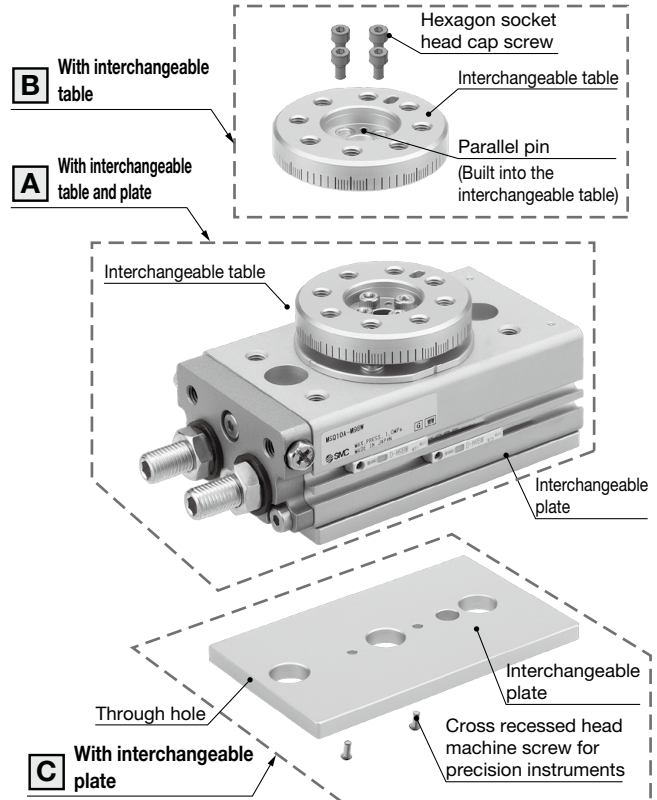
Size	Part no.	Contents
		Description (Qty.)
10	P891010-50	· Interchangeable table (1) · Parallel pin (1)
20	P891020-50	· Hexagon socket head cap screw (4)
30	P891030-50	· Interchangeable plate (1) · Cross recessed head machine screw for precision instruments (2)
50	P891040-50	

Interchangeable B Unit (With Interchangeable Table)

Size	Part no.	Contents
		Description (Qty.)
10	P891010-51	· Interchangeable table (1)
20	P891020-51	· Parallel pin (1)
30	P891030-51	· Hexagon socket head cap screw (4)
50	P891040-51	

Interchangeable C Unit (With Interchangeable Plate)

Size	Part no.	Contents
		Description (Qty.)
10	P891010-52	· Interchangeable plate (1)
20	P891020-52	· Cross recessed head machine screw for precision instruments (2)
30	P891030-52	
50	P891040-52	



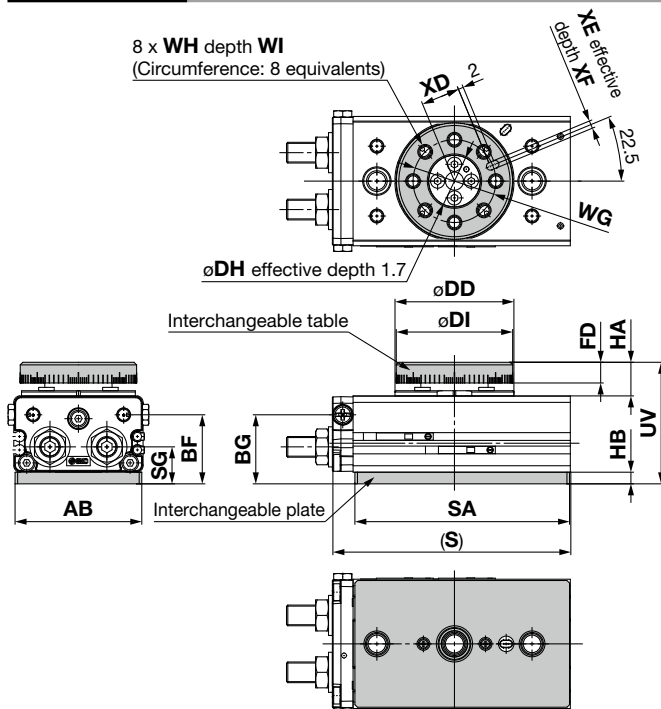
* To position the product, use the knock pin holes on the body instead of the through holes that are empty in the interchangeable plate.

* Refer to page 26 for the tightening torque of the interchangeable parts.

Dimensions

* Mounting diagram of the interchangeable table and plate

Dimensions other than those shown below are the same as those of the basic type. Refer to page 13.



Size	AB	SG	BF	BG	DD	DH	DI	FD	HA	HB
10	49	14.3	26.7	26.7	46h9	20H9	45h9	8	13	4.5
20	64	17.1	29.6	29.6	61h9	28H9	60h9	10	17	6
30	69	15.8	32	33	67h9	32H9	65h9	10	17	2
50	79	20.5	38	38	77h9	35H9	75h9	12.5	20	3

Size	S	SA	UV	WG	WH	WI	XD	XE	XF
10	92	83	47	32	M5 x 0.8	8	15	3H9	3.5
20	117	106	54	43	M6 x 1	10	20.5	4H9	4.5
30	127	114	57	48	M6 x 1	10	23	4H9	4.5
50	152	139	66	55	M8 x 1.25	12.5	26.5	5H9	5.5

MSQ Series / With External Shock Absorber Made to Order



Please contact SMC for detailed dimensions, specifications, and delivery times.

Symbol

-C

1 With Interchangeable Plate

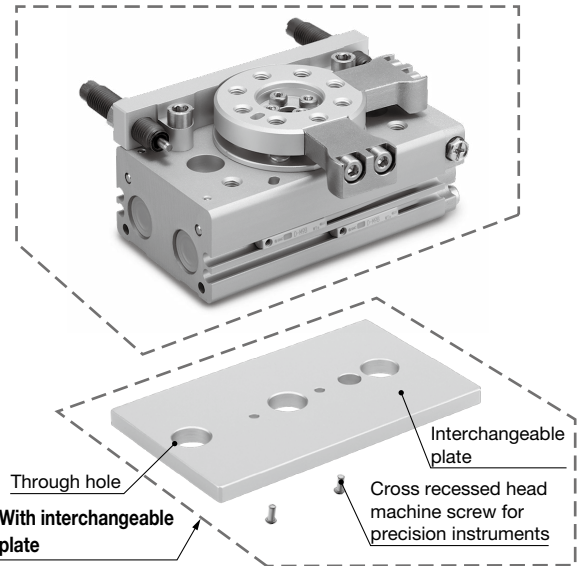
How to Order

Standard model no. **-C**

• **Made to order**

C With interchangeable plate

- * The interchangeable plate can be ordered separately. For details, refer to the table below.
- * The interchangeable plate is assembled before shipment.



Part Numbers of Interchangeable Parts Interchangeable C Unit (With Interchangeable Plate)

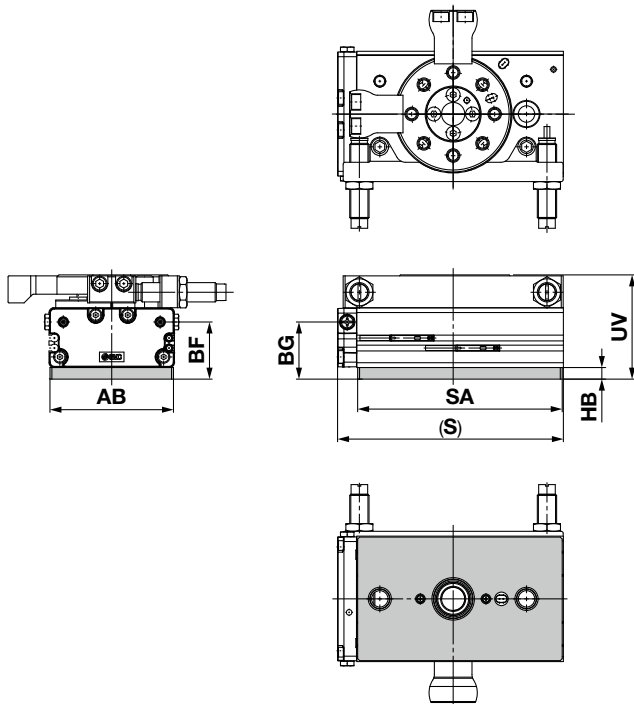
Size	Part no.	Contents
		Description (Qty.)
10	P891010-52	· Interchangeable table (1) · Cross recessed head machine screw for precision instruments (2)
20	P891020-52	
30	P891030-52	
50	P891040-52	

* Refer to page 26 for the tightening torque of the interchangeable parts.

* To position the product, use the knock pin holes on the body instead of the through holes that are empty in the interchangeable plate.

Dimensions


* Mounting diagram of the interchangeable plate
Dimensions other than those shown below are the same as those of the basic type. Refer to page 21.





Size	[mm]						
	AB	BF	BG	HB	S	SA	UV
10	49	26.7	26.7	4.5	92	83	47
20	64	29.6	29.6	6	117	106	54
30	69	32	33	2	127	114	57
50	79	38	38	3	152	139	66

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

 **Danger :** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

 **Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

 **Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

*1) ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots etc.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. SMC products cannot be used beyond their specifications. They are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not allowed.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, combustion equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

Caution

SMC develops, designs, and manufactures products to be used for automatic control equipment, and provides them for peaceful use in manufacturing industries.

Use in non-manufacturing industries is not allowed.

Products SMC manufactures and sells cannot be used for the purpose of transactions or certification specified in the Measurement Act of each country. The new Measurement Act prohibits use of any unit other than SI units in Japan.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Suction cups (Vacuum pads) are excluded from this 1 year warranty.**

A suction cup (vacuum pad) is a consumable part, so it is warranted for a year after it is delivered.


Also, even within the warranty period, the wear of a product due to the use of the suction cup (vacuum pad) or failure due to the deterioration of rubber material are not allowed by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Revision History

Edition B	* A bumper (cushion) has been added.
Edition C	* An external shock absorber option has been added.
Edition D	* A high-precision type has been added. * The number of pages has been decreased from 36 to 32.

 **Safety Instructions** Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.