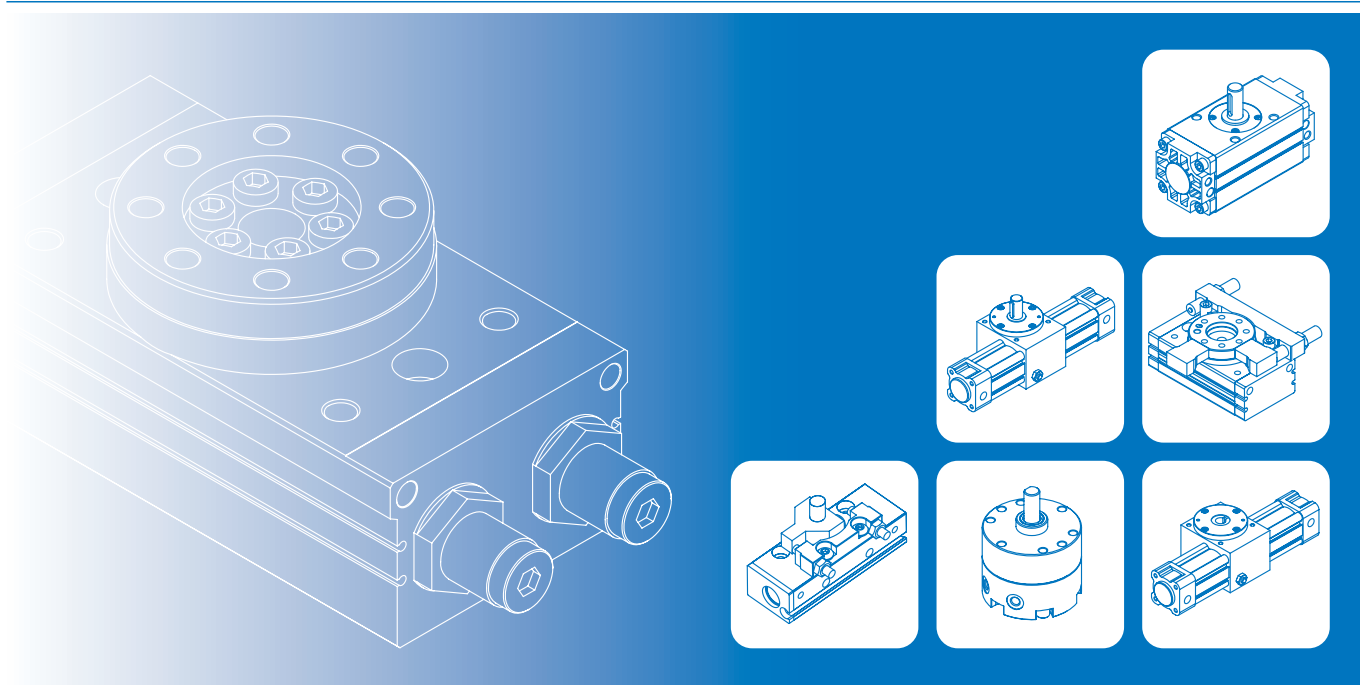


ROTARY ACTUATOR



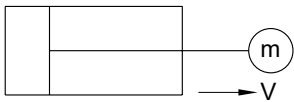
	Moment of inertia	1-2
MCRA	ø63	1-4
MCRB	ø16~ø32	1-8
MCRJ-S	ø6, ø8	1-13
MCRC	20, 30	1-16
F MCRQ	ø12~ø40	1-22
MCRQ-S	ø16~ø25	1-29
MRT*	ø40~ø80 MRTH / MRTF	1-33

F Fast delivery

Our goal is to achieve 3-day lead time, if there is stock of component set. For more information, please go to our **MINDMAN website** (www.mindman.com.tw) and click on the "Component Set Inventory" button.

- The load will create inertial forces (kinetic energy) when moving the load with Rotary Actuator. In order to stop the moving load, it is necessary to use stopper or Shock Absorbers to absorb the kinetic energy of load.
- The moving load with actuator can be distinguished as following
 1. Linear motion (air cylinder), Fig.(1)
 2. Rotation motion (rotary actuator), Fig.(2)
- Calculate the kinetic energy by using the formula in FIG.

Linear motion

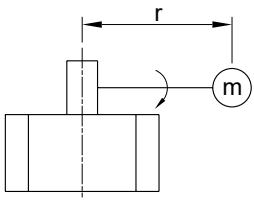


E : Kinetic energy
 m : Load mass
 V : Speed

$$E = \frac{1}{2} \cdot m \cdot V^2 \dots (1)$$

Fig. (1) Linear motion

Rotation motion



E : Kinetic energy
 I : Moment of inertia(= $m \cdot r^2$)
 ω : Speed
 m : Mass
 r : Radius of rotation

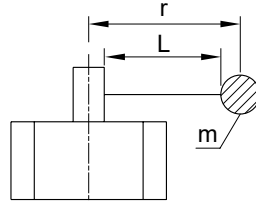
$$E = \frac{1}{2} \cdot I \cdot \omega^2 = \frac{1}{2} \cdot m \cdot r^2 \cdot \omega^2 \dots (2)$$

Fig. (2) Rotation motion

- For linear motion, if the velocity V of formula (1) is constant, the kinetic energy E and mass m is proportional; The rotation motion, formula (2) shows even the angular velocity ω and mass m is constant, kinetic energy E will also proportional with r^2 . Therefore, even the mass is small but the rotation radius r is large, when the moment of Inertia $I = m \cdot r^2$ is large, kinetic energy E will become larger, it will cause bearing damage or other accidents.
- Therefore when there is a rotation motion, the product selection should be based on moment of inertia instead of mass.

Moment of inertia

- Moment of inertia shows, it is not easy to rotate the stationary object; the same which means it is difficult to stop the rotating object.
- Rotary Actuators in the allowable kinetic energy has its limitations, it can be calculated moment of inertia to calculate minimum rotation of moment of inertia described as following.

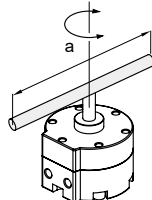


$I = m \cdot r^2$
 m : Mass
 r : Radius of rotation

Above figure represents the moment of inertia for the distance r from rotary shaft to mass m of the object. The formula for moment of Inertia is not the same if the shapes of the object are different. The following examples are the calculated on the basis of specific moment of inertia.

1. Thin shaft

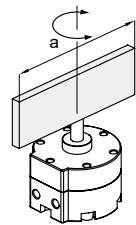
Position of rotational axis: Perpendicular to the shaft through the shaft through the center of gravity.



$I = m \cdot \frac{a^2}{12}$

2. Thin rectangular plate

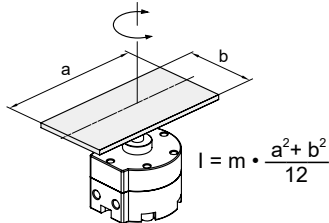
Position of rotational axis: Parallel to side b and through the center of gravity.



$I = m \cdot \frac{a^2}{12}$

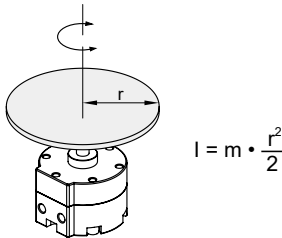
3. Thin rectangular plate (Including rectangular parallelepiped)

Position of rotational axis: Perpendicular to the plate through the center of gravity.



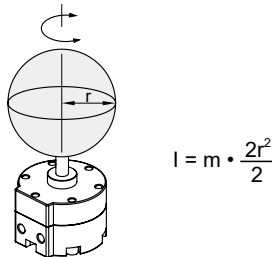
4. Round plate (Including column)

Position of rotational axis: Through the center axis.



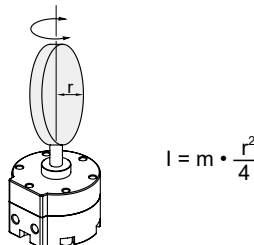
5. Solid sphere

Position of rotational axis: Through the center of diameter.

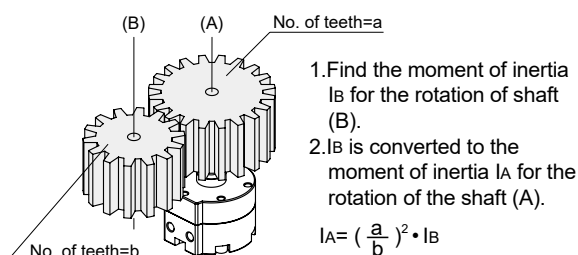


6. Thin round plate

Position of rotational axis: Through the center of diameter.



7. Gear transmission



Use the following formula to calculate the rotation time

$$t \geq \sqrt{\frac{2 \cdot I \cdot \theta^2}{E}}$$

t : Rotation time (s)
 E : Kinetic energy (J)
 I : Moment of inertia ($\text{kg} \cdot \text{m}^2$)
 θ : Rotation angle (rad)

The meaning of this formula is the critical rotation time for not cause damage of the cylinder. Therefore the rotation time must be set on or over the t seconds calculated in above formula.

After calculated the moment of inertia by load shape, use the following formula to calculate the kinetic energy of the load.

$$E = 1/2 \cdot I \cdot \omega^2$$

E : Kinetic energy (J)
 I : Moment of inertia ($\text{kg} \cdot \text{m}^2$)
 ω : Angle speed (rad/s)

Angle speed

$$\omega = 2 \theta / t \dots (1)$$

$$\omega = \theta / t \dots (2)$$

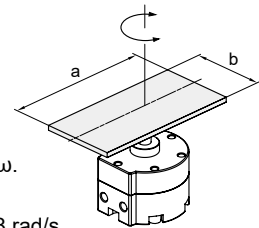
t : Rotation time (s)
 I : Moment of inertia ($\text{kg} \cdot \text{m}^2$)
 θ : Rotation angle (rad)

However, when the rotation time for 90° becomes longer than 2 seconds, use formula (2).

Calculation example

Load form: Cuboid
 Rotation angle θ : 180°
 Rotation time t : $1 \text{ s}/180^\circ$
 Length of a part: 0.12 m
 Length of b part: 0.06 m
 Mass (m) : 0.1 kg

$$I = m \cdot \frac{a^2 + b^2}{12}$$



(Step 1) Find the angle speed ω .

$$\omega = \frac{2\theta}{t} = \frac{2}{1} \times \pi = 6.28 \text{ rad/s}$$

(Step 2) Find the moment of inertia I .

$$I = m \cdot \frac{a^2 + b^2}{12}$$

$$= 0.1 \times \frac{144 \times 10^{-4} + 36 \times 10^{-4}}{12}$$

$$= 1.5 \times 10^{-4} \text{ kg} \cdot \text{m}^2$$

(Step 3) Find the kinetic energy E .

$$E = \frac{1}{2} \cdot I \cdot \omega^2 = \frac{1}{2} \times 1.5 \times 10^{-4} \times 6.28^2$$

$$= 0.002958 \text{ J}$$



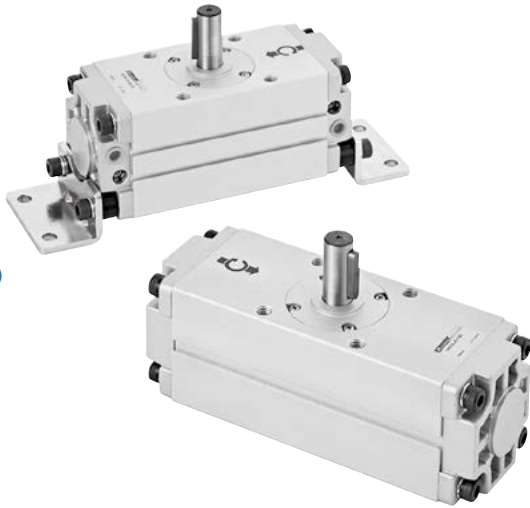
Moment of inertia



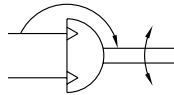
Technical data



Caution for safety
(Read before installing)






Symbol



Features

- Compact body.
- Functional design with clean appearance.
- Simple mounting of sensors.
- Magnetic as standard.

Specification

Model	MCRA		
Acting type	Double acting		
Tube I.D. (mm)	ø63		
Port size	Rc1/8		
Medium	Air		
Operating pressure range	0.1~1 MPa		
Proof pressure	1.5 MPa		
Ambient temperature	-5~+60°C (No freezing)		
Acting angle tolerance	0~+4°		
Lubrication	Not required		
Cushion	Air cushion		
Allowable kinetic energy	1.5J (Air cushion)		
Sensor switch	RCE  , RCE1  , RDEP 		
Weight (kg)	90°	180°	LB
	2.7	3.1	0.4

Order example

MCRA — 63 — 90 — □

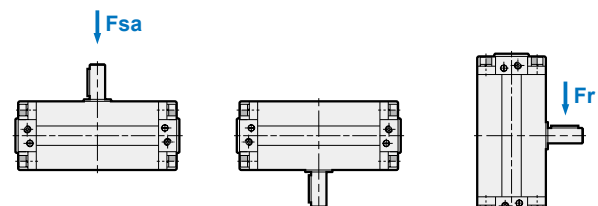
MODEL TUBE I.D. PORT THREAD

Blank: Rc thread
G: G thread
NPT: NPT thread

ROTARY ANGLE

Code	Rotary angle
90	90°
180	180°


Shaft loading



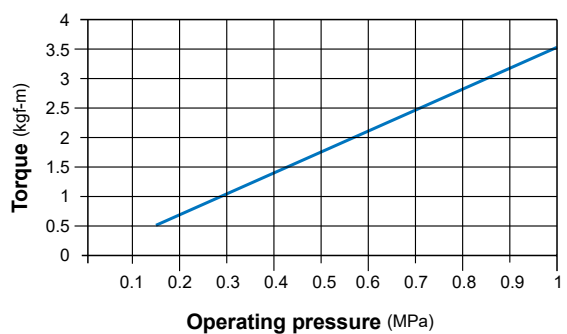
Unit: kgf

Load direction		
Fsa	Fsb	Fr
60	20	30

Order example of mounting accessories

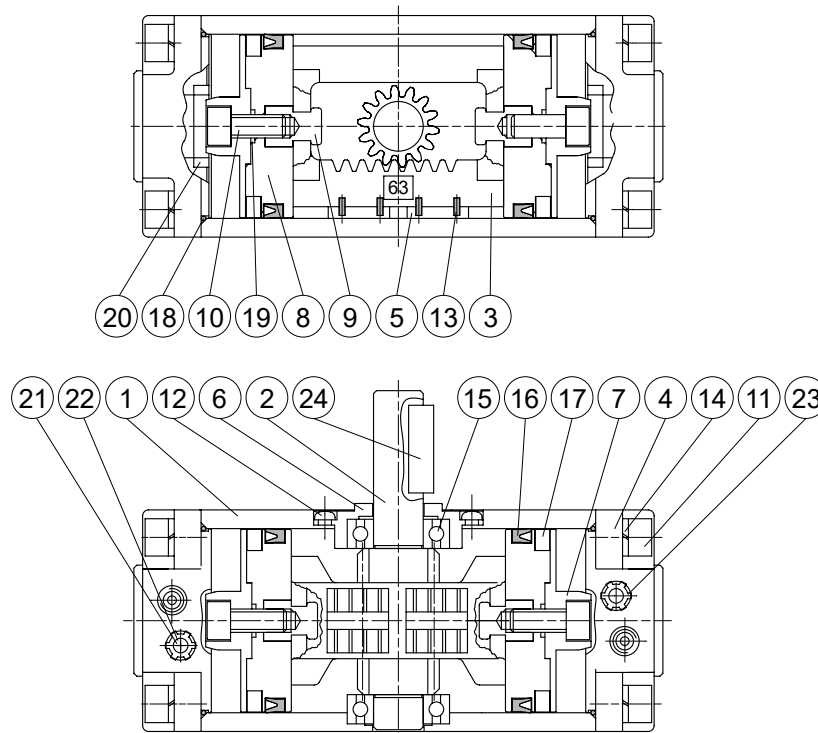
Code	LB (Purchase 2 pcs)
Mounting Tube I.D.	
ø63	LB-R1-63

Torque diagram



ROTARY ACTUATOR

mindman



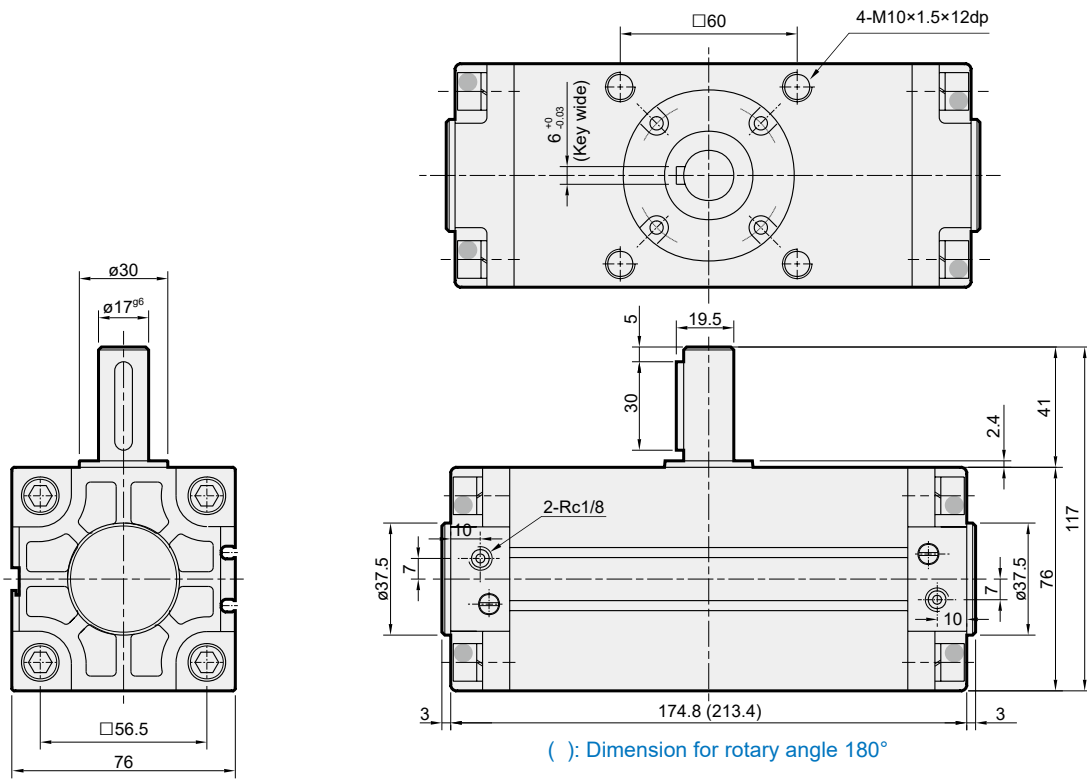
Material

No.	Part name	Material	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy	1	
2	Shaft	Carbon steel	1	
3	Rack	Carbon steel	1	
4	Cover	Aluminum alloy	2	
5	Slider	Plastic	2	
6	Bearing retainer	Aluminum alloy	1	
7	Piston #1	Aluminum alloy	2	
8	Piston #2	Aluminum alloy	2	
9	Screw #1	Carbon steel	2	
10	Screw #2	SCM	2	
11	Bolt	SCM	8	
12	Screw	SCM	4	
13	Spring pin	Spring steel	4	
14	Spring washer	SCM	8	
15	Bearing	Bearing steel	2	
16	Piston packing	NBR	2	●

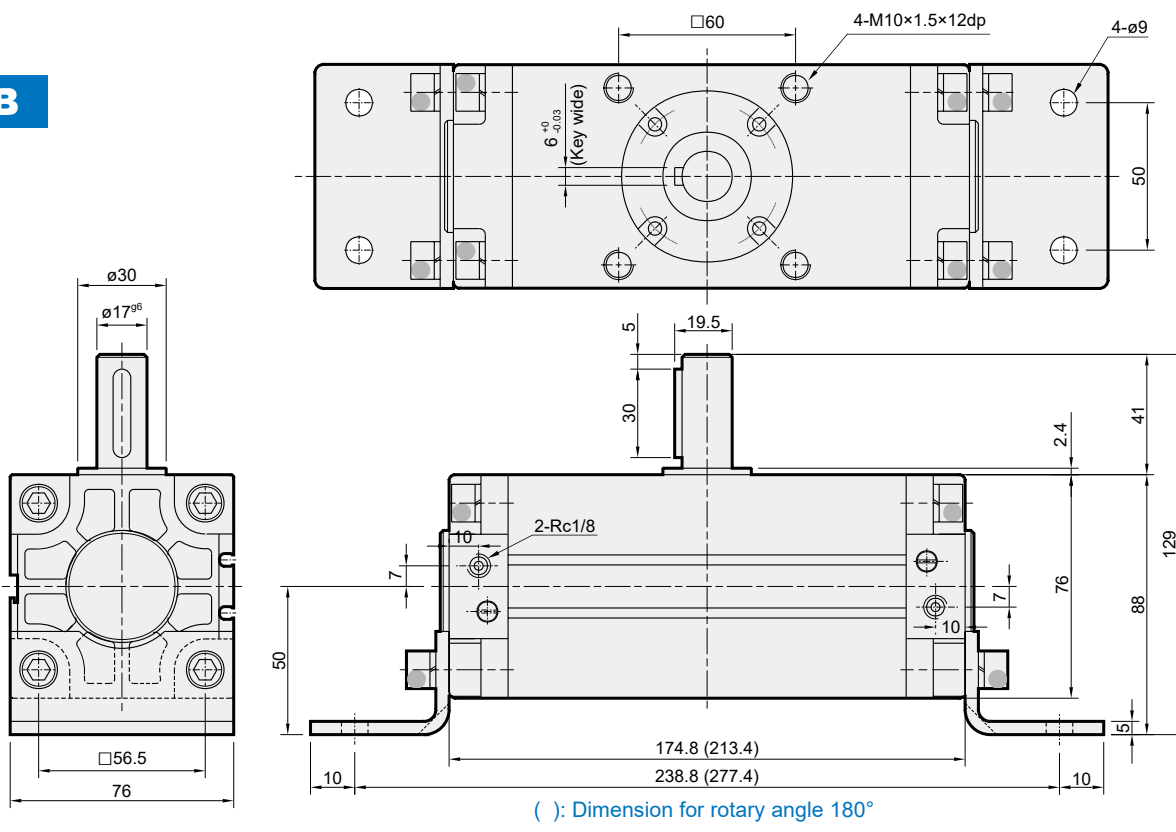
No.	Part name	Material	Q'y	Repair kits (inclusion)
17	Magnet ring	Magnet material	2	
18	Gasket	NBR	2	●
19	O-ring	NBR	2	●
20	Cushion packing	NBR	2	
21	Needle valve	Copper	2	
22	Needle valve gasket	NBR	2	●
23	Needle valve washer	Aluminum alloy	2	
24	Parallel key	Carbor steel	1	

Order example of repair kits

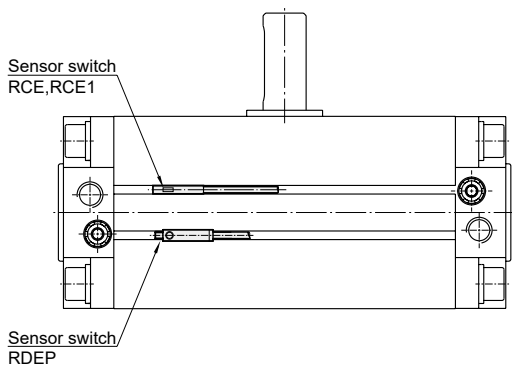
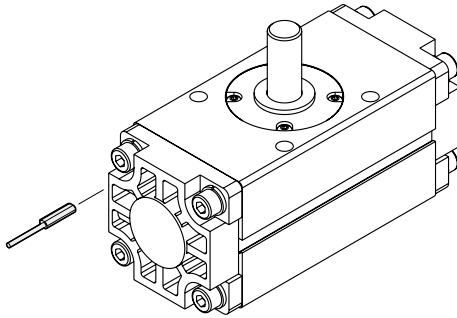
Tube I.D.	Repair kits
ø63	PS-MCRA-63



LB



Installation of sensor switch





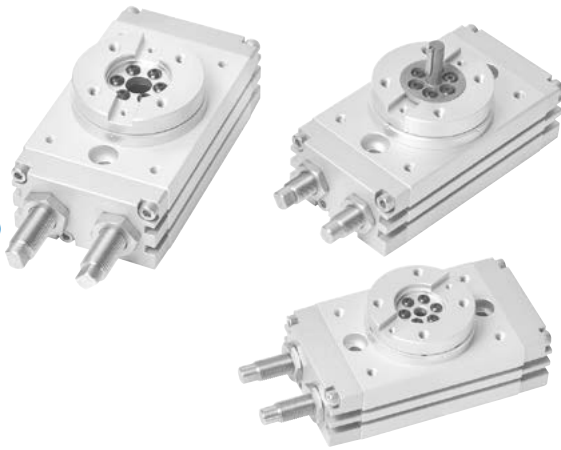
Moment of inertia



Technical data




Caution for safety
(Read before installing)



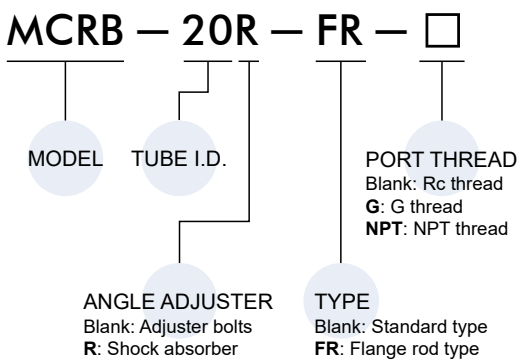
Features

- Twin rack and pinion fitted as standard.
- Can be adjusted between 0 and 190 degrees.
- Simple mounting of sensors.
- Magnetic as standard.

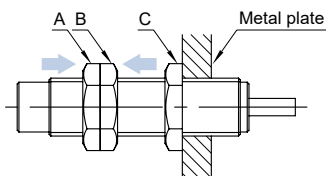
Specification

Model	MCRB				
Acting type	Double acting				
Tube I.D. (mm)	16	20	25	32	
Port size	Rc1/8				
Medium	Air				
Max. operating pressure	Adjusting bolt	1 MPa			
	Shock absorber	0.6 MPa (*1)			
Min. operating pressure	0.1 MPa (*2)				
Proof pressure	1.5 MPa				
Ambient temperature	-5~+60°C (No freezing)				
Lubrication	Not required				
Cushion	NBR spacer				
Allowable kinetic energy	Cushion pad	0.007J	0.040J	0.081J	0.32J
	Cushion	0.039J	0.116J	0.294J	1.6J
Stable rotation time regulation range	0.2~1.0 s/90°				
Sensor switch	RCD 				
Weight (kg)	0.7	1.16	1.57	3.07	

Order example



Installation guide of shock absorber



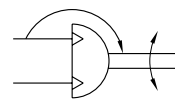
- 1 Install 3 nuts on the shock absorber as the picture shown.
- 2 Bind the A nut and B nut together via tightening them with different rotating direction.
- 3 Hold B nut and rotate C nut to bind the plate and C nut together.
- 4 Unbind the A nut and B nut. The installation is complete.

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

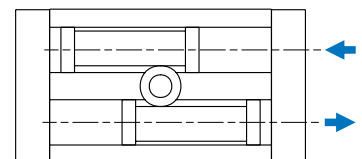
*2. No-load conditions.

*3. The shock absorber is expendable. Replace when damping performance decrease.

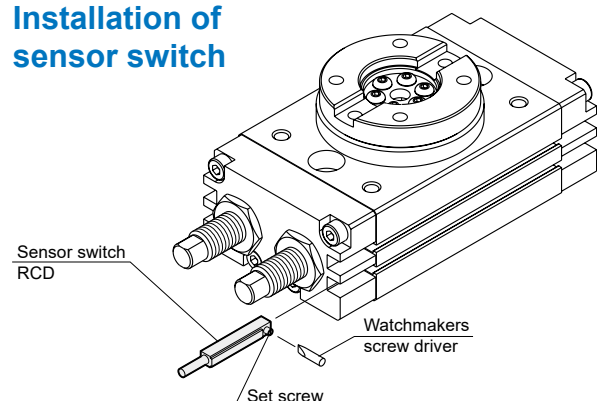
Symbol



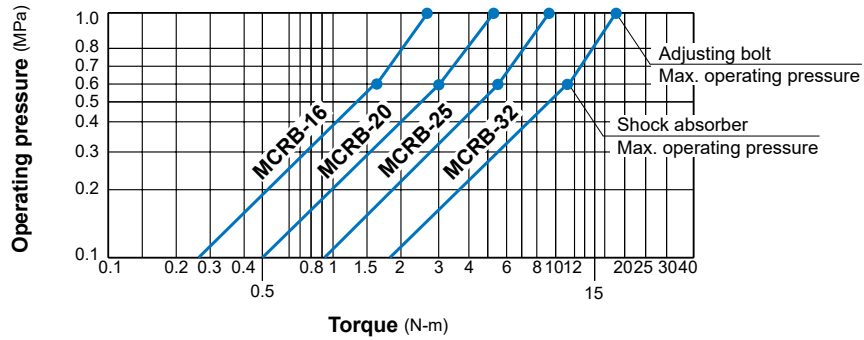
Action profile



Installation of sensor switch



Torque diagram



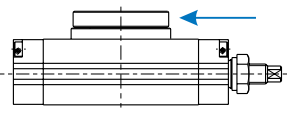
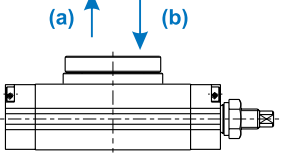
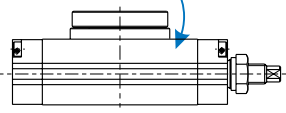
Theoretic force

Unit: N-m

Model		MCRB			
Tube I.D.		16	20	25	32
Operating pressure (MPa)	0.1	0.26	0.5	0.91	1.88
	0.2	0.52	1	1.81	3.78
	0.3	0.78	1.5	2.72	5.66
	0.4	1.04	2.01	3.62	7.56
	0.5	1.31	2.51	4.55	9.44
	0.6	1.57	3	5.45	11.32
	0.7	1.83	3.5	6.36	13.23
	0.8	2.09	4.02	7.26	15.12
	0.9	2.35	4.52	8.17	17.01
	1.0	2.61	5.03	9.08	18.9

Allowable load

Set the load and moment to be applied to the table within the allowable values shown in the table below. (Values outside of limitations will cause excessive play, deteriorate accuracy, and shorten service life.)

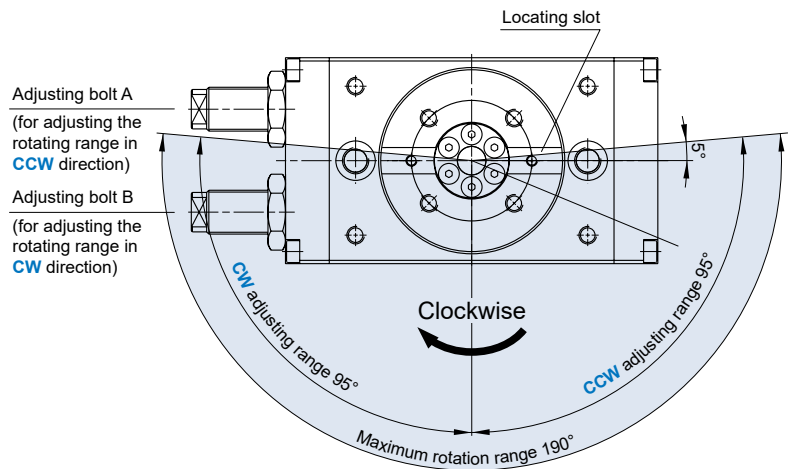
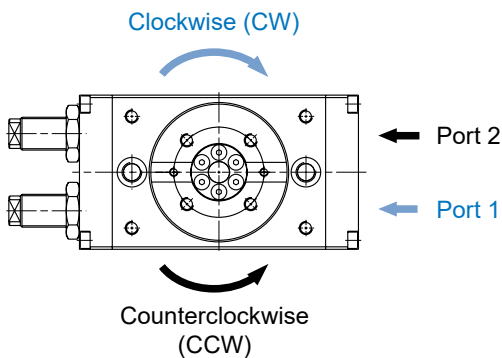
Pictures						
	Tube I.D.	Allowable radial load (N)	Allowable thrust load (N)			Allowable moment (N.m)
			(a)	(b)		
16	78	74	78	2.4		
20	196	197	363	5.3		
25	314	296	451	9.7		
32	390	493	708	18		

ROTARY ACTUATOR

Rotating direction and angle

- When the port 1 is pressurized, the flange rotates in clockwise (CW) direction.
- When the port 2 is pressurized, the flange rotates in counter-clockwise (CCW) direction.

The rotating angle range can be adjust by the method shown as right figure.



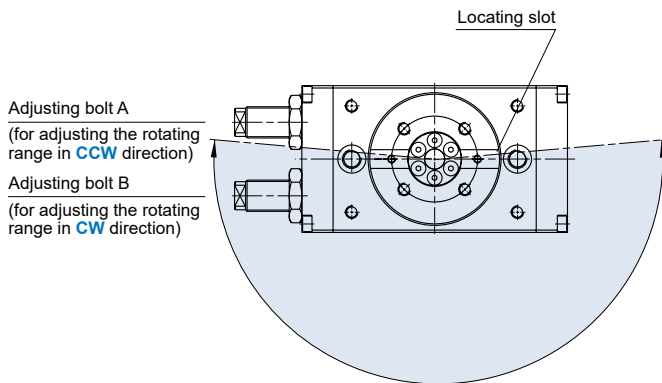
NOTE

- The figure shows the rotating range and use the pin hole as indicator.
- The locating slot in the figure locates at the situation which the CCW & CW rotating range are both adjusted at 90°.

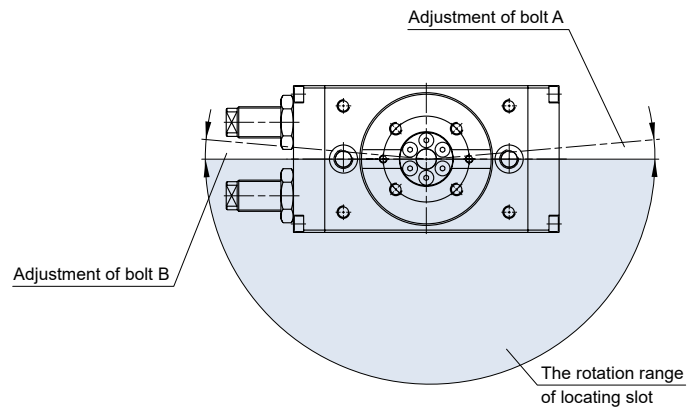
Rotating range adjusting example

- The followed figures show the rotating range of different adjustment via bolt A and B. (The drawings also show the rotation ranges of the locating slot.)

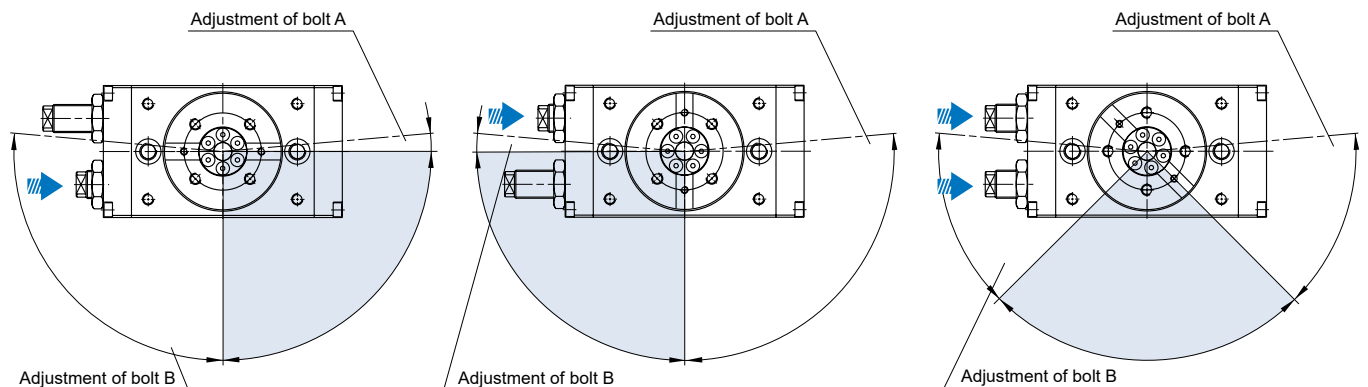
190° (Max) Rotation



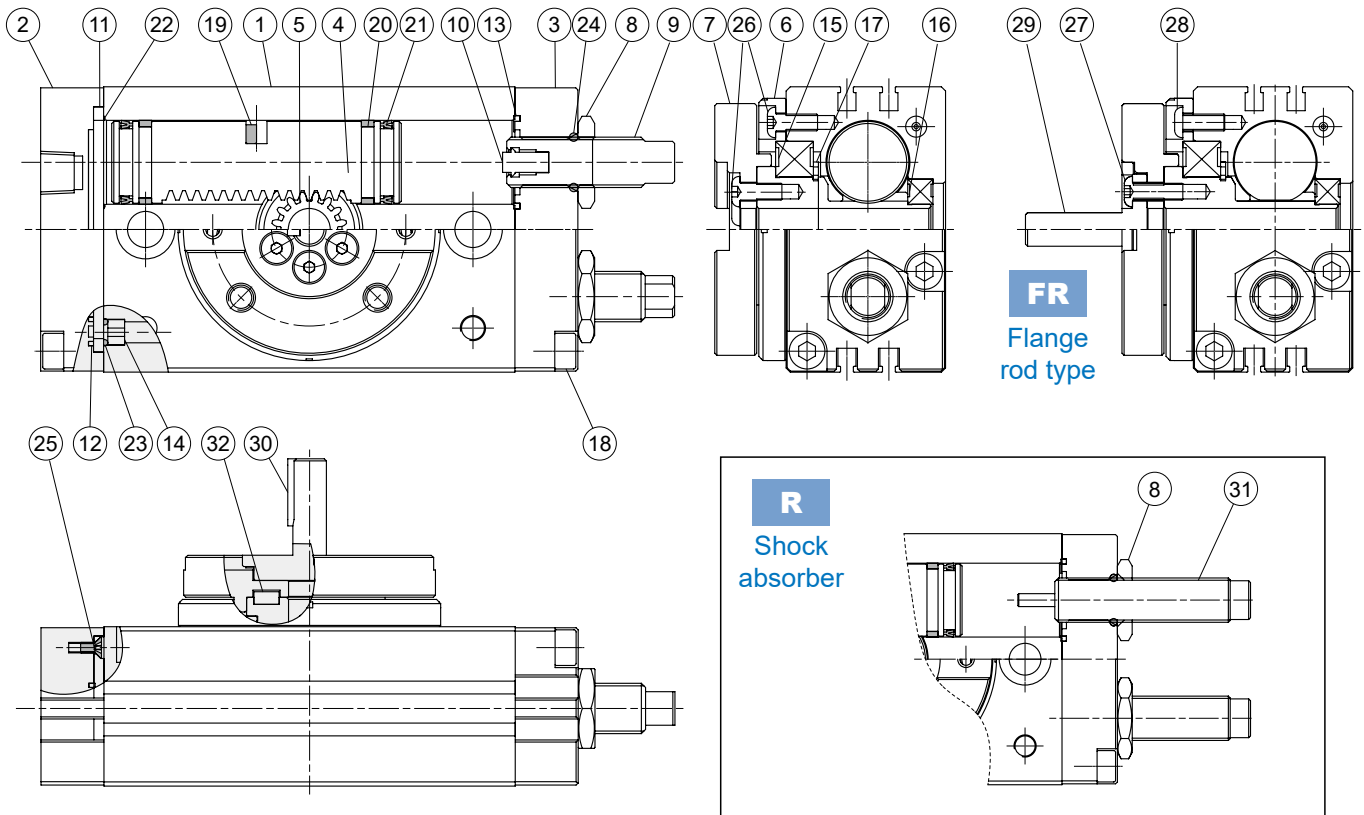
180° Rotation



90° Rotation



ROTARY ACTUATOR



Material

No.	Part name	Material	Q'y	Repair kits (inclusion)
1	Body	Aluminum alloy	1	
2	Cover	Aluminum alloy	1	
3	End cover	Aluminum alloy	1	
4	Piston	Stainless steel	2	
5	Pinion	SCM	1	
6	Bearing retainer	Aluminum alloy	1	
7	Table	Aluminum alloy	1	
8	Seal nut	Stainless steel	2	
9	Adjusting bolt *1	Stainless steel	2	
10	Cushion pad *1	NBR	2	●
11	Plate	Aluminum alloy	1	
12	Packing	NBR	1	●
13	Packing	NBR	2	●
14	Fixed	Copper	2	
15	Ball bearing	Bearing steel	1	
16	Ball bearing	Bearing steel	1	
17	Snap ring	Spring steel	1	
18	Bolt	Stainless steel	8	
19	Magnet	Magnet material	2	
20	Wear ring	Resin	4	
21	Piston packing	NBR	4	●

No.	Part name	Material	Q'y	Repair kits (inclusion)
22	O-ring	NBR	2	●
23	O-ring	NBR	2	●
24	O-ring	NBR	2	●
25	Screw	Carbon steel	2	
26	Bolt	Carbon steel	10	
27	Bolt *2	Carbon steel	6	
28	Bolt *2	Carbon steel	4	
29	Rotate shaft *2	Carbon steel	1	
30	Round key *2	Carbon steel	1	
31	Shock absorber *3	—	2	
32	Round key	Carbon steel	1	

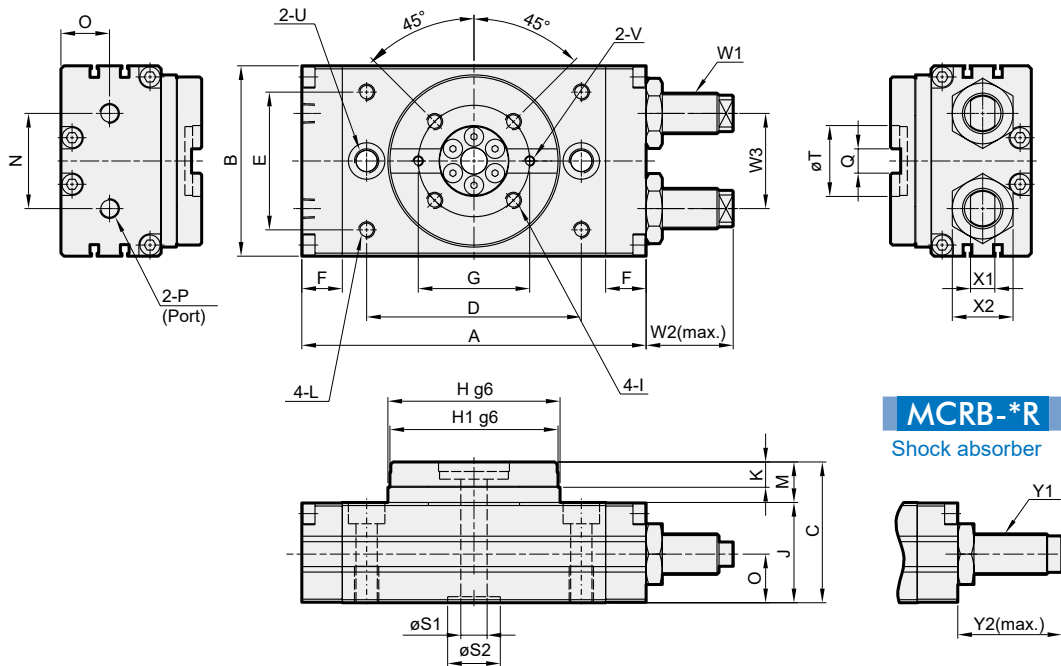
*1. Only suitable for adjuster bolts.

*2. No.27~30 for (FR) flange rod type.

*3. Only suitable for (R) shock absorber.

Order example of repair kits

Tube I.D.	Repair kits	
	Adjuster bolts	Shock absorber (R)
ø16	PS-MCRB-16	PS-MCRB-16R
ø20	PS-MCRB-20	PS-MCRB-20R
ø25	PS-MCRB-25	PS-MCRB-25R
ø32	PS-MCRB-32	PS-MCRB-32R



MCRB-*R
Shock absorber

Code Tubr I.D.	A	B	C	D	E	F	G	H	H1	I	J	K	L	M	N	O	P
16	108	58	47	62	38	15	38	50	48	M5×7dp,P.C.D38	33	8	M5×8dp	14	26	15.5	Rc1/8
20	128	68	55	78	47	15	46	62.5	60	M6×7dp,P.C.D46	38	10	M6×8dp	17	27	18.5	Rc1/8
25	135.5	77	58.5	84	55	15.5	48	67	65	M6×9dp,P.C.D48	41.5	10	M6×8dp	17	37	20	Rc1/8
32	170	94	69.5	106	68	20	55	85	83	M8×10dp,P.C.D55	49.5	12.5	M8×8.5dp	20	47	24	Rc1/8

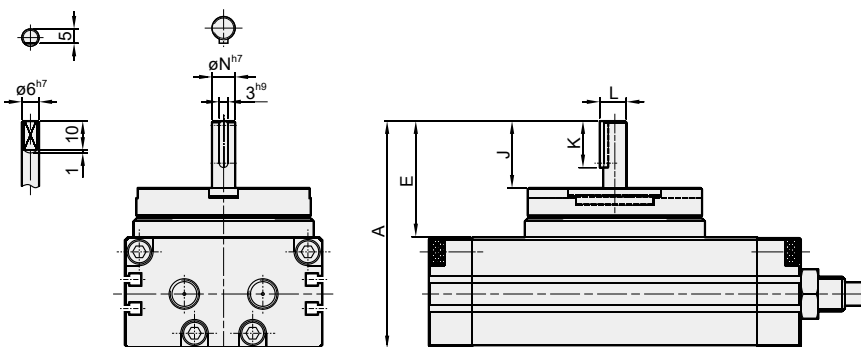
Code Tubr I.D.	Q	S1	S2	T	U	V	W1	W2
16	8 ^{+0.03} ₋₀ (wide)×3.3dp	6	17 H9 ^{+0.043} ₀ ×2.5dp	24 H9 ^{+0.052} ₀ ×3dp	2- $\phi 6.8$ thru, $\phi 11 \times 6.5$ dp,M8×12dp(sink)	M3×4dp	M10×1.0	27
20	10 ^{+0.03} ₋₀ (wide)×3.5dp	10	22 H9 ^{+0.052} ₀ ×2.5dp	32 H9 ^{+0.062} ₀ ×3dp	2- $\phi 8.6$ thru, $\phi 14 \times 8.5$ dp,M10×15dp(sink)	M4×6dp	M12×1.0	23
25	12 ^{+0.03} ₋₀ (wide)×4dp	13	22 H9 ^{+0.052} ₀ ×3dp	32 H9 ^{+0.062} ₀ ×3.7dp	2- $\phi 8.6$ thru, $\phi 14 \times 8.5$ dp,M10×15dp(sink)	M4×5dp	M14×1.5	36
32	12 ^{+0.03} ₋₀ (wide)×5dp	13	26 H9 ^{+0.052} ₀ ×3dp	35 H9 ^{+0.062} ₀ ×4.7dp	2- $\phi 10.5$ thru, $\phi 18 \times 10.5$ dp,M12×18dp(sink)	M5×5dp	M20×1.5	43

Code Tubr I.D.	W3	X1	X2	Y1	Y2
16	26	7	17	FK-1008L-S	24
20	32	8	19	FK-1210L-S	36.5
25	37	8	22	FK-1412L-S	41
32	47	12	30	FK-2016L-S	55

Flange rod type

$\phi 16$

$\phi 20 \sim \phi 32$



Code Tubr I.D.	A	E	J	K	L	N
16	64.5	31.5	17.5	-	-	-
20	78	40	23	16	9.2	8
25	81.5	40	23	20	11.2	10
32	109.5	60	40	20	13.2	12

* Other dimensions are the same as standard type.

MCRJ-S series

MINI-ROTARY ACTUATOR



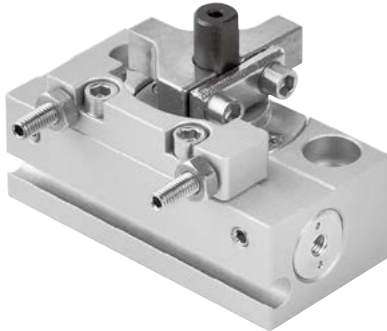
Moment of inertia



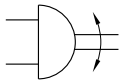
Technical data



Caution for safety
(Read before installing)

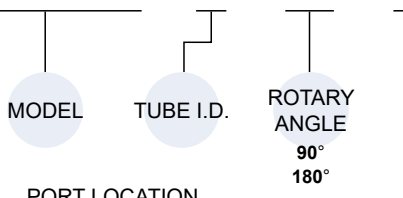


Symbol

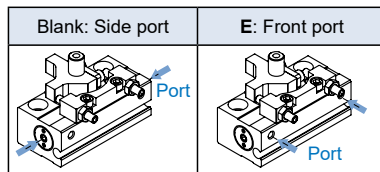


Order example

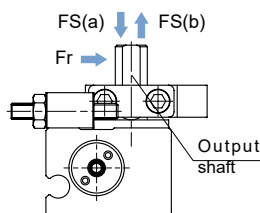
MCRJ - S - 6 - 90 - E



PORT LOCATION



Allowable load



Tube I.D. (mm)	Allowable load (N)			Output shaft size (mm)
	Fr	FS (a)	FS (b)	
6	25	20	20	ø5
8	30	25	25	ø6

Features

- Rack and pinion type with external stoppers.
- Rotary angle 90°, 180°.
- Compact and lightweight, mounting from 3 directions.
- Standard with magnet.

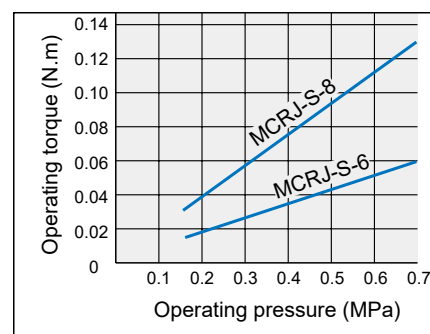
Specification

Model	MCRJ-S	
Tube I.D. (mm)	6	8
Port size	M3 × 0.5	
Rotation	90°, 180°	
Medium	Air (Non-lube)	
Operating pressure range	0.15~0.7 MPa	
Ambient temperature	0~+60°C (No freezing)	
Angle adjustment range	Each rotation end ±5°	
Sensor switch	RDC(V), RQC(V) , RDFE(V)	
Weight (g)	90°	47.2
	180°	53.4
		70.9
		81.6

Operating torque

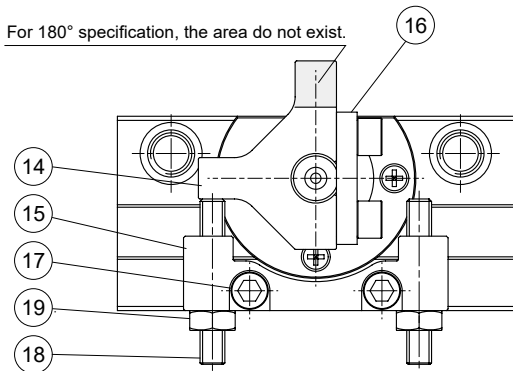
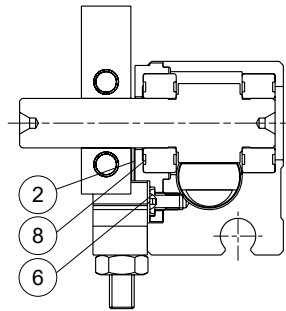
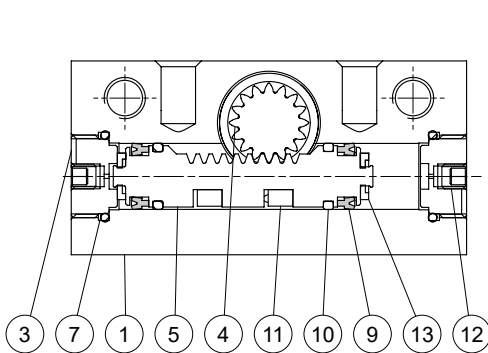
Tube I.D. (mm)	Operating pressure (MPa)						
	0.15	0.2	0.3	0.4	0.5	0.6	0.7
6	0.013	0.017	0.026	0.034	0.042	0.05	0.059
8	0.029	0.038	0.057	0.076	0.095	0.11	0.13

Note. Effective torque values are representative values. They are not guaranteed values. Use them only as a guide.



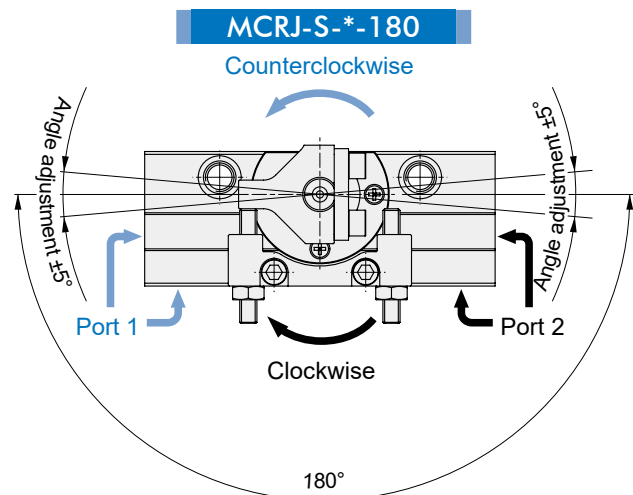
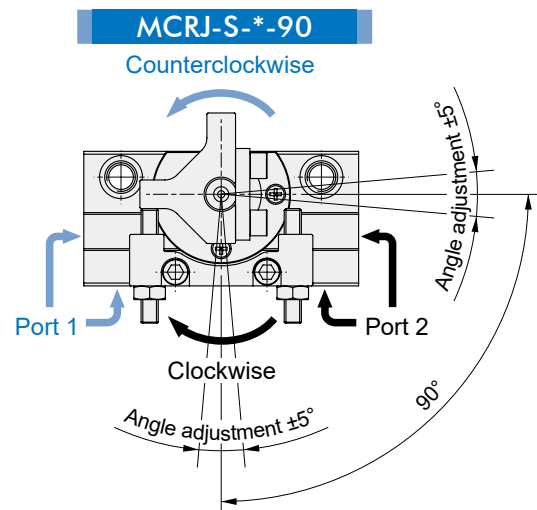
Allowable kinetic energy / Rotation time adjustment range

Tube I.D. (mm)	Allowable kinetic energy (J)	Rotation time adjustment range for stable operation (s/90°)
6	0.001	0.1~0.5
8	0.002	



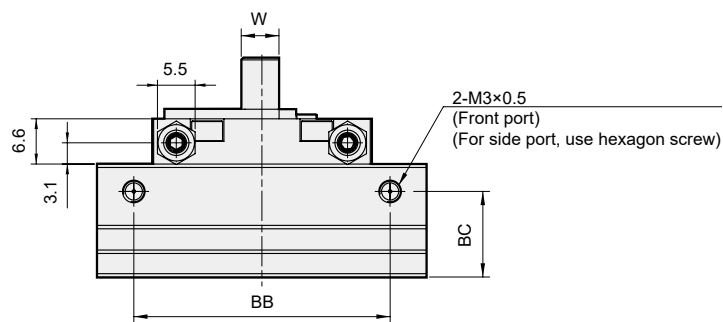
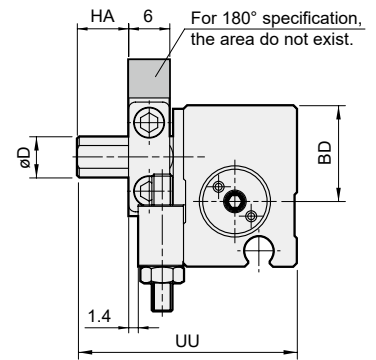
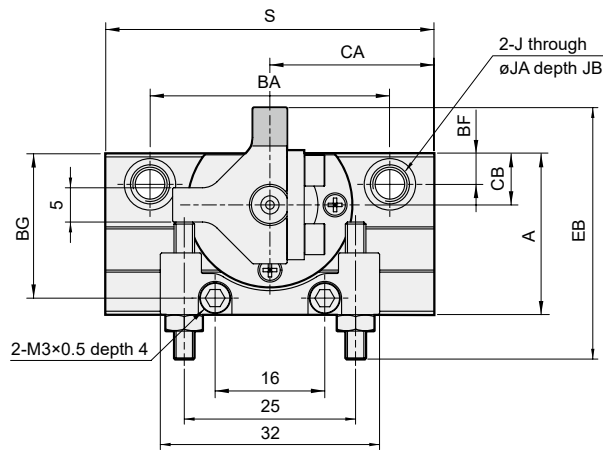
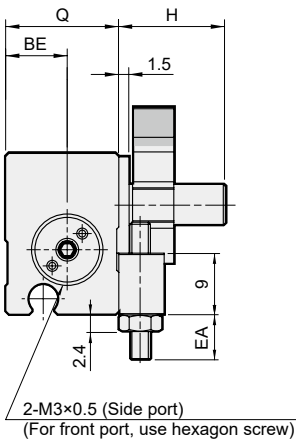
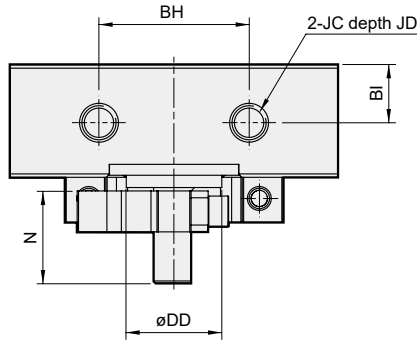
Rotating direction and angle

- The shaft rotates counterclockwise when the input air is from port 1. The shaft rotates clockwise when the input air is from port 2.
- The rotation range can be adjusted by adjustment screws.



Material

No.	Tube I.D. Part name	6	8	Q'y
1	Body	Aluminum alloy		1
2	Bearing holder	Aluminum alloy		1
3	Cover	Aluminum alloy		2
4	Pinion	Stainless steel		1
5	Piston	Stainless steel		1
6	Screw	Stainless steel		3
7	O ring	NBR		2
8	Ball bearing	Bearing steel		2
9	Piston seal	NBR		2
10	Wear ring	Resin		2
11	Magnet	Magnet material		2
12	Screw	Steel		2
13	Gasket	NBR		2
14	Stopper	Alloy steel		1
15	Holder	Aluminum alloy		1
16	Stopper retainer	Low carbon steel		1
17	Hexagon screw	Stainless steel		4
18	Hexagon screw	Stainless steel		2
19	Hexagon nut	Low carbon steel		2



Code Tubr I.D.	A	BA	BB	BC	BD	BE	BF	BG	BH	BI	CA	CB	D	DD	EA	EB	HA	J	JA	JB	JC	JD	H	N	Q	S	UU	W
6	19.5	30	32.4 (43.4)	9.5	11	6.5	3.5	17.1	20	7	21.5(27)	5.5	5g6	10h9	4.5	32.7	6.5	M4×0.7	5.8	3.5	M4×0.7	5	14.5	12.5	13.5	43(54)	28	4.5
8	23.5	35	37.4 (50.4)	12.5	14	9	4.5	21.1	22	8.5	24(30.5)	7.5	6g6	14h9	6.5	36.7	7.5	M5×0.8	7.5	4.5	M5×0.8	6	15.5	13.5	16.5	48(61)	32	5.5

* () for 180° specification.



Moment of inertia



Technical data





Caution for safety
(Read before installing)



Features

- Compact and lightweight, mounting from 3 directions.
- Rotary angle 90°, 180°, 270°.
- Both rods have locating plane.
- Spin the rod with built-in vane mechanism.
- Options of angle adjuster for various usage.
- Options of magnet for the flush fitting sensor switch.

Specification

Model	MCRC		
Acting type	Double acting		
Size	20	30	
Port size	M5×0.8		
Rotation	90°, 180°, 270°		
Acting angle tolerance	0~+4°		
Medium	Air (Non-lube)		
Max. operating pressure	0.7 MPa	1 MPa	
Min. operating pressure	0.15 MPa		
Proof pressure	1.05 MPa	1.5 MPa	
Ambient temperature	+5~+60°C		
Allowable kinetic energy (J)	0.0033	0.02	
Load (N)	Radial	25	30
	Axial	20	25
Rotation time adjustment range (s/90°) (*1)	0.03~0.3		
Volume (cm ³)	90°	A port: 3.5 B port: 4.8	A port: 8.4 B port: 11.3
	180° (*2)	5.9	14.9
	270° (*2)	7.7	19.6
Sensor switch		-	RDC(V), RQC(V)  RDFE(V) 
	90°	105	200
Weight (g)	180°	105	195
	270°	103	192

Order example

MCRC – 30 W – 180 – M A F

MODEL

SIZE
20
30

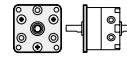
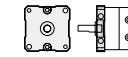
W: Double rod
S: Single rod

ROTATION
90: 90°
180: 180°
270: 270°

Magnet (*)	Angle adjustable (*)	Type (option)
Blank: without M: with magnet	Blank: Non-adjustable A: Angle adjustable	F: for adding FAC accessories


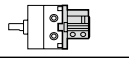
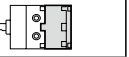
* Only for (W) double rod and size 30.

Order example of mounting accessories

Code	FA	FAC *	
Fig			
Size			
20	FA-R2-20	FAC-R2-20	
30	FA-R2-30	FAC-R2-30	
Weight	20	46 g	31 g
	30	69 g	47 g

* FAC cannot be assembled with standard cylinder because the shaft needs to be extended by 7.5 mm.

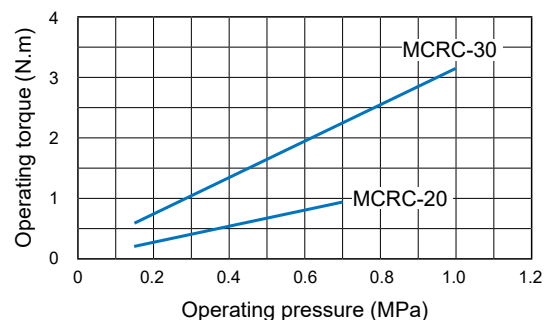
Order example of type kits

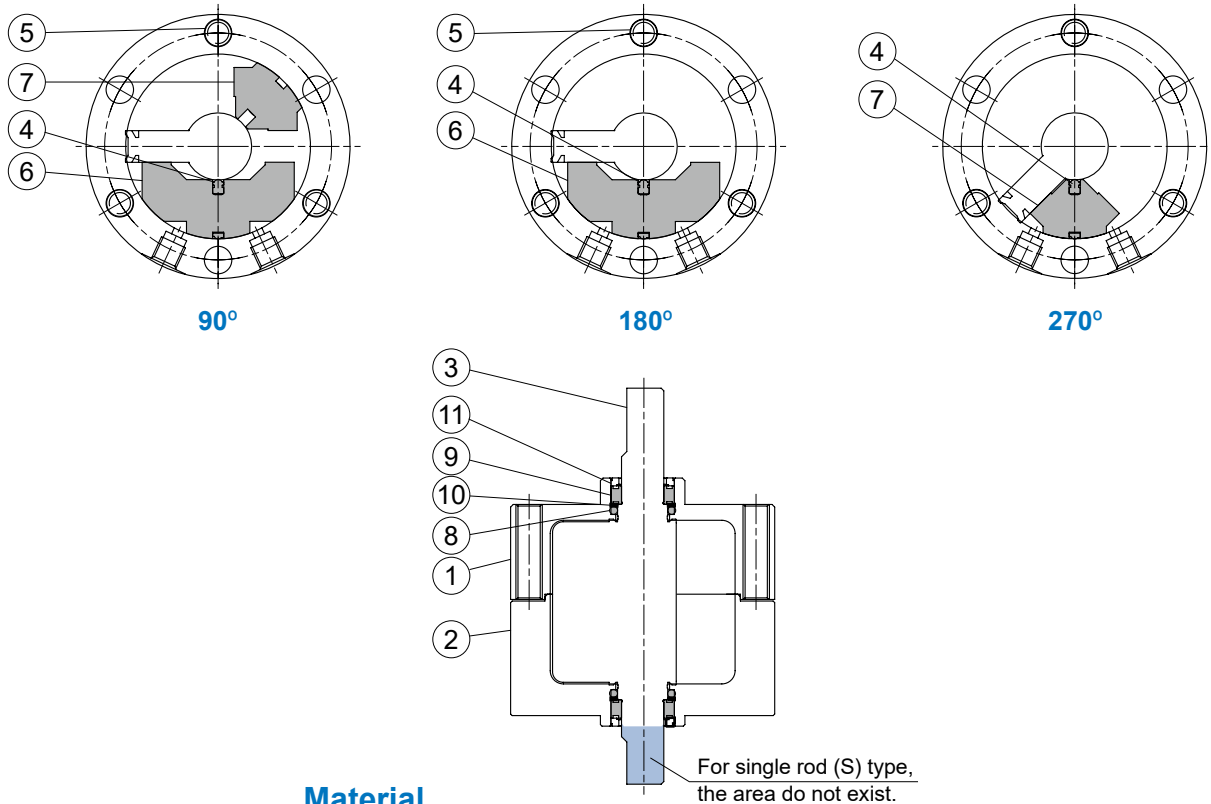
Type	With magnet + Angle adjustable	With magnet	Angle adjustable
Fig			
Size			
30	AK-MCRC-30-MA	AK-MCRC-30-M	AK-MCRC-30-A
Weight	171 g	68 g	135 g

*1. When the operation speed is lower than the lower speed limit, the rod may jitter or stop. Please use the product in the range as table shown.

*2. Port A and B have the same volume.

Torque diagram

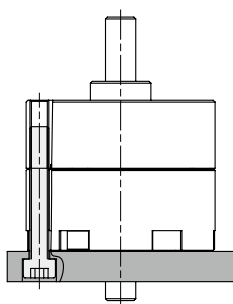




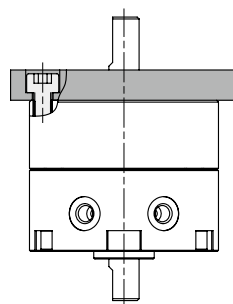
Material

No.	Part name	Material	Q'y		
			90°	180°	270°
1	Upper body	Aluminum	1		
2	Lower body	Aluminum	1		
3	Shaft	Stainless steel	1		
4	Packing	NBR	1		
5	Bolt	Stainless steel	3		
6	Adjusting block	Plastic	1	1	0
7	Adjusting block	Plastic	1	0	1
8	O-ring	NBR	2		
9	Ball bearing	Bearing steel	2		
10	Gasket	Stainless steel	2		
11	Retaining ring	Stainless steel	2		

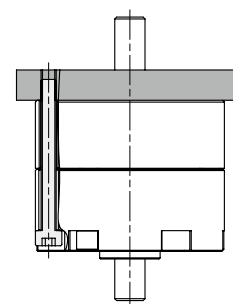
Mounting methods



Body tapped



Body tapped

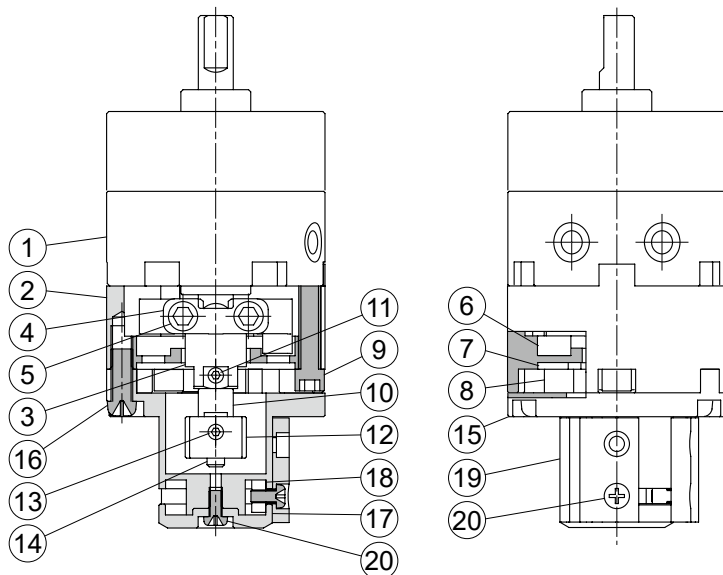


Body through-hole
(Fixed with the customer's plate)

ROTARY ACTUATOR

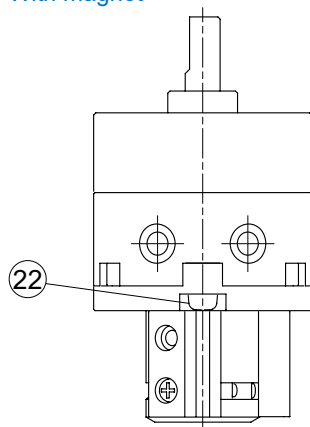
MCRC-30W-*-MA

With magnet + Angle adjustable



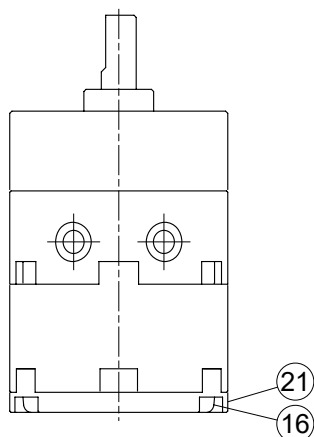
MCRC-30W-*-M

With magnet



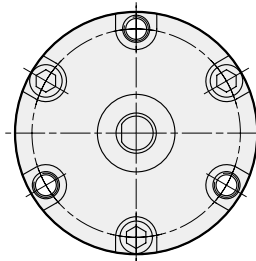
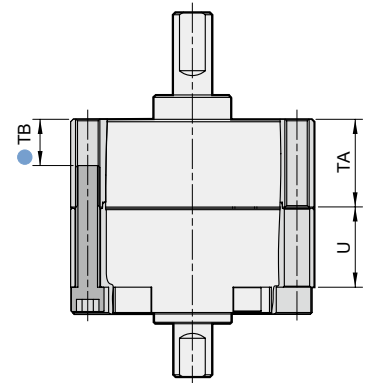
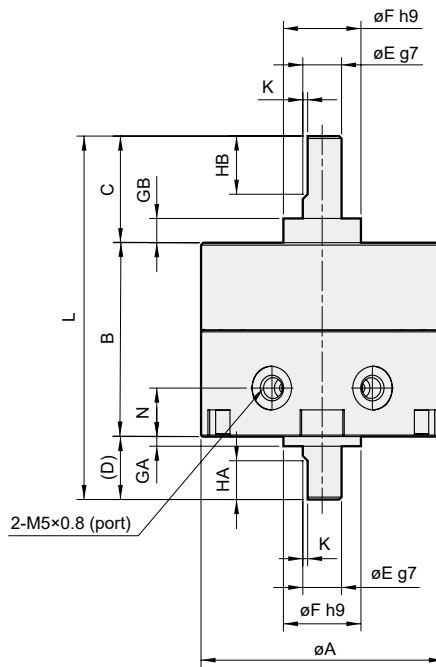
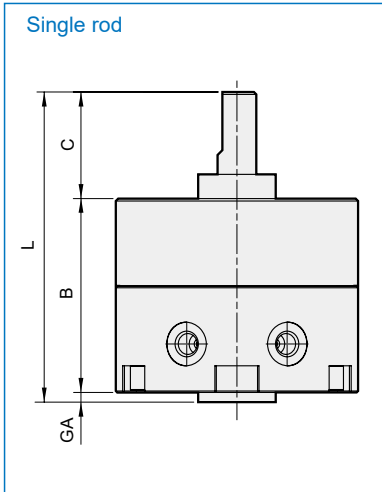
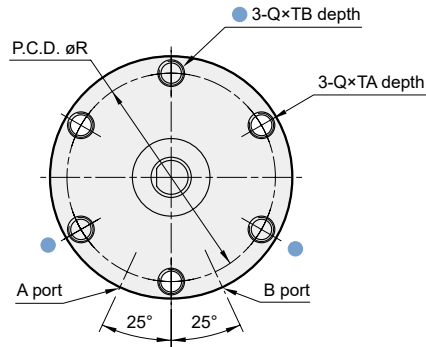
MCRC-30W-*-A

Angle adjustable



Material

No.	Part name	Material	Q'y		
			MA	M	A
1	MCRC-30W-□	-	1	1	1
2	Angle adjusting holder	Aluminum alloy	1	0	1
3	Angle positioning holder	Alloy steel	1	0	1
4	Stopper retainer	Carbon steel	1	0	1
5	Bolt	Stainless steel	2	0	2
6	Adjusting block #1	Alloy steel	2	0	2
7	Adjusting block #2	Carbon steel	2	0	2
8	Bolt	Stainless steel	2	0	2
9	Bolt	Stainless steel	3	0	3
10	Connector	Aluminum alloy	1	0	0
11	Screw	Alloy steel	1	0	0
12	Magnet holder	Aluminum alloy	1	1	0
13	Screw	Alloy steel	1	1	0
14	Magnet	Magnet material	1	1	0
15	Sensor adjustment holder	Aluminum alloy	1	1	0
16	Screw	Stainless steel	3	0	3
17	Cover #1	Aluminum alloy	1	1	0
18	Sensor adjusting block	Aluminum alloy	2	2	0
19	Sensor fixing block	Aluminum alloy	2	2	0
20	Screw	Stainless steel	3	3	0
21	Cover #2	Aluminum alloy	0	0	1
22	Screw	Stainless steel	0	3	0

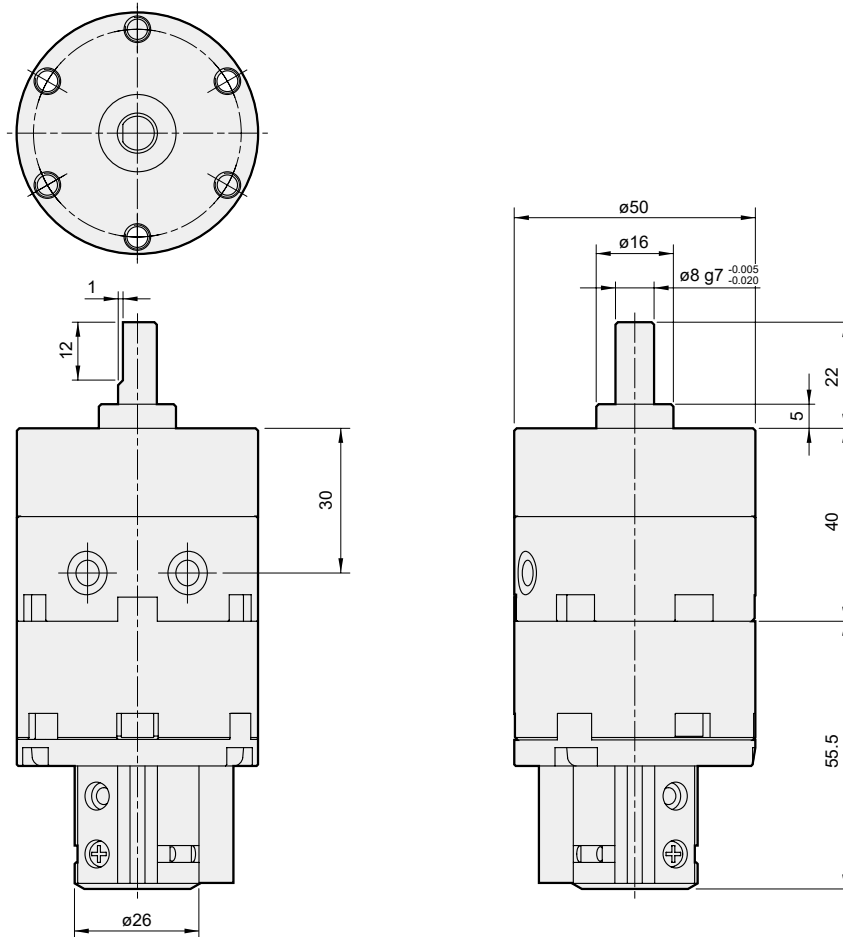


Code Size	A	B	C	D	E	F	GA	GB	HA	HB	K	L		N	Q	R	TA	TB	U
												Single rod	Double rod						
20	42	29	20	(8.5)	6 ^{-0.004} _{-0.016}	14 ⁰ _{-0.043}	1.5	4.5	7	10	0.5	50.5	59	9	M4×0.7	36	13.5	8.5	11
30	50	40	22	(13)	8 ^{-0.005} _{-0.020}	16 ⁰ _{-0.043}	2	5	8	12	1	64	75	10	M5×0.8	43	18	9.5	16

ROTARY ACTUATOR

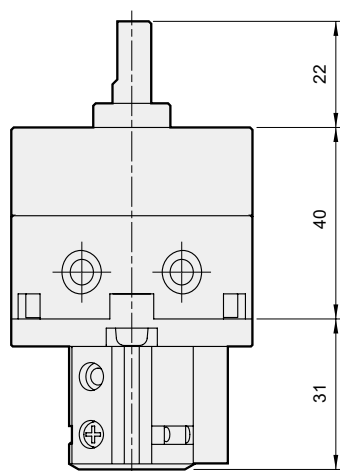
MCRC-30W-*-MA

With magnet + Angle adjustable



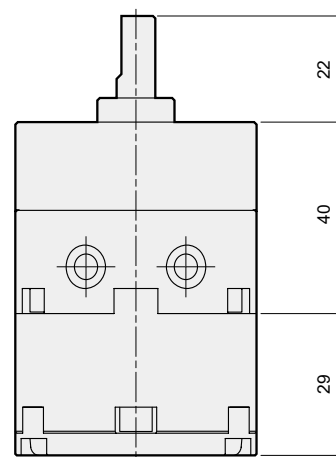
MCRC-30W-*-M

With magnet



MCRC-30W-*-A

Angle adjustable



ROTARY ACTUATOR

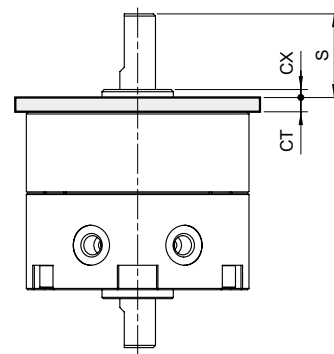
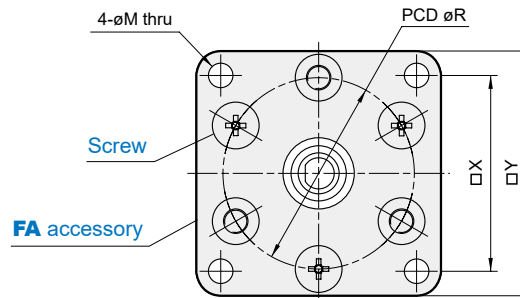
FA

Material

FA: Carbon steel

Screw: Carbon steel

Code Size	CT	CX	M	R	S	X	Y
20	3.2	1.3	4.5	36	16.8	36	46
30	3.2	1.8	5.5	43	18.8	44	55



FAC

* Need to select the MCRC-□-□-F specification and cannot be assembled with standard cylinders.

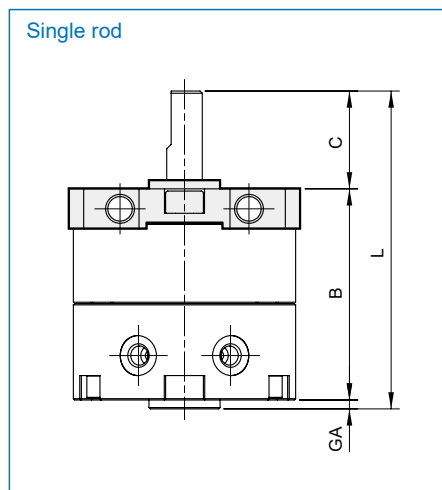
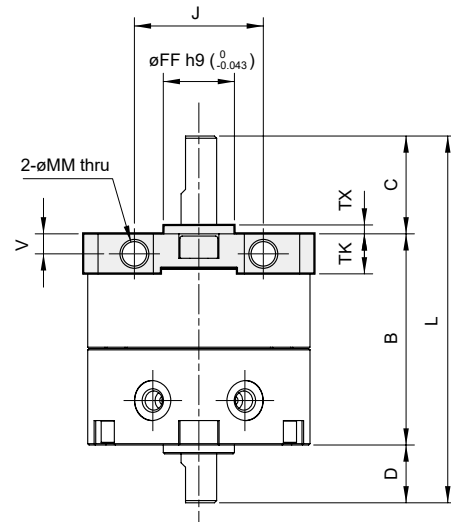
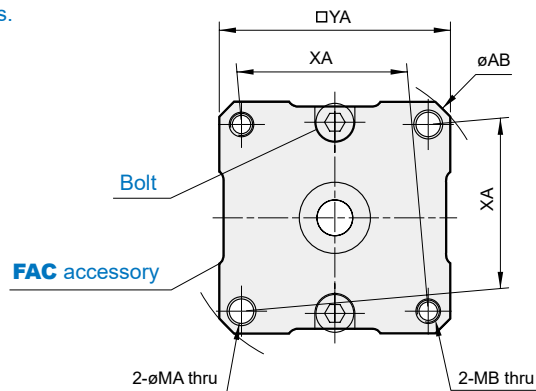
Material

FAC: Aluminum alloy

Bolt: Carbon steel

Code Size	AB	B	C	D	FF	GA	J	L	
								Single rod	Double rod
20	59	35.5	20	8.5	14	1.5	26	57	65.5
30	69	47.5	22	13	16	2	29	71.5	82.5

Code Size	MA	MB	MM	TK	TX	V	XA	YA
20	4.5	M4×0.7	4.5	8	1.5	4	36	44
30	5.5	M5×0.8	5.5	9	2	4.5	42	52



MCRQ series

ROTARY ACTUATOR

COMING SOON

Compatible with R*C(V) series sensor

Update information 



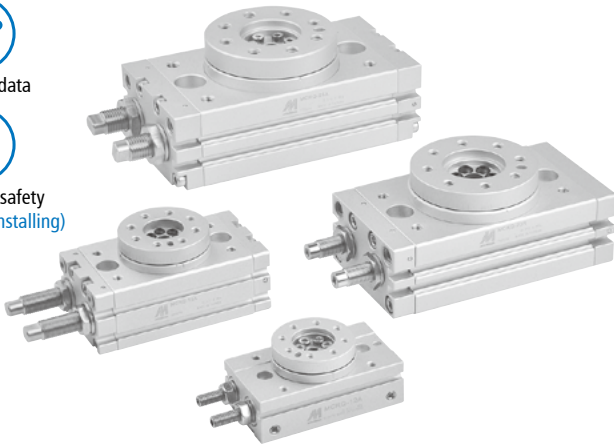
Moment of inertia



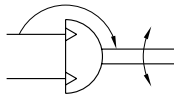
Technical data



Caution for safety
(Read before installing)



Symbol



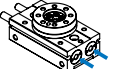
Order example

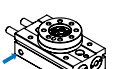
MCRQ - 20R - [] - []

MODEL TUBE I.D.

ANGLE ADJUSTER
A: With adjusting bolt
R: With shock absorber
* ø12 without shock absorber.

PORT LOCATION (*)

Blank: End port


E: Front port


PORT THREAD



Blank: M5×0.8 (for ø12, ø16)
Blank: Rc thread
G: G thread
NPT: NPT thread (for ø20~ø40)

* ø12 only option.
* Port location cannot be changed after delivery.

Features

- Centering boss and locating hole for accurate positioning.
- Operating range of table is 0°~190° by angle adjusting screw.
- Compact design using double rack and single pinion.
- Hollow shaft standard for wiring and piping.
- Possible to fit shock absorbers as stops.
- Ease of mounting with integral table.
- Magnetic as standard.

Specification

Model	MCRQ						
Acting type	Double acting						
Tube I.D. (mm)	12	16	20	25	32	40	
Port size	M5×0.8		Rc1/8				
Medium	Air						
Max. operating pressure	adjusting bolt	0.7MPa	1 MPa				
	shock absorber	—	0.6 MPa (*1)				
Min. operating pressure	0.1 MPa (*2)						
Ambient temperature	0~+60°C (No freezing)						
Cushion	adjusting bolt	Rubber bumper					
	shock absorber	—	Shock absorber (*3)				
Angle adjustment range	0° to 190°(max.) (*4)						
Sensor switch	RDC(V), RQC(V)  , RDVE(V) 						
Weight (kg)	adjusting bolt	0.25	0.60	1.24	2.10	4.18	7.67
	shock absorber	—	0.61	1.31	2.12	4.19	7.72
Minimum rotation that will not allow decrease of energy absorption ability	—	72°	58°	69°	77°	82°	

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

*2. No-load conditions.

*3. The shock absorber is expendable. Replace when damping performance decrease.

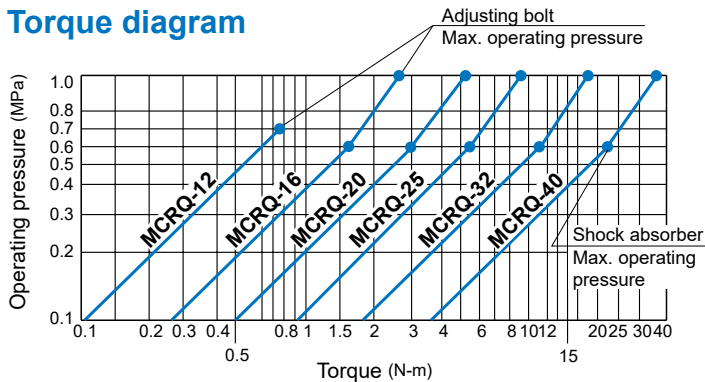
*4. Be careful if the rotation angle of a type with internal shock absorber is set below the value in the table below, the piston stroke will be smaller than the shock absorber's effective stroke, resulting in decreased energy absorption ability.

Allowable kinetic energy and rotation time adjustment range

Model	Allowable kinetic energy (J)		Rotation time adjustment range for stable operation(s/90°)	
	Adjustment bolt	Internal shock adsorber	Adjustment bolt	Internal shock adsorber
MCRQ-12	0.006	—	0.2 to 1.0	—
MCRQ-16	0.007	0.039		0.2 to 0.7
MCRQ-20	0.048	0.116		
MCRQ-25	0.081	0.294	0.2 to 2.0	0.2 to 1.0
MCRQ-32	0.32	1.6		
MCRQ-40	0.53	2.9		

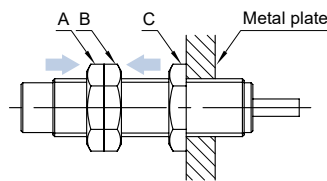
* Be careful if a type with internal absorber is used below the minimum speed, the energy absorption ability will decrease drastically.

Torque diagram



Installation guide of shock absorber

- ❶ Install 3 nuts on the shock absorber as the picture shown.
- ❷ Bind the A nut and B nut together via tightening them with different rotating direction.
- ❸ Hold B nut and rotate C nut to bind the plate and C nut together.
- ❹ Unbind the A nut and B nut. The installation is complete.
- ❺ For the tightening torque of the fixed nut of the shock absorber, please refer to the table below.



Tube I.D.	Max. tightening torque (N.m)
16	1.67
20	3.14
25	10.8
32	23.5
40	62.8

Theoretic force

Unit: N·m

Model		MCRQ					
Tube I.D.		12	16	20	25	32	40
Operating pressure (MPa)	0.1	0.1	0.26	0.5	0.91	1.88	3.78
	0.2	0.21	0.52	1	1.81	3.78	7.53
	0.3	0.31	0.78	1.5	2.72	5.66	11.31
	0.4	0.41	1.04	2.01	3.62	7.56	15.09
	0.5	0.52	1.31	2.51	4.55	9.44	18.87
	0.6	0.63	1.57	3	5.45	11.32	22.62
	0.7	0.73	1.83	3.5	6.36	13.23	26.4
	0.8	—	2.09	4.02	7.26	15.12	30.16
	0.9	—	2.35	4.52	8.17	17.01	33.93
	1.0	—	2.61	5.03	9.08	18.9	37.7

Allowable load

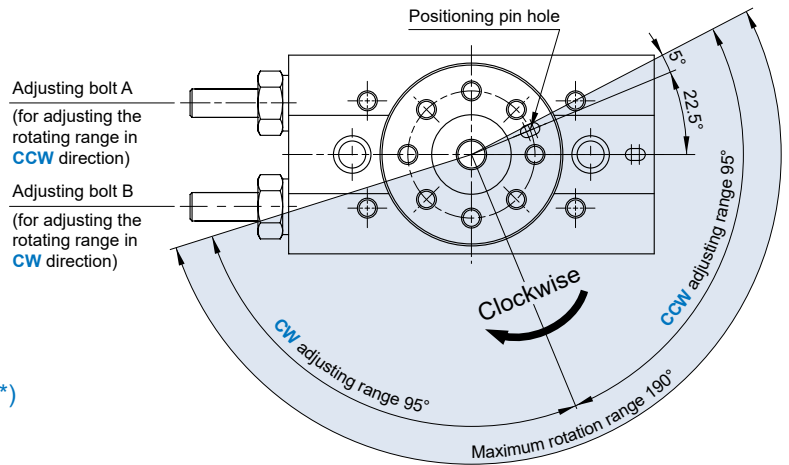
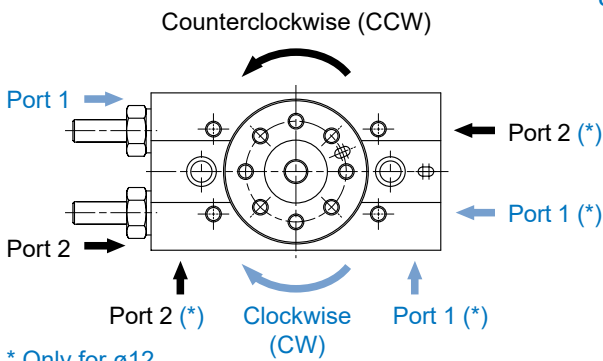
Set the load and moment to be applied to the table within the allowable values shown in the table below. (Values outside of limitations will cause excessive play, deteriorate accuracy, and shorten service life.)

Pictures	Tube I.D.	Allowable radial load (N)	Allowable thrust load (N)		Allowable moment (N.m)
			(a)	(b)	
12	54	71	71	1.5	
16	78	74	78	2.4	
20	196	197	363	5.3	
25	314	296	451	9.7	
32	390	493	708	18	
40	543	740	1009	25	

Rotating direction and angle

- When the port 1 is pressurized, the flange rotates in clockwise (CW) direction.
- When the port 2 is pressurized, the flange rotates in counter-clockwise (CCW) direction.

The rotating angle range can be adjust by the method shown as right figure.

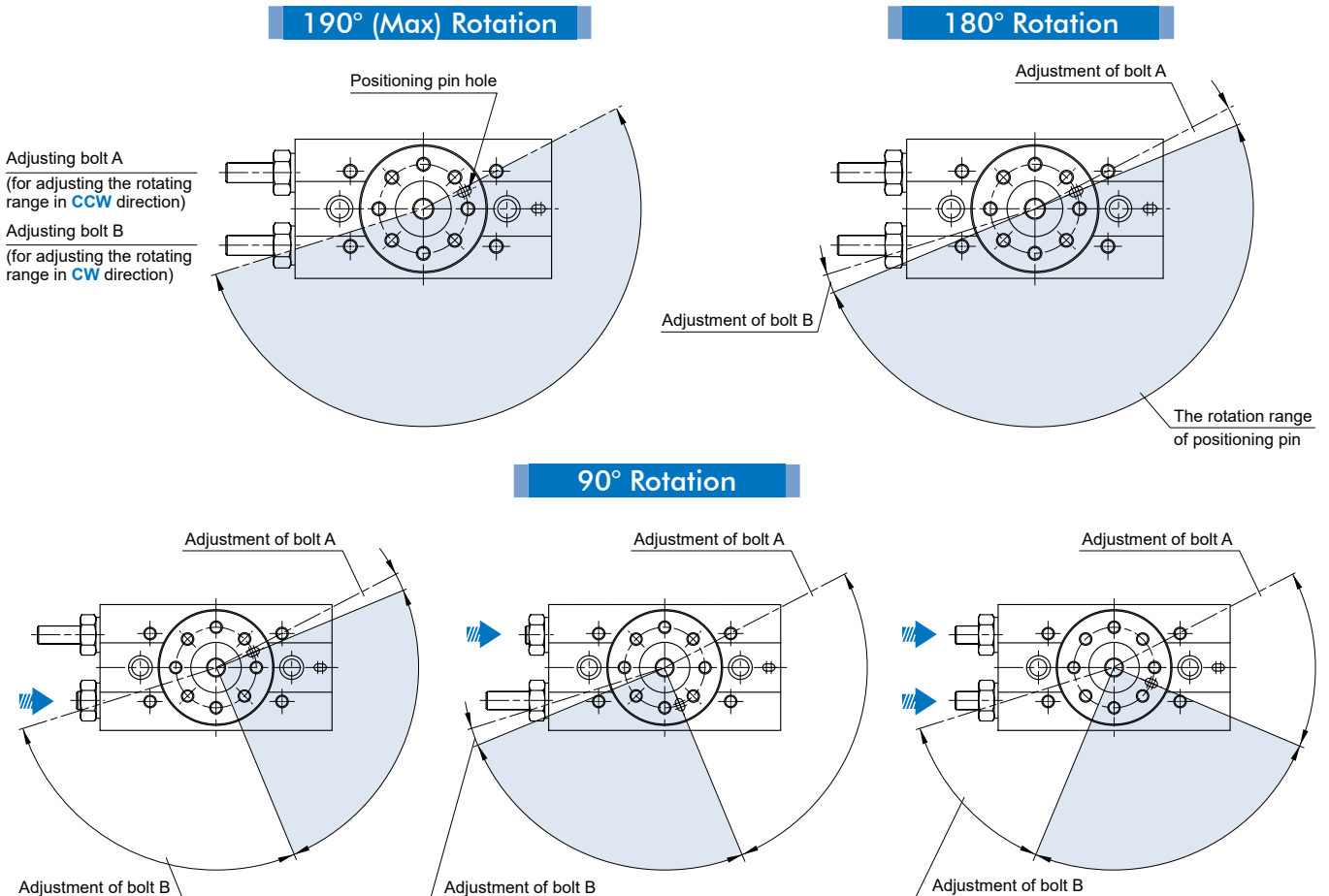


NOTE

- The figure shows the rotating range and use the pin hole as indicator.
- The pin hole position in the figure locates at the situation which the CCW & CW rotating range are both adjusted at 90°.

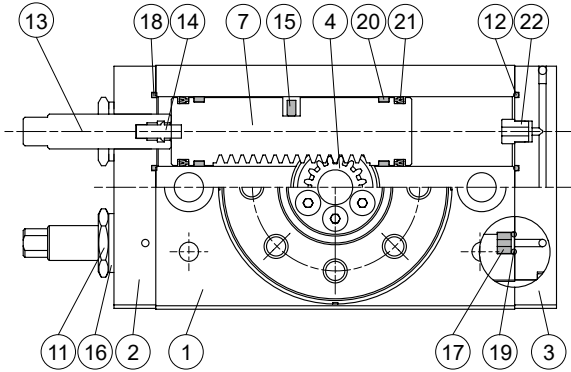
Rotating range adjusting example

- The followed figures show the rotating range of different adjustment via bolt A and B. (The drawings also show the rotation ranges of the positioning pin hole.)

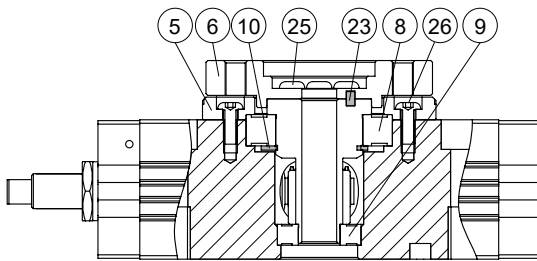
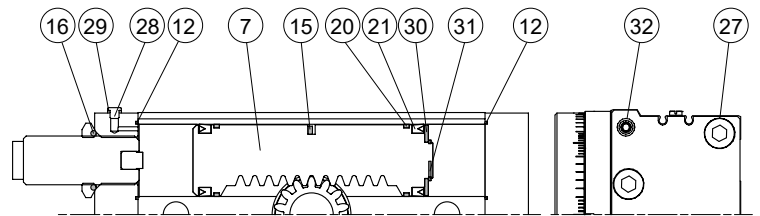


ROTARY ACTUATOR

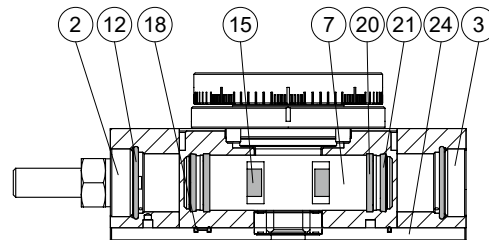
ø16~ø32



ø40



ø12



Material

A: Repair kits (inclusion)

No.	Part name	Material	Tube I.D. & Q'y				A
			12	16	20~32	40	
1	Body	Aluminum alloy	1				
2	Cover	Aluminum alloy	2	1			
3	End cover	Aluminum alloy	2	1			
4	Pinion	SCM	1				
5	Bearing retainer	Aluminum alloy	1				
6	Table	Aluminum alloy	1				
7	Piston	Stainless steel	2				
8	Rolling bearing	Bearing steel	1				
9	Rolling bearing	Bearing steel	1				
10	Snap ring	Spring steel	-	1	-		
11	Seal nut	Carbon steel	2				
12	O-ring	NBR	4	2	4	●	
13	Adjusting bolt *1	Stainless steel *2	2				
	Shock absorber *3	-	-	2			
14	Cushion pad *1	NBR	2				●
15	Magnet	Magnet material	4	2			
16	Seal washer	*4	2				●
17	Fixed	Copper	-	4	2	-	
18	Piston packing	NBR	1	-	2	-	
19	O-ring	NBR	-	4	2	-	
20	Wear ring	Resin	4				

*1. Only suitable for (A) with adjusting bolt. *2. ø40: Carbon steel
 *3. Only suitable for (R) with shock absorber.
 *4. ø12~ø32: NBR+Carbon steel; ø40: NBR

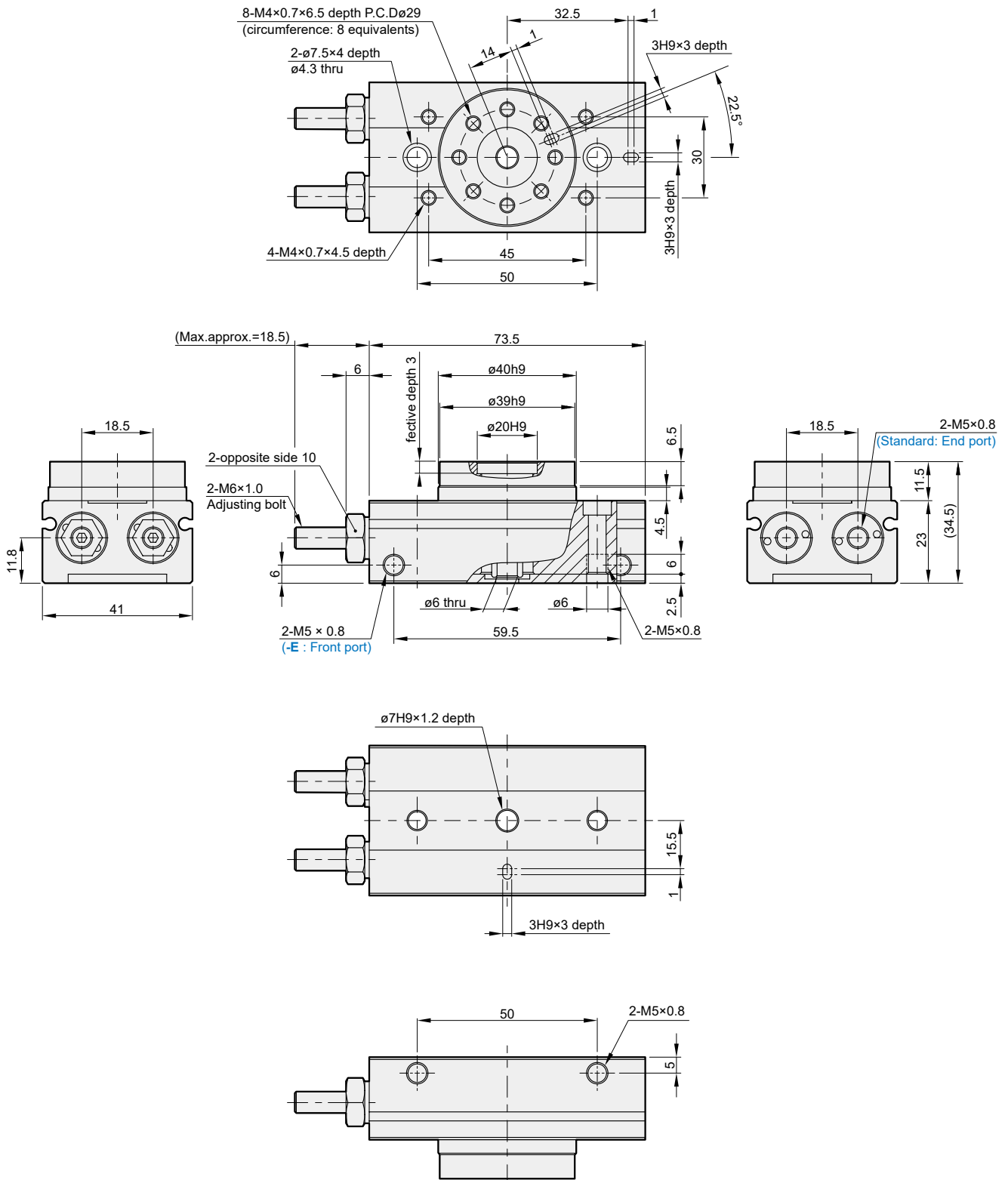
A: Repair kits (inclusion)

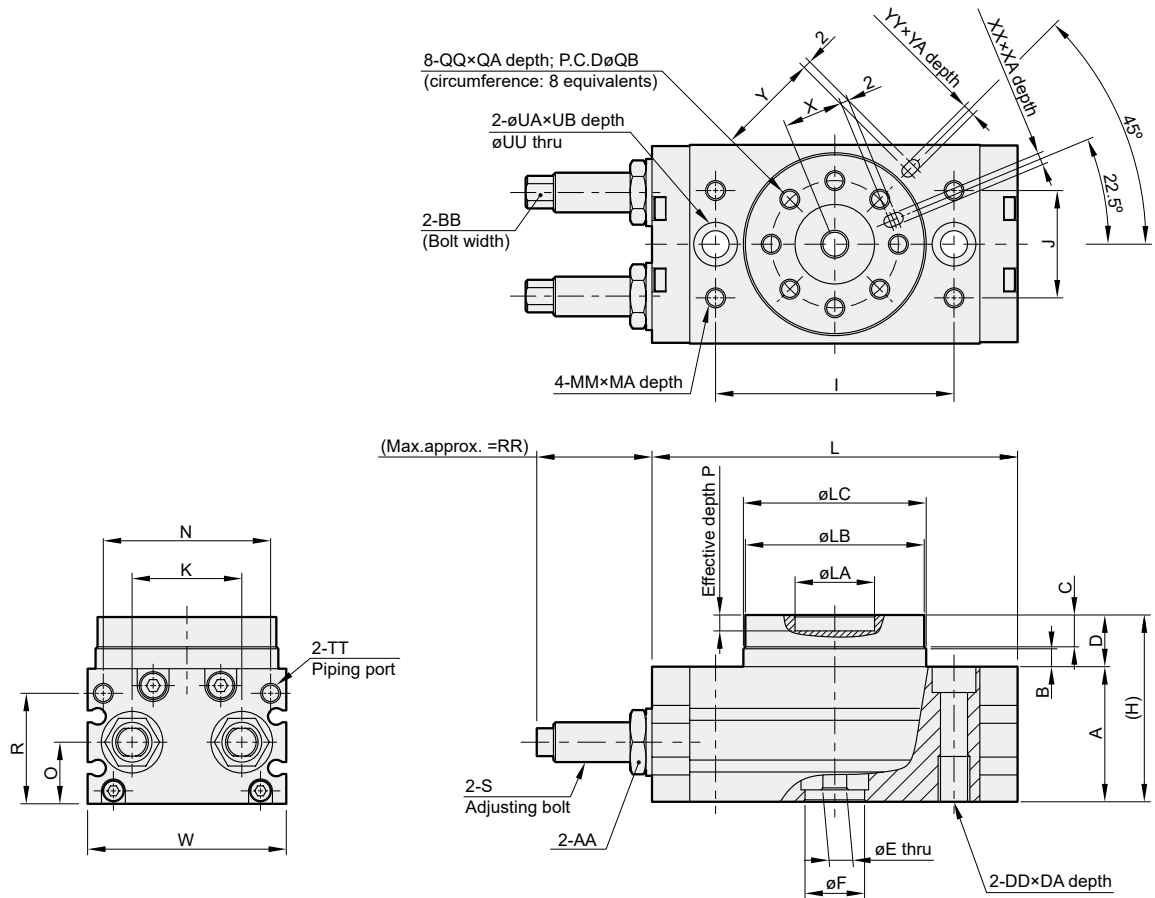
No.	Part name	Material	Tube I.D. & Q'y						A
			12	16	20	25	32	40	
21	Piston Seal	NBR	4						●
22	Stop chunk	Aluminum alloy	-	2	-				
23	Pin *5	SCM	1						
24	Plate	Aluminum alloy	1	-					
25	Bolt	Stainless steel *6	6						
26	Bolt	Carbon steel	4	6	4	6			
27	Bolt	Stainless steel	4						
28	Plug	Copper	-	-	-	1			
29	Plug washer	PET	-	-	-	1			
30	Piston retainer	Aluminum alloy	-	-	-	2			
31	Piston snap ring	Spring steel	-	-	-	2			
32	Plug	Carbon steel	-	-	-	2			

*5. ø20~ø40: Key
 *6. ø16, ø20: Carbon steel

Order example of repair kits

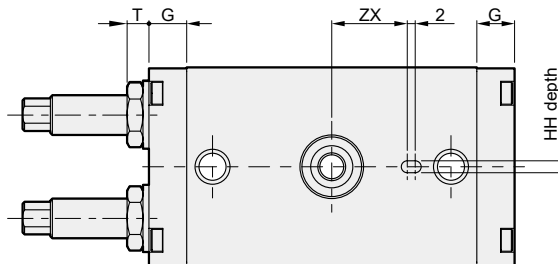
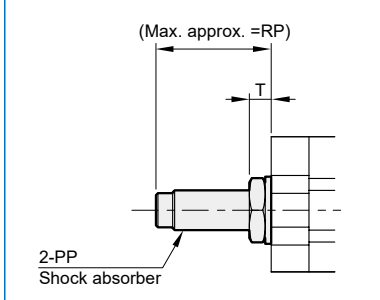
Tube I.D.	Repair kits	
	Adjuster bolts (A)	Shock absorber (R)
ø12	PS-MCRQ-12A	-
ø16	PS-MCRQ-16A	PS-MCRQ-16R
ø20	PS-MCRQ-20A	PS-MCRQ-20R
ø25	PS-MCRQ-25A	PS-MCRQ-25R
ø32	PS-MCRQ-32A	PS-MCRQ-32R
ø40	PS-MCRQ-40A	PS-MCRQ-40R





MCRQ-16~25R

With shock absorber



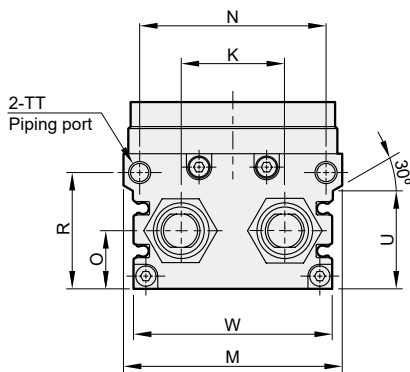
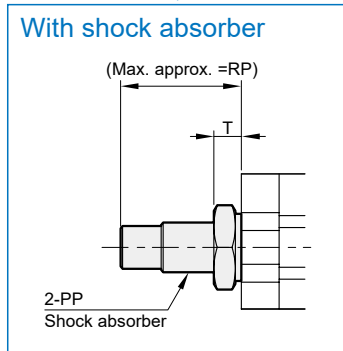
Code Tubr I.D.	A	AA	B	BB	C	D	DA	DD	E	F	G	H	HH	I	J	K	L	LA	LB	LC	MA	MM	N
16	34	14	4.5	7	8	13	12	M8×1.25	6	15H9	9.5	47	3H9×3.5	60	27	26	92	20H9	45h9	46h9	8	M5×0.8	37
20	40	17	6.5	7	10	17	15	M10×1.5	10	22H9	12	57	4H9×4.5	84	37	32	127	32H9	65h9	67h9	8	M6×1	54
25	46	22	7.5	8	12	20	18	M12×1.75	13	26H9	15.5	66	5H9×5.5	100	50	37	152	35H9	75h9	77h9	8	M8×1.25	63

Code Tubr I.D.	O	P	PP	QA	QB	QQ	R	RP	RR	S	T	TT	UA	UB	UU	W	X	XA	XX	Y	YA	YY	ZX
16	15.5	4	FK-1008L-S	8	32	M5×0.8	29	29	31	M10×1.0	5.5	M5×0.8	11	6.5	6.8	50	15	3.5	3H9	27	3.5	3H9	19
20	19.5	4.5	FK-1008L-S	10	48	M6×1.0	33	23.5	26	M10×1.0	4.5	Rc1/8	14	8.5	8.6	70	23	4.5	4H9	39	4.5	4H9	28
25	22	5	FK-1412L-S	12	55	M8×1.25	37.5	33	31.2	M14×1.5	7.5	Rc1/8	18	10.5	10.5	80	26.5	5.5	5H9	45	5.5	5H9	33

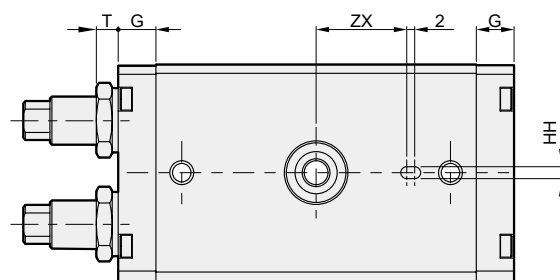
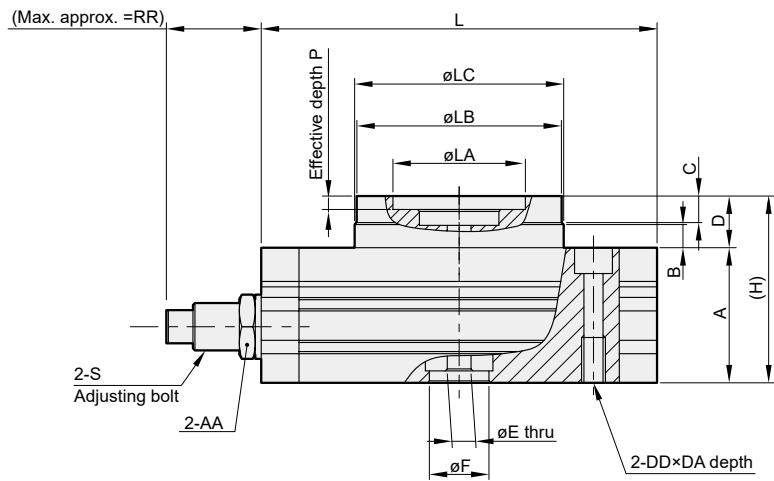
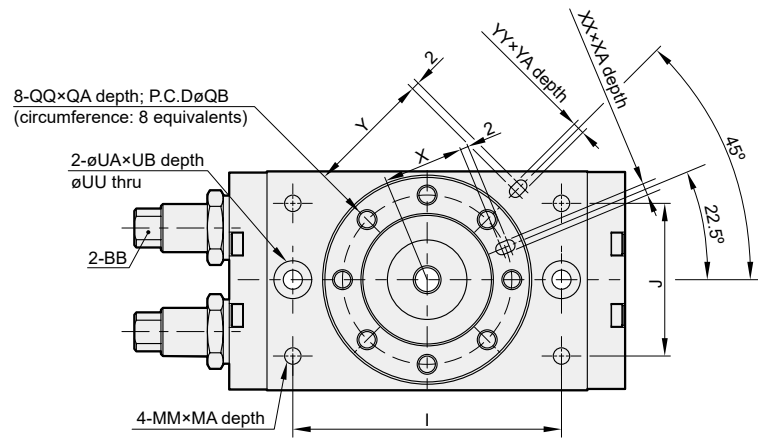
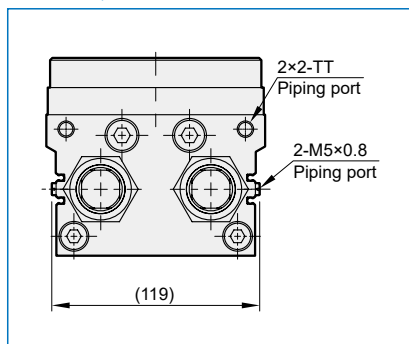
ROTARY ACTUATOR

MCRQ-32R, 40R

With shock absorber



MCRQ-40



Code Tubr I.D.	A	AA	B	BB	C	D	DA	DD	E	F	G	H	HH	I	J	K	L	LA	LB	LC	M	MA
32	59	30	12	Bolt width 12	14.5	27	18	M12x1.75	13	24H9	17	86	6H9x4.5 dp	130	66	47	189	56H9	98h9	100h9	102	10
40	74	36	15	Bolt width 21	16.5	32	25	M16x2.0	24	32H9	24	106	8H9x6.5 dp	150	80	60	240	64H9	116h9	118h9	120	13

Code Tubr I.D.	MM	N	O	P	PP	QA	QB	QQ	R	RP	RR	S	T	TT	U	UA	UB	UU	W	X	XA
32	M8x1.25	85	27.5	6	FK-2016L-S	14.5	77	M10x1.5	50.5	46	38.1	M20x1.5	10.5	Rc1/8	42	18	10.5	10.5	95	37.5	6.5
40	M12x1.75	100	37	9	FK-2725L-S	16.5	90	M12x1.75	65.5	68	45	M27x1.5	7	Rc1/8	57	20	12.5	14.2	113	44	8.5

Code Tubr I.D.	XX	Y	YA	YY	ZX
32	6H9	59	4.5	6H9	49
40	8H9	69	4.5	8H9	54

MCRQ-S series

ROTARY ACTUATOR

COMING SOON

Compatible with R*C(V) series sensor

[Update information](#)



Mindman



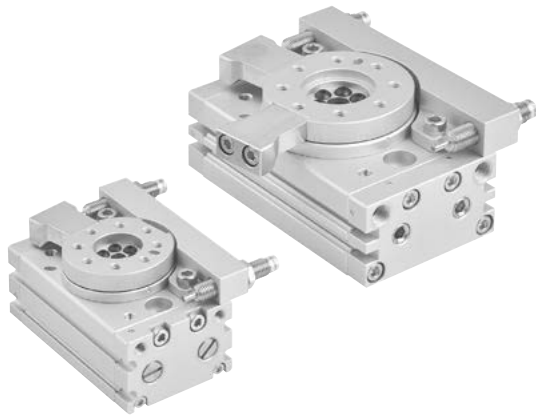
Moment of inertia



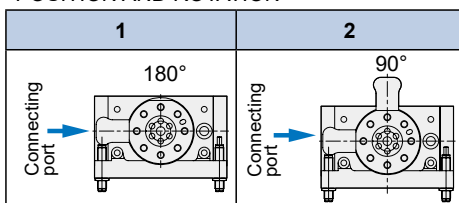
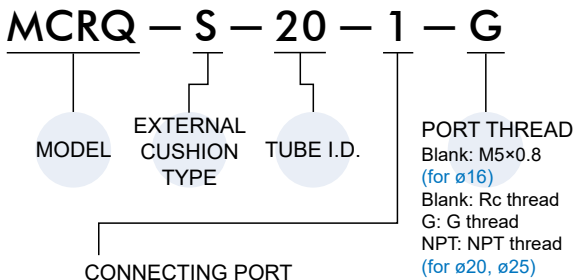
Technical data



Caution for safety
(Read before installing)

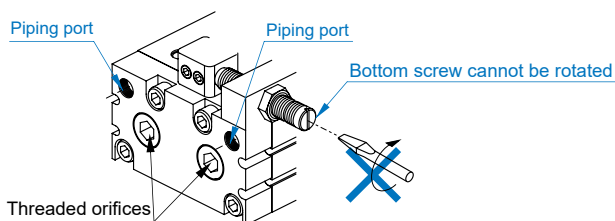


Order example



Notice for shock absorber

- The threaded orifices shown below are not connecting ports. Never remove the plugs as this will cause malfunction.
- Never rotate the bottom screw of the shock absorber. (It is not an adjustment screw.) This may cause oil leakage.



Features

- **4 to 10 times more allowable kinetic energy** (compared with internal shock absorber type)
- **Total length shortened**
Longitudinal mounting space is reduced because there is no protrusion from adjustment bolts or internal shock absorbers.

Specification

Model	MCRQ-S		
Acting type	Double acting		
Tube I.D. (mm)	16	20	25
Port size	M5×0.8	Rc1/8	
Rotation	90°, 180°		
Medium	Air (Non-lube)		
Max. operating pressure	1 MPa (*1)		
Min. operating pressure	0.2 MPa		
Ambient temperature	0~+60°C (No freezing)		
Allowable kinetic energy (J)	0.231	1.21	1.82
Rotation time adjustment range (s/90°)	0.2~1.0 (*2)		
Cushion	Shock absorber		
Shock absorber type	MDSC-0806-3N	MDSC-1008-3N	MDSC-1412-3N
Angle adjustment range	Each rotation end ± 3°		
Weight (kg)	90°	0.67	1.55
	180°	0.64	1.48
Sensor switch	RDC(V), RQC(V) , RDFE(V)		

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

*2. For stable operation the time required for 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), however, approximately 0.2 to 2 seconds are required.

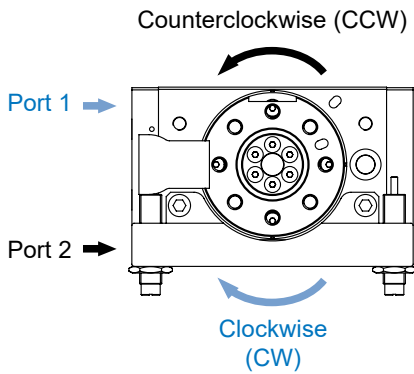
Range of shock absorber operates

Model	Adjustment angle per rotation of angle adjustment screw	Range of angle the shock absorber operates (single side)
MCRQ-S-16	1.5°	12°
MCRQ-S-20	1.1°	9°
MCRQ-S-25	1.3°	11°

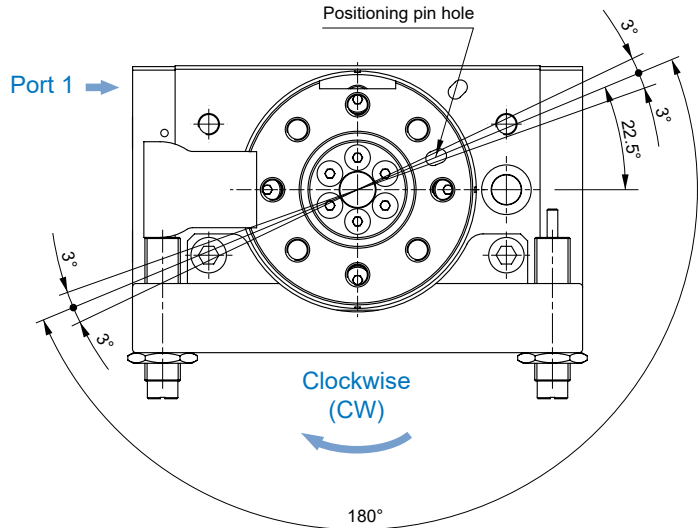
Rotating direction and angle

- When the port 1 is pressurized, the flange rotates in clockwise (CW) direction.
- When the port 2 is pressurized, the flange rotates in counter-clockwise (CCW) direction.

The rotating angle range can be adjusted by the method shown as right figure.

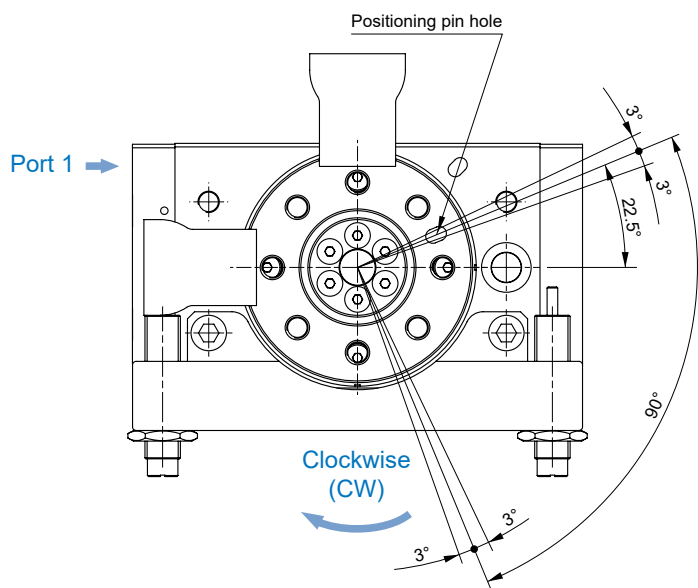


MCRQ-S-*-1 180°

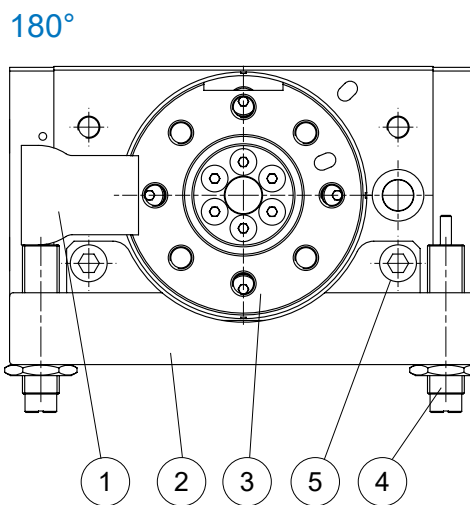
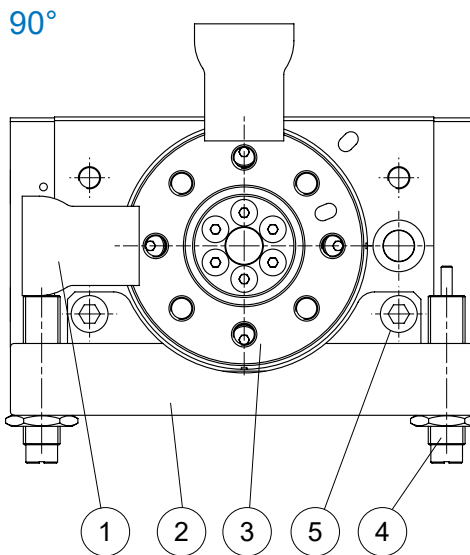
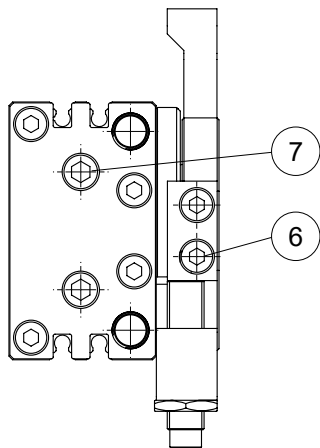


Minimum rotating range 174°
Maximum rotating range 186°

MCRQ-S-*-2 90°



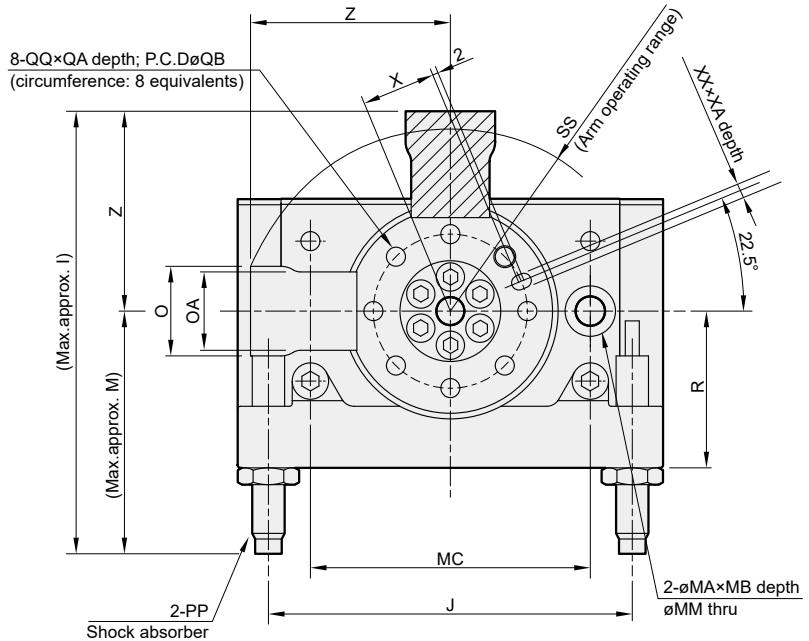
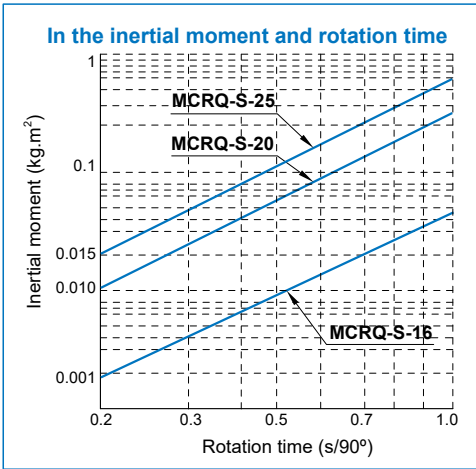
Minimum rotating range 84°
Maximum rotating range 96°



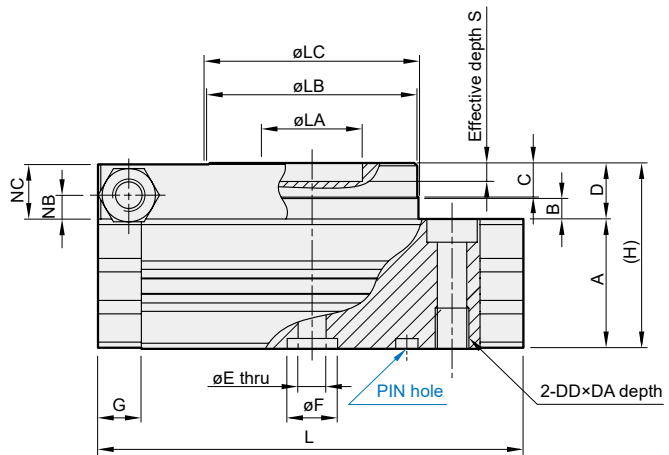
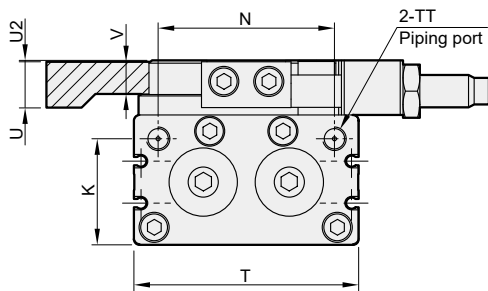
Material

No.	Part name	Material	Rotation & Q'y	
			90°	180°
1	Fixing plate	Carbon steel	2	1
2	Cushion mount	Aluminum alloy	1	1
3	Flange table	Aluminum alloy	1	1
4	Shock absorber	—	2	2
5	Bolt	Stainless steel	2	2
6	Bolt	Stainless steel	4	2
7	Plug	Stainless steel	2	2

ROTARY ACTUATOR



Code Tubr I.D.	PP
16	MDSC-0806-3N
20	MDSC-1008-3N
25	MDSC-1412-3N



PIN hole size

Code Tubr I.D.	HH	ZX
16	3H9×3.5	19
20	4H9×4.5	28
25	5H9×5.5	33

Code Tubr I.D.	A	B	C	D	DA	DD	E	F	G	H	I	J	K	L	LA	LB	LC	M	MA	MB	MC
16	34	4.5	8	13	12	M8×1.25	6	15H9	9.5	47	92.8	80.6	29	92	20H9	45h9	46h9	48.5	11	6.5	60
20	40	6.5	10	17	15	M10×1.5	10	22H9	12	57	119.3	110	33	127	32H9	65h9	67h9	59	14	8.5	84
25	46	7.5	12	20	18	M12×1.75	13	26H9	15.5	66	154.8	130	37.5	152	35H9	75h9	77h9	83.3	18	10.5	100

Code Tubr I.D.	MM	N	NB	NC	O	OA	QA	QB	QQ	R	S	SS	T	TT	U	U2	V	X	XA	XX	Z
16	6.8	37	5.5	12.5	20	15.6	8	32	M5×0.8	33	4	45.4	50	M5×0.8	11.5	0.3	7.5	15	3.5	3H9	44.3
20	8.6	54	8	16.5	27	21.5	10	48	M6×1	46	4.5	61.8	70	Rc1/8	13.5	0.5	9	23	4.5	4H9	60.3
25	10.5	63	8.5	19.5	32	28	12	55	M8×1.25	54.5	5	73.3	80	Rc1/8	18	0.5	11	26.5	5.5	5H9	71.5



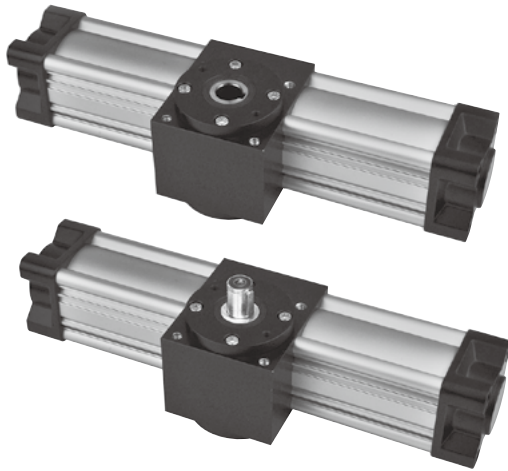
Moment of inertia



Technical data



Caution for safety
(Read before installing)



MRTH

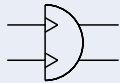
Male pivot gear
(standard type)

MRTH-D

Male pivot gear
(double end rod type)

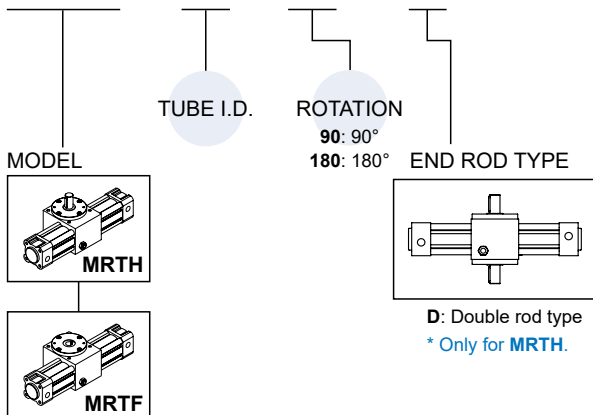
MRTF

Female pivot gear



Order example

MRTH - 40 - 90 - D



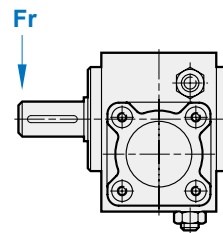
Features

- The body is manufactured in anodized aluminium alloy, and has been designed looking at the harmonious aesthetic development.
- Pinion and rack produced from carbon steel reduces backlash within the mechanism.
- Rotation adjustment screw.
- Magnetic as standard.

Specification

Model	MRTF, MRTH, MRTH-D			
Tube I.D. (mm)	40	63	80	
Standard rotation	90±5°, 180±5°			
Rotating shaft dia. (mm)	16	24	28	
Initial position of slot (mm)	See dimensional feature			
Medium	Filtered air with or without lubrication			
Operating pressure range	0.13~0.7 MPa			
Ambient temperature	-5~+60°C (No freezing)			
Max. allowable axial thrust (kg)	10	12	20	
Cushion angle	74°	75°	80°	
Max. allowable kinetic energy	90°	0.266J	0.675J	1.34J
	180°	0.58J	1.54J	3.03J
Max. allowable radial trust (Fr)	514.5 N	725.2 N	896.7 N	
Sensor switch	LN65			

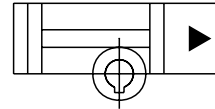
Max. allowable radial trust



Cylinder weight

Unit: kg

Model	MRTH		MRTH-D		MRTF		LN65
Fig							
Tube I.D./Angle	90°	180°	90°	180°	90°	180°	Sensor switch
40	3.30	3.40	3.35	3.45	3.14	3.24	0.03
63	5.80	6.20	5.95	6.35	5.47	5.87	
80	10.25	10.80	10.49	11.00	9.69	10.24	



Compressed air consumption for a complete cycle

Unit: L/cycle

Model	Rotation	Operating pressure (MPa)									
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
MRTH40 MRTF40	90°	0.1571	0.2352	0.3133	0.3915	0.4696	0.5477	0.6259	0.7040	0.7821	0.8603
	180°	0.3141	0.4704	0.6267	0.7829	0.9392	1.0955	1.2517	1.4080	1.5643	1.7205
MRTH63 MRTF63	90°	0.4383	0.6564	0.8744	1.0925	1.3105	1.5286	1.7466	1.9647	2.1828	2.4008
	180°	0.8766	1.3127	1.7488	2.1850	2.6211	3.0572	3.4933	3.9294	4.3655	4.8016
MRTH80 MRTF80	90°	0.8480	1.2698	1.6917	2.1135	2.5354	2.9572	3.3791	3.8009	4.2228	4.6447
	180°	1.6959	2.5396	3.3834	4.2271	5.0708	5.9145	6.7582	7.6019	8.4456	9.2893

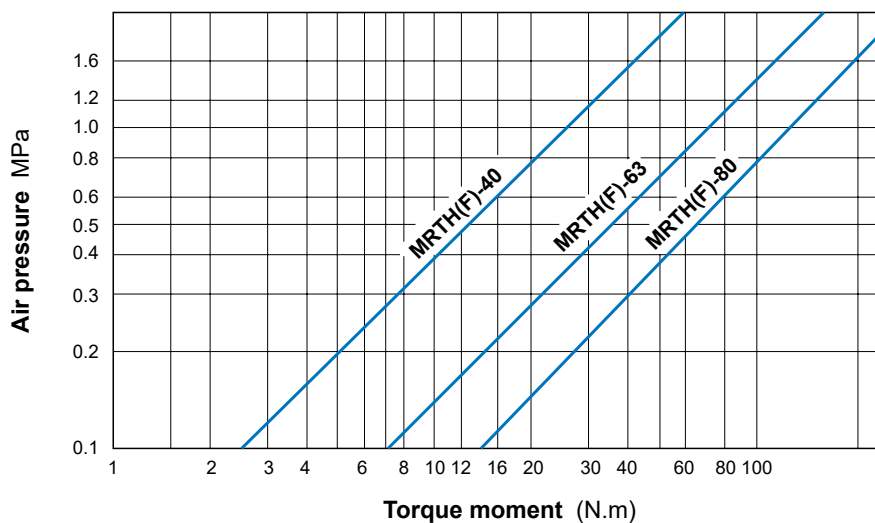
Model	MRTH, MRTF		
Tube I.D.(mm)	40	63	80
Constant K	0.3491	0.3927	0.4712

The method of calculation (Compressed air consumption)

$$Q = 2 \times K \times A \times n \times Dg \times \frac{P+0.101}{0.101} \times 10^{-6}$$

Q:	Compressed air consumption (L/cycle)
A:	Piston area (mm ²)
Dg:	Rotation
P:	Air pressure (MPa)
K:	Constant
n:	Cycle of operation (cycle/min)

Output torque table



Kinetic energy of rotation motion

$$E = \frac{1}{2} \times I \omega^2$$

E:	Kinetic energy	(J)
I:	Moment of inertia	(Kg·m ²)
ω:	Angle speed	(rad/s)

Equation table moment of inertia

(1)

$$I = \frac{ML^2}{3}$$

(2)

$$I = \frac{ML^2}{12}$$

(5)

$$I = I_1 + M_1 L_1^2 + \frac{M_2 L_2^2}{3}$$

*I*₁ = Obtain the center of gravity of the load (M₁) as *I*₁, a provisional shaft (B).

(3)

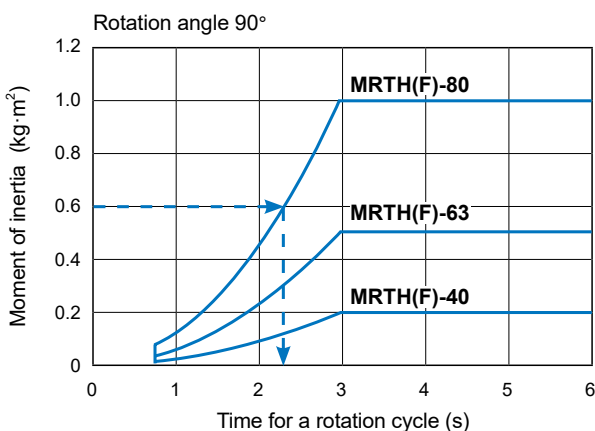
$$I = \frac{MD^2}{8}$$

(4)

$$I = \frac{M}{12} (a^2 + b^2)$$

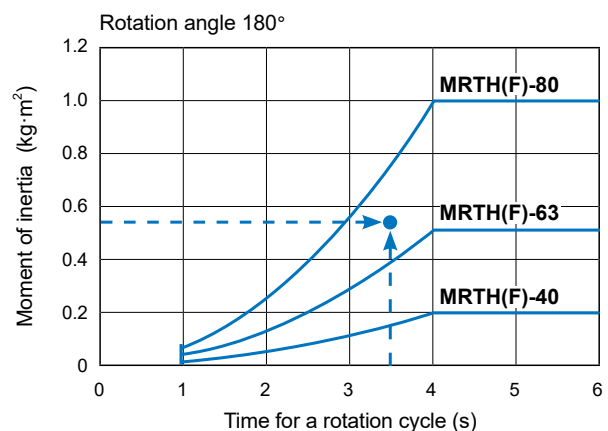
I (I₁):	Moment of inertia	(Kg·m ²)
M (M₁, M₂):	Load mass	(Kg)
L, a, b:	Side length	(m)
D:	Diameter	(m)

Moment of inertia



Example 1

When there are constraints for the moment of inertia of load, but not for rotation time. From "rotation angle = 90°", MRTH(F)-80, to operate at the load moment of inertia 0.6 kg·m²: MRTH(F)-80 will be 2.3 seconds or higher.

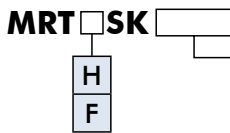


Example 2

When there are constraints for the moment of inertia of load, but not for rotation time. From "rotation angle = 180°", to operate at the load moment of inertia 0.5 kg·m² and at the rotation time setting of 3.5 seconds: The model will be MRTH(F)-80.

ROTARY ACTUATOR

How to order the seal kit

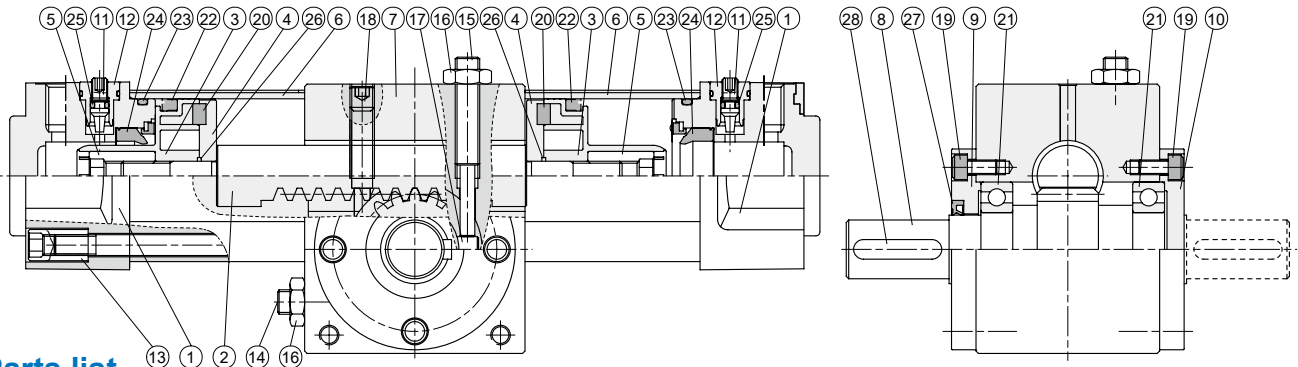


Tube I.D.	Seal kit
40	MRTHSK40 - Including No.22,23,24,25,26,27
63	MRTHSK63 - Including No.22,23,24,25,26,27
80	MRTHSK80 - Including No.22,23,24,25,26,27

Tube I.D.	Seal kit
40	MRTFSK40 - Including No.22,23,24,26,27
63	MRTFSK63 - Including No.22,23,24,26,27
80	MRTFSK80 - Including No.22,23,24,26,27

MRTH

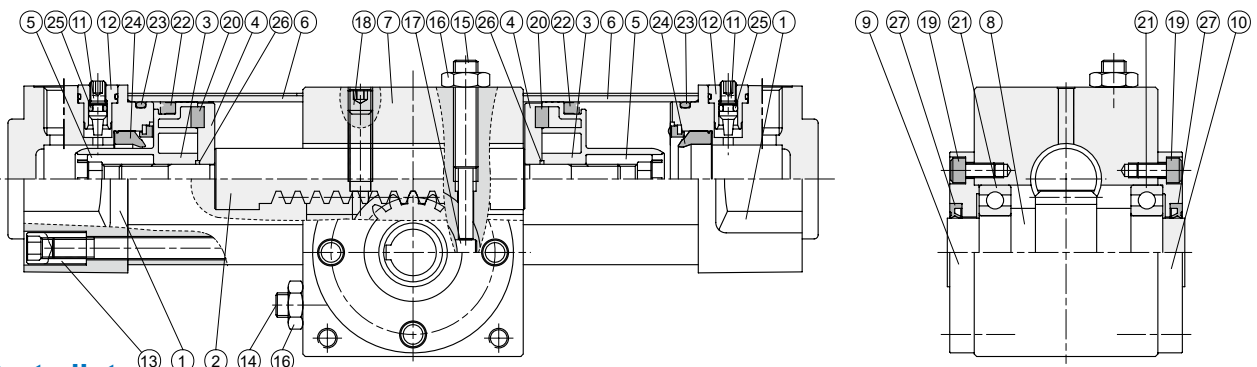
MRTH-D



Parts list

No.	Part name	Q'y	No.	Part name	Q'y	No.	Part name	Q'y
1	End cap	2	11	Cushion needle	2	21	Ball bearing	2
2	Rack	1	12	Washer	2	22	Piston packing	2
3	Piston	2	13	Tie bolt	8	23	Cylinder gasket	2
4	Magnet holder	2	14	Adjusting screw	1	24	Cushion packing	2
5	Piston nut	2	15	Adjusting screw	1	25	O-ring	2
6	Cylinder tube	2	16	Lock nut	2	26	Piston gasket	2
7	Housing	1	17	Stopper pin	1	27	Rod packing	1
8	Pinion shaft	1	18	Set screw	1	28	Key (MRTH-D=2)	1
9	End cover	1	19	Hexagon socket head screw	8			
10	End cover	1	20	Magnet	2			

MRTF

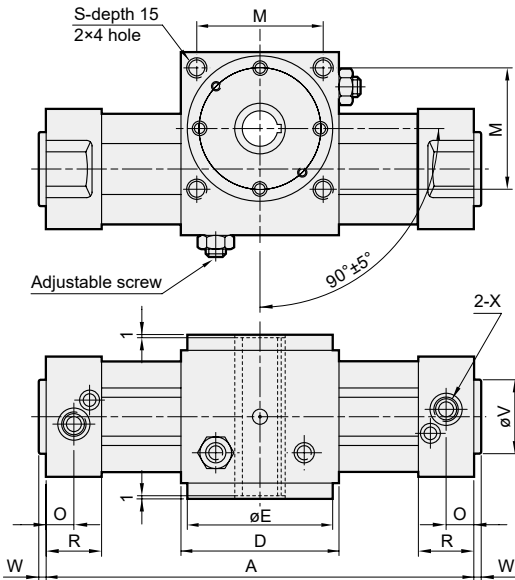


Parts list

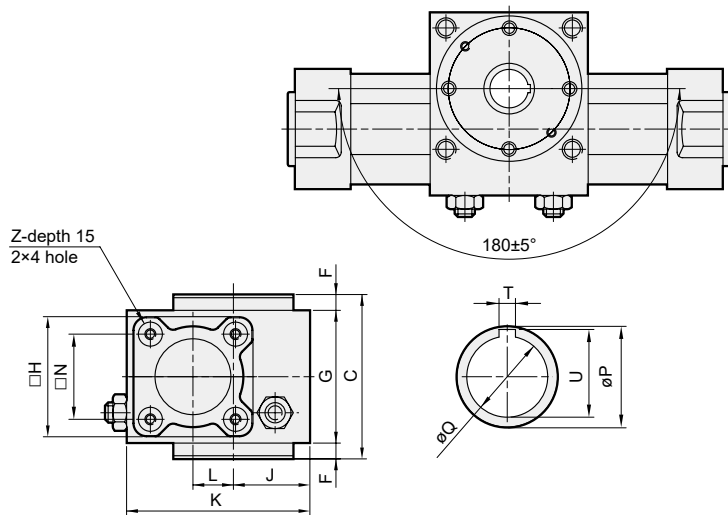
No.	Part name	Q'y	No.	Part name	Q'y	No.	Part name	Q'y
1	End cap	2	10	End cover	1	19	Hexagon socket head screw	8
2	Rack	1	11	Cushion needle	2	20	Magnet	2
3	Piston	2	12	Cushion plug	2	21	Ball bearing	2
4	Magnet holder	2	13	Tie bolt	8	22	Piston packing	2
5	Piston nut	2	14	Adjusting screw	1	23	Cylinder gasket	2
6	Cylinder tube	2	15	Adjusting screw	1	24	Cushion packing	2
7	Housing	1	16	Lock nut	2	25	O-ring	2
8	Pinion shaft	1	17	Stopper pin	1	26	Piston gasket	2
9	End cover	1	18	Set screw	1	27	Rod packing	2

MRTF

Angle of rotation 90°



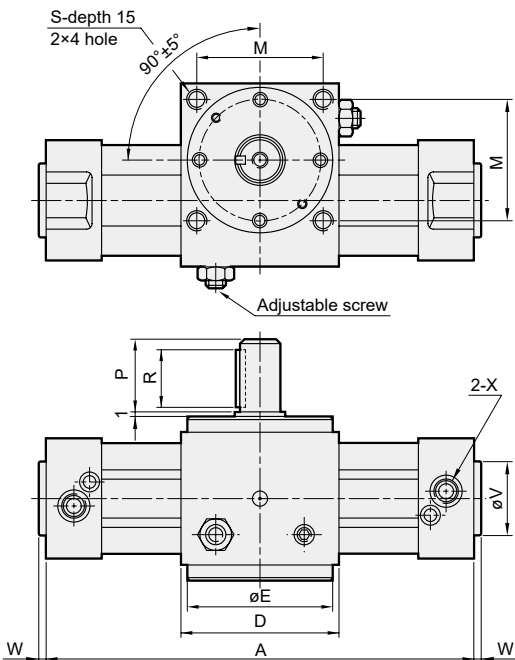
Angle of rotation 180°



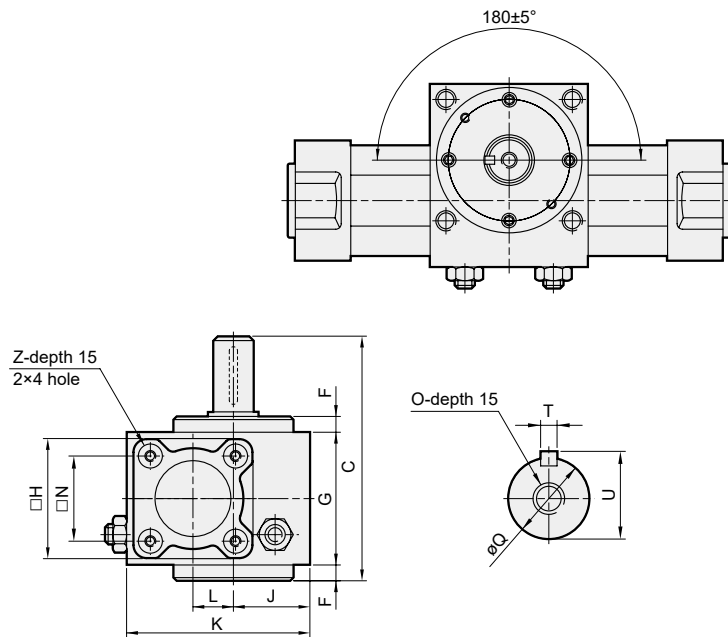
Model	A		C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Z
	90°	180°																						
MRTF-40	263	326	81	75	72	8	65	53	37.5	93	27.5	60	38	15	25	14	30	M6	5	16.5	35	5	G1/4	M6
MRTF-63	306	377	95	90	82	10	75	75	42.5	110	30	70	56.5	16	30	19	32	M8	6	22	45	4	G3/8	M8
MRTF-80	343	428	119	105	96	12	95	95	51.5	135	36	82	72	19	35	24	38	M10	6	27	45	5	G3/8	M10

MRTH

Angle of rotation 90°



Angle of rotation 180°

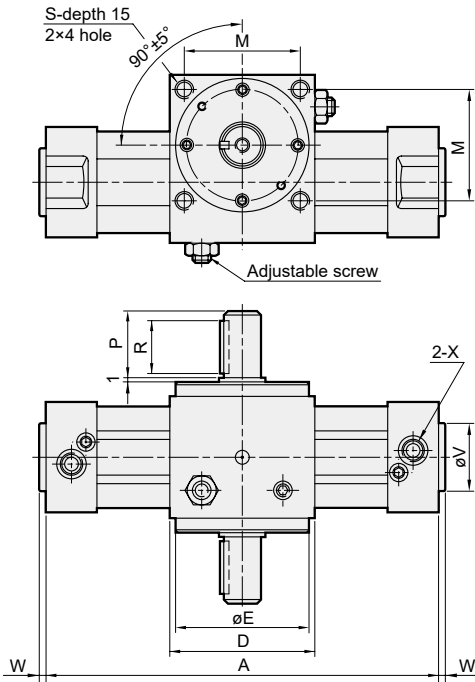


Model	A		C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Z
	90°	180°																						
MRTH-40	263	326	112	75	72	8	65	53	37.5	93	27.5	60	38	M5	30	16	25	M6	5	18	35	5	G1/4	M6
MRTH-63	306	377	138	90	82	10	75	75	42.5	110	30	70	56.5	M8	42	24	36	M8	8	27	45	4	G3/8	M8
MRTH-80	343	428	170	105	96	12	95	95	51.5	135	36	82	72	M8	50	28	45	M10	8	31	45	5	G3/8	M10

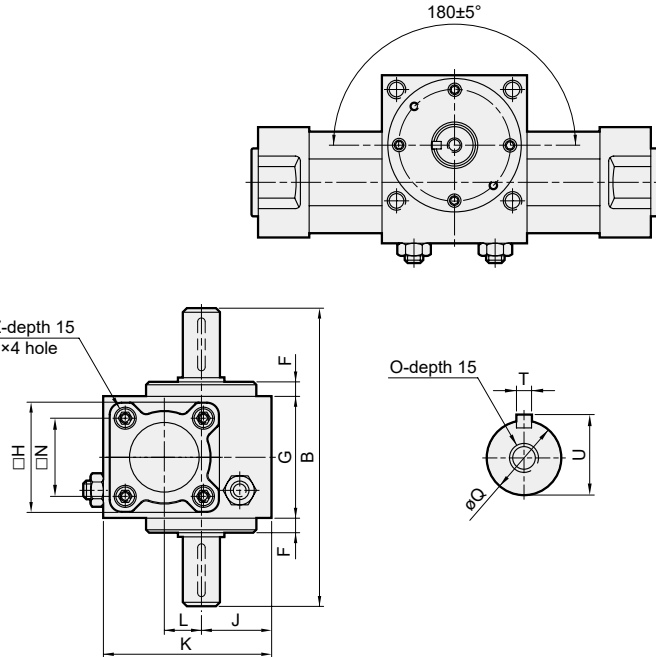
ROTARY ACTUATOR

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MRTH-D Angle of rotation 90°

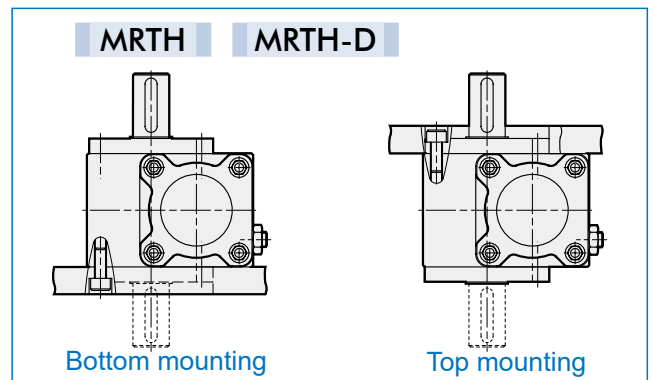
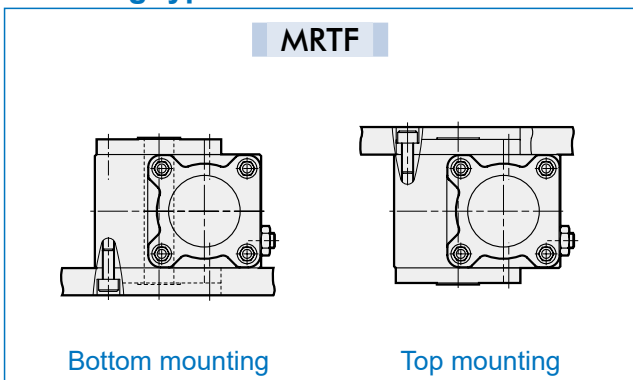


Angle of rotation 180°

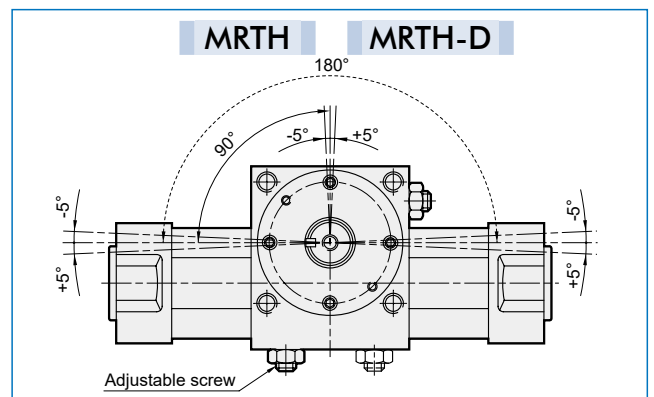
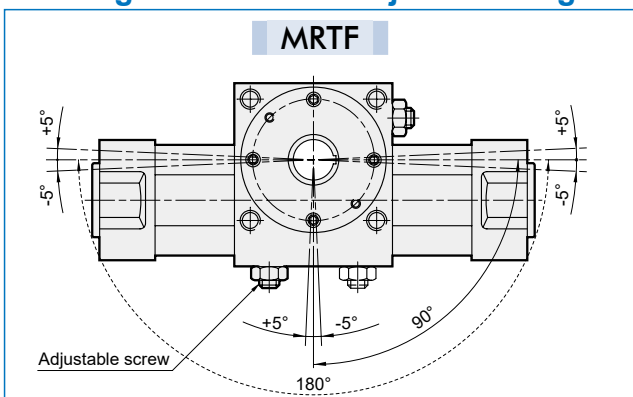


Model	A		B	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Z
	90°	180°																						
MRTH-40-D	263	326	143	75	72	8	65	53	37.5	93	27.5	60	38	M5	30	16	25	M6	5	18	35	5	G1/4	M6
MRTH-63-D	306	377	181	90	82	10	75	75	42.5	110	30	70	56.5	M8	42	24	36	M8	8	27	45	4	G3/8	M8
MRTH-80-D	343	428	221	105	96	12	95	95	51.5	135	36	82	72	M8	50	28	45	M10	8	31	45	5	G3/8	M10

Mounting type

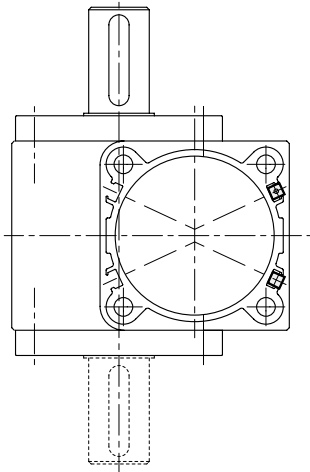


Rotating direction and adjustable angle

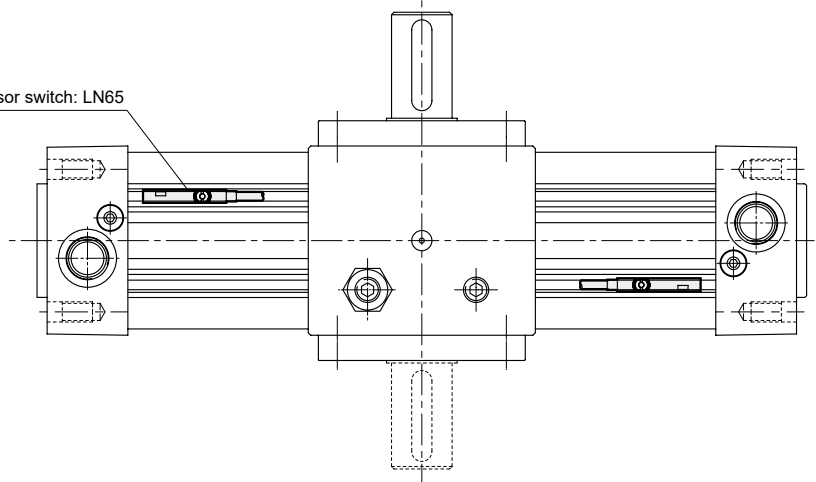


MRTH

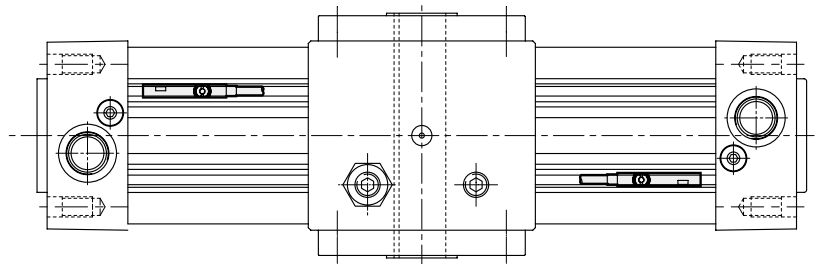
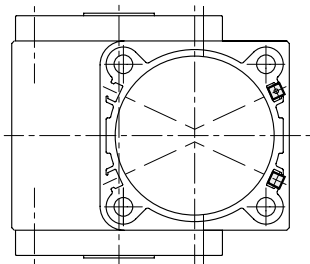
MRTH-D



Sensor switch: LN65

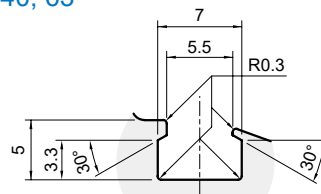


MRTF

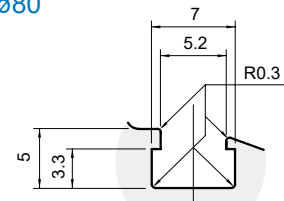


Sensor switch mounting groove

$\phi 40, 63$



$\phi 80$



Tube I.D.	Sensor switch
40, 63, 80	LN65

