Rotary Clamp Cylinders - Overview

■Overview
The square and space-saving cylinders have built-in rotary (swing) clamping mechanisms.
Suitable for clamping small workpieces such as electronic parts in limited spaces.

■Features
- **Space Saving / Square**
  Sensors of all diameters (Contact / No Contact) are mountable to the cylinders.
- **High Rigidity**
  For enhanced wear resistance, the cylinders are equipped with two guide grooves compatible with all diameters.
  In addition, each of the guide pins is outfitted with a roller (Ø32 ~ Ø50).

■Basic Specifications of Clamp Cylinders

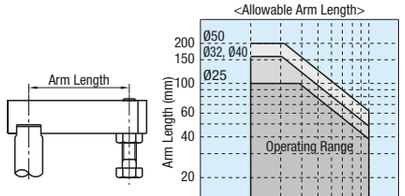
Tube I.D. (mm)		25	32	40	50
Operating Type		Double Acting			
Applicable Fluid		Compressed Air			
Max. Operating Pressure (MPa)		1.0			
Min. Operating Pressure (MPa)		0.2			
Guaranteed Withstand Pressure (MPa)		1.6			
Operating Temp. Range (°C)		-10 ~ 60 (Non-Freezing)			
Connection Dia.		M5	Rc1/8		Rc1/4
Piston Speed (mm/s)		50~200			
Cushion Mechanism		With Cushion Rubber			
Lubrication		N/A			
Rotating Angle		90°±10°			
Rotating Direction		Right / Left			
Rod Non-rotating Accuracy (when Clamped): Initial Value		±1°	±0.9°		±0.7°
Pressure Area (mm^2)	Instroke Side	377	603	1055	1649
	Outstroke Side	490	804	1256	1963
Service Life		1 Million Times			

■Stroke

Tube I.D. (mm)	Stroke	Stroke on Rotating (mm)	Stroke on Clamping (mm)	Rotating Direction
Ø25	31	11	20	Counterclockwise Clockwise
Ø32	35	15	20	
Ø40	35	15	20	
Ø50	70	20	50	

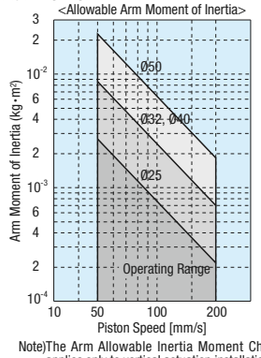
■Design / Selection
▲ NOTE
■In operation, the piston rod of this cylinder strokes while rotates (at 90°). Be sure that the arm mounted onto the tip of the piston rod does not interfere with any external objects while rotating. Take precautions such as installing a protective cover if the pivoting arm mounted onto the tip of the piston rod poses a hazard to human body.

■Arm Length & Operating Pressure
Set the arm length and the operating pressure to be within the ranges below.



■Clamping Position
Do not clamp while the arm is rotating.
For clamping, allow 3 mm or more before the stroke end.

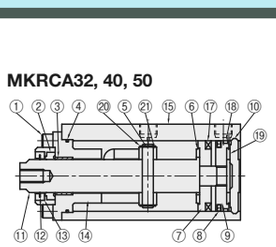
■Arm Inertia Moment & Piston Speed
Set the arm inertia moment and the piston speed to be within the operating range as shown below.



Note)The Arm Allowable Inertia Moment Chart applies only to vertical actuation installations.

■Selection Example A
<Requirements>
・Required Clamping Force : 500N
・Operating Pressure: 0.5MPa
・Piston Speed: 100mm/s
・Arm Length: 80mm
・Arm Inertia Moment: 2.0x10^{-3}kg/m

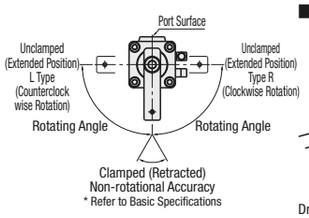
1. Calculate a required pressure area.
   Required Pressure Area (mm^2)= Required Clamping Force (N) / Operating Pressure (MPa)=500/0.5=1000 (mm^2).
2. Select a cylinder size based on the list and the pressure area (instroke side).
   Ø40 Pressure Area: 1055 (mm^2) > Required Pressure Area 1000 (mm^2)
3. Make sure that the arm length and the operating pressure are within the operating ranges as shown in the applicable chart.
   Operating Pressure 0.5MPa - Arm Length 80mm: Within the Operating Range
4. Confirm that the arm inertia moment and the piston speed are within the operating ranges as shown in the chart.
   Lever Inertia Moment 2.0x10^{-3}kg/m-Piston Speed 100mm/s: Within the Operating Range



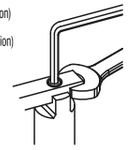
MKRCA25

MKRCA32, 40, 50

Number	Product Name	Material	Number	Product Name	Material
①	Hex Socket Head Cap Screw	Stainless Steel	⑪	Piston Rod	Steel
②	Rod Gasket	Nitrile Rubber	⑫	Coil Scraper	Copper Alloy
③	Bushing	Coppers	⑬	Holder	Aluminum Alloy
④	Cylinder Gasket	Nitrile Rubber	⑭	Rod Cover	Steel
⑤	Pin	Steel	⑮	Cylinder Body	Aluminum Alloy
⑥	Cushion Rubber	Urethane Rubber	⑯	Spacer Washer	Stainless Steel
⑦	Spacer	Ø25: Special Resin Ø32 ~ Ø50: Aluminum Alloy	⑰	Magnet	Plastic
			⑱	Wear Contact	Acetal Resin
⑧	Piston Gasket	Nitrile Rubber	⑲	Cushion Rubber	Urethane Rubber
⑨	Piston	Aluminum Alloy	⑳	E Type Retaining Ring	Steel
⑩	Cover	Ø25: Stainless Steel Ø32 ~ Ø50: Aluminum Alloy	㉑	Roller	Steel



■How to Mount an Arm
Mount an arm according to the following steps as shown below.



Tighten the screw with a hex wrench.

Fix the arm with a vise/spanner.

Draw the rotating portion out of the piston rod. Make sure that the piston rod rotates before fixing the arm.
If the arm is fixed at any other location, overload might damage the internal components.

After tightening the screws, be sure to retighten them at the tightening torque listed on the right.

■Tightening Torque

Tube Dia.	Tightening Torque
25~40	4.3~5.3N・m
50	10.8~13.2N・m

[IMPORTANT] Precautions for Handling Rotary Clamp Cylinders *Be sure to read the precautions [IMPORTANT!] in the "Compact Air Cylinder Overview" on P.1484.

(Rotary Clamp Cylinders) ▲ CAUTION
Never touch any moving part while the cylinder is in operation. It is extremely dangerous because fingers may be caught between moving parts.

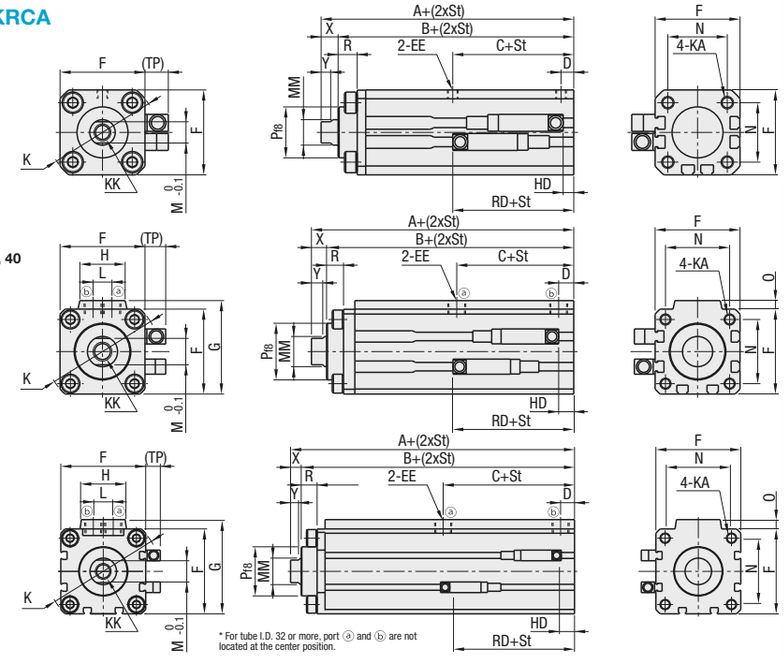
(Rotary ClampCylinder) ▲ NOTE
① Protect the sliding sections of the piston rods and piston guide rods from being scratched and dented.
② Installing the Speed Controller
Install the speed controller (meter out: throttle on the exhaust side) to the air pressure outlet side.
The performance of the speed controller affects the operation of the cylinder.
Use a speed controller with low cracking pressure.
③ Installing Conditioning Equipment
Cylinder failures are mostly caused by foreign materials in the atmosphere or drains.
Protect the cylinder from trouble by installing an air dryer or air filter upstream.
④ Space
Provide sufficient space around the equipment to ensure easy handling.
⑤ Flushing
Before plumbing, flush the pipe thoroughly to protect it from solids or seal tape fragments.
⑥ Ambient Environment
Do not use the cylinder in the following environments:
An area filled with oil or grease. (It may cause dust to adhere to the sliding section.)
An area where intense vibrations may occur.
An area where the equipment may be affected by chemicals.

Rotary Clamp Cylinders

■Rotary Clamp Cylinders

RoHS

MKRCA



* For tube I.D. 32 or more, port ⓐ and ⓑ are not located at the center position.

■Rotary Clamp Cylinder External Dimensions

Tube I.D. (mm)	A	B	C	D	EE	F	G	H	K	KA	KK	L	M	MM	N	O	P	R	X	Y
25	57	49	26	6	M5x0.8	40	-	-	51	M6 Depth 11	M8 Depth 15	-	10	12	28	-	24	9	8	4.5
32	69	61	27	8	Rc1/8	45	49.5	24	60	M6 Depth 11	M10 Depth 15	10	14	16	34	4.5	30	9	8	6
40	70	62	29	8.5	Rc1/8	52	57	24	69	M6 Depth 11	M10 Depth 15	10	14	16	40	5	35	9	8	6
50	74	66	29	10.5	Rc1/4	64	71	33	86	M8 Depth 13	M12 Depth 15	15	17	20	50	7	37	12	8	6

For selections, be sure to check the "Specifications" and "Precautions" on P.1497.

Part Number Type	Tube I.D. (mm)	St Stroke	Rotating Direction	Stroke on Rotating (mm)	Stroke on Clamping (mm)	Unit Price 1 ~ 4 pc(s).
MKRCA	25	31	L (Counterclockwise Rotation)	11	20	
	32	35		15	20	
	40	35		15	20	
	50	70	R (Clockwise Rotation)	20	50	

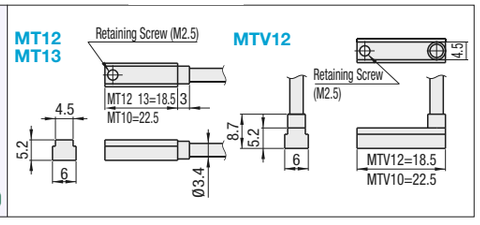
■Rotary Clamp Cylinder External Dimensions

Tube I.D. (mm)	MT12, 13/MTV12			MT10/MTV10		
	HD	RD	(TP)	HD	RD	(TP)
25	6	25	0	5	26	0
32	9	28	0	8	29	0
40	10	29	0	9	30	0
50	11	30	0	10	31	0

Ordering Example: Part Number - St Stroke - Rotating Direction
MKRCA25 - 31 - L

■Rotary Clamp Cylinder Sensors

RoHS



Part Number Type	L Selection		Load Voltage	Load Current	Sensor Type	Line	Wire Exit	Unit Price L1 (1m)	Unit Price L3 (3m)
MT12	L1 (1m)	L3 (3m)	12/24VDC 110VAC	5~50mA(DC) 7~20mA(AC)	Contact	2	Rear		
MT13			10~30VDC	*5~20mA	No Contact	2			
			30VDC or Less	100Am or Less	No Contact	3			
MTV12			12/24VDC 110VAC	5~50mA(DC) 7~20mA(AC)	Contact	2	Top		
			10~30VDC	*5~20mA	No Contact	2			

The values of the maximum load current 20mA is for 25°C. When used in ambient temperature 25°C or higher, load current is lower than 20mA. (5 ~ 10mA when 60 °C)
The sensor used for this rotary clamp cylinder is applicable only for rotary clamp cylinders.
It cannot be used for compact type, pen type or guide type cylinders.

Ordering Example: Part Number

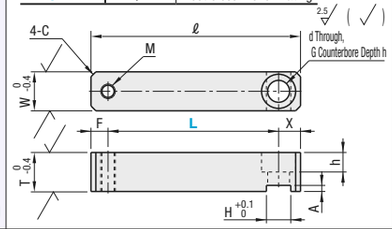
■Rotary Clamp Cylinder Sensors Specifications

Item	Contact Point 2 Wire Type		No Contact Point 2 Wire Type	No Contact Point 3 Wire Type
			MT12, MTV12	MT13
Application	For PLC and Relays		For Controller (Dedicated)	For PLC and Relays
Output Method				NPN Output
Power Supply Voltage				10~28VDC
Load Voltage	12/24VDC	110VAC	10~30VDC	30VDC or Less
Load Current	5~50mA	7~20mA	*5~20mA	100mA or Less
Consumption Current				24VDC, 10mA or lower
Internal Voltage Drop	3V or Less		4V or Less	0.5V or Less
Lamp	LED (Lights when ON)			
Leakage Current	0mA		1mA or Less	10μA or Less
Lead Wire Length	1m (Oil Resistant Vinyl Cab Tire Cord 0.2mm^2)			
Max. Impact	294m/s^2		980m/s^2	
Insulation Resistance	20mΩ or more with 500VDC high resistance meter			
Dielectric Strength Voltage	No anomaly to be recognized after application of 1000VAC for 1 minute.			
Ambient Temperature	-10 ~ +60°C			
Protection Structure	IEC Standards IP67 JIS C0920 (Water-resistant) Oil-proof			
Mass	1m:20g 3m:50g			
Circuit	Brown Line [+] Blue Line [-]		Brown Line [+] Blue Line [-]	Brown Wire [Power Supply+] Black Line [Output] Blue Line [Power Supply -]

Rotary Clamp Cylinder Arms / Brackets / Guides

■Rotary Clamp Cylinder Arms

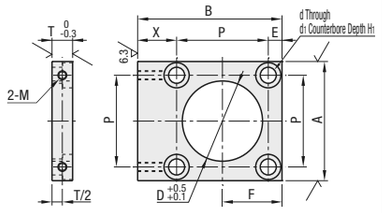
Type	Material	Surface Treatment
RCLA	EN 1.0038 Equiv.	-
RCLAB	EN 1.1191 Equiv.	Black Oxide
RCLAM		Electroless Nickel Plating



Part Number Type	No.	L 1mm Increment	W	T	H	G	d	h	A	X	M	F	C	ℓ	Unit Price RCLA	RCLAB	RCLAM
RCLA RCLAB RCLAM	20	15~100	16	16	10	14	9	9	3	9	6	7	2	L+16			
	25	15~100	16	16	10	14	9	9	3	9	6	7	2	L+16			
	32	20~160	20	20	14	17.5	11	11	4	12	8	10	2	L+22			
	40	20~160	20	20	14	17.5	11	11	4	12	8	10	2	L+22			
	50	25~200	22	22	17	20	14	13	4	13	10	10	3	L+23			

■Rotary Clamp Cylinder Brackets

Type	Material	Surface Treatment
RCYB	EN 1.0038 Equiv.	-
RCYBB	EN 1.1191 Equiv.	Black Oxide

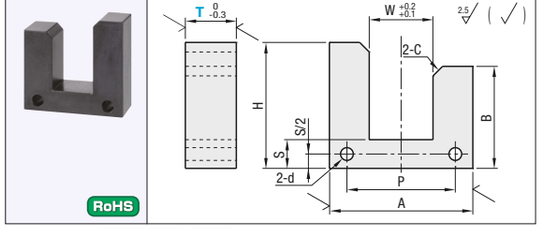


Part Number Type	No.	T	D	A	P	X	B	E	F	M	d	d1	h1	Unit Price RCYB	RCYBB
RCYB RCYBB	20	9	24	38	25.5	18.25	P+E+X	6.25	19	M4	6.5	11	6.5		
	25	9	24	44	28	19	P+E+X	6	20	M4	6.5	11	6.5		
	32	9	30	50	34	18	P+E+X	8	25	M4	6.5	11	6.5		
	40	9	35	60	40	19	P+E+X	10	30	M4	6.5	11	6.5		
	50	12	37	65	50	26.5	P+E+X	7.5	32.5	M6	9	14	9		

No. indicates applicable Rotary Clamp Cylinder Tube I.D.

■Rotary Clamp Cylinder Guides

Type	Material	Surface Treatment
RCYG	EN 1.0038 Equiv.	-
RCYGB	EN 1.1191 Equiv.	Black Oxide



Part Number Type	No.	T Selection	W	S	H	B	A	P	C	d	Unit Price RCYG	RCYGB
RCYG RCYGB	20-21	9 12 16	16	9	30	22	38	25.5	3	4.5		
	20-31	9 12 16			40	32						
	25-21	9 12 16	16	9	30	22	44	28				
	25-31	9 12 16			40	32						
	32-25	9 12 16	20	9	33	22	50	34				
	32-35	9 12 16			43	32						
	40-25	9 12 16	20	9	33	21	60	40				
	40-35	9 12 16			43	31						
	50-40	9 12 16	22	12	50	34	65	50	4	6.5		
	50-70	9 12 16			80	64						

No. indicates applicable Rotary Clamp Cylinder Tube I.D / Stroke.

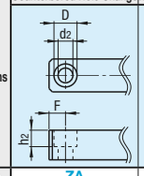
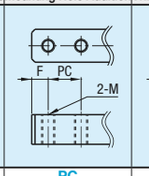
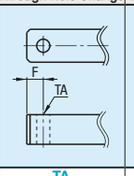
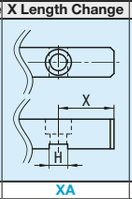
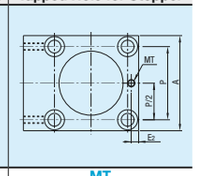
Ordering Example

Part Number	-	L, T
RCLA32	-	100
RCYG40-25	-	12
RCYB32		

Alterations

Part Number	-	L	-	(ZA, PC, TA, XA)
RCLA32	-	100	-	ZA6
RCLAM50	-	150	-	XA

Part Number	-	(MT)
RCYB32	-	MT4

	Counterbored Hole Change	Mounting Hole Addition	Through Hole Change	X Length Change	Tapped Hole for Stopper
Alterations					
Code	ZA	PC	TA	XA	MT
Spec.	Change from a tapped hole to a counterbored hole.	A tapped hole to be added.	Change from a tapped hole to a through hole.	X dimension to be changed.	A tapped hole for the stopper is added.

ZA

M	ZA	d2	D	h2
6	6	6.6	11	6.6
8	8	9	14	9
10	10	11	17.6	11

⊗Cannot be combined with Through Hole Change (TA).
Ordering Code ZA8
Applicable to Arms (RCLA□) only

PC

Mx2≤PC≤L-Gx2
1mm Increment
Ordering Code PC20
⊗Cannot be combined with Counterbored Hole Change (ZA).
If combined with TA, a mounting hole will be added after the change.
Applicable to Arms (RCLA□) only

TA

No.	TA
20, 25	4.0~12.0
32, 40, 50	4.0~14.0

⊗Cannot be combined with Counterbored Hole Change (ZA).
Ordering Code TA4.5
Applicable to Arms (RCLA□) only

XA

No.	X
20	25
25	30
32	35
40	40
50	45

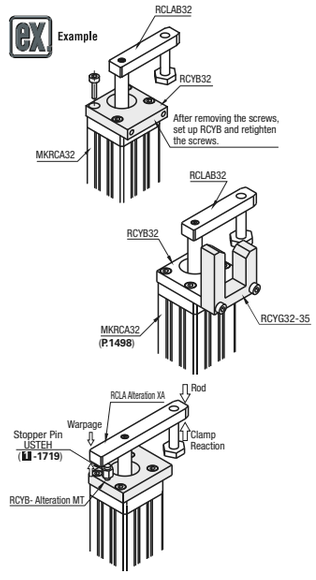
Ordering Code XA
Applicable to Arms (RCLA□) only

MT

No.	E2	MT			
20	3	M3	M4		
25	4	M3	M4	M5	
32	5	M3	M4	M5	
40	6	M3	M4	M5	M6
50	7	M4	M5	M6	M8

Ordering Code MT4
Applicable to Bracket (RCYB□) only.

ex Example



Compact Parallel Grippers - Overview

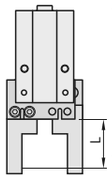
■Compact Parallel Gripper - Features

- These are lightweight and compact, as well as achieving the high-rigidity and high gripping forces
- High gripping repeatability leads to less gripping errors.
- These can be used with the fingers, which are easy-to-select depending on column, cylindrical or square workpiece shape.
- The fingers can be mounted to the main body directly, having more freedom for designing.
- By installing attachments (optional), it can be mounted with the same mounting method with the guide-integrated type Pneumatic Grippers.

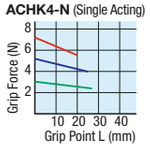
■Selection Guide

- Selection Procedure
  ①Confirmation of Conditions: Confirm the necessary open/close stroke, workpiece weight and shape.
  ②Calculation of Required Gripping Force: The required gripping force should be 10 to 20 times of the workpiece weight. (When high acceleration, deceleration or impact load may occur, higher multiplier should be selected.)
  ③Selection of Types: The gripping forces are different by gripping methods (External Grip / Internal Grip), gripping point distance and operating pressure depending on types. Select the appropriate model from the Gripping Force Chart.
- Precautions for Selection
  Design the Finger Attachments to be lightweight and short.
  Set the overhang under the limit of specified value of each product type.
  Lateral overhang loads will apply torsional moments on the sliding components and it may cause premature wear.

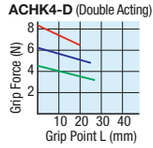
■Gripping Point - Gripping Force Data



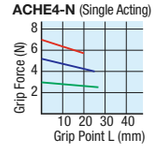
ACHK4-N (Single Acting)



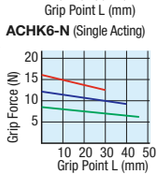
ACHK4-D (Double Acting)



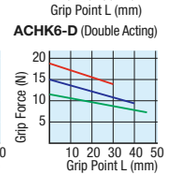
ACHE4-N (Single Acting)



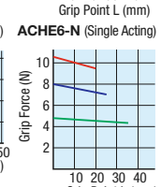
ACHK6-N (Single Acting)



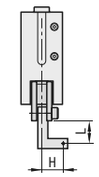
ACHK6-D (Double Acting)



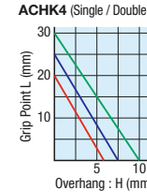
ACHE6-N (Single Acting)



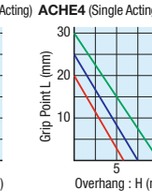
■Gripping Point - Overhang Data



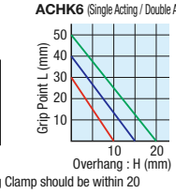
ACHK4 (Single / Double Acting)



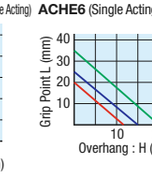
ACHE4 (Single Acting)



ACHK6 (Single Acting / Double Acting)



ACHE6 (Single Acting)



0.5MPa
0.4MPa
0.3MPa

* L for the Spring Clamp should be within 20

■Performance

Repeatability	±0.01mm
Non-load Durability Test	100 Million Open/Close Cycles
Stroke Accuracy	0~0.3mm
Gripping Force	Compared to the same size products from other manufacturers: Approx. 2 times ~ *Comparison between other manufacturers' cylinder with 6mm dia. and ACHK4 (Research by MISUMI)

■Specifications

Operating Method	Single and Double Acting / Parallel Open/Close
Applicable Fluid	Clean Air (Filtered, Compressed Air)
Operating Pressure Range	0.3~0.5MPa
Ambient Temperature	5 ~ 50°C
Lubrication	Non-lubrication (Lithium Grease Applied)
Pneumatic Fitting	M3x0.5 (ACHE: M5x0.8)
Operation Speed (max)	Single Acting 120CPM / Double Acting 180CPM
Repeatability	±0.01mm
Stroke Tolerance	0~+0.3mm

* For ACHE Type, only Single Acting Type is available.
* The operation speed of ACHE Type is Max.180CPM.

■Safety Precautions

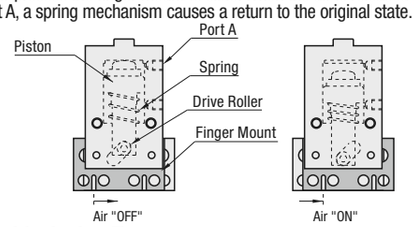
Danger

- Do not use the cylinder for the following applications:
  1. Medical Equipment for Sustaining Human Life or Maintaining the Human Body 2. Systems or Machine Equipment for Moving or Transporting Humans. 3. Vital Parts of Machinery These products are not designed to be used for purposes requiring high levels of safety. Loss of human life may result.
- Do not use in locations with dangerous combustible or flammable objects. The objects may ignite or catch fire.
- Never modify the products. It may cause injury, electric shock or fire by abnormal operations.
- Avoid inappropriate dismantling or re-assembling of the products which affect the basic structure, performance or functions.
- Do not splash water on the products. If the products are made wet, washed or used in the water, they may cause injury, electric shock or fire by abnormal operations.

■Open/Close Operation

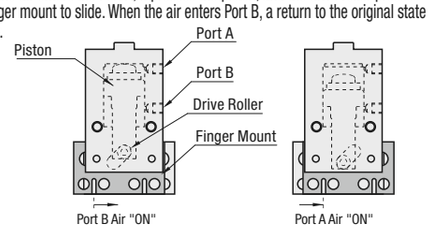
Single Acting Type

When the air enters the Port A, it presses the piston, and the drive roller presses the finger mount to slide. When the air is released from Port A, a spring mechanism causes a return to the original state.

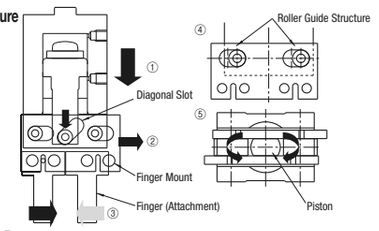


Double Acting Type

When the air enters the Port A, it presses the piston, and the drive roller presses the finger mount to slide. When the air enters Port B, a return to the original state occurs.



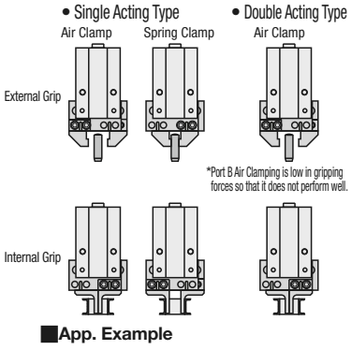
■Product Structure



①Piston descends.
②The diagonal slot moves to the arrow direction.
③Fingers (Attachment) close.
④2 rollers guide the cylinder movement.
⑤The piston rotates when moving forward and back and presses the finger mount onto the inner wall of the cylinder. The clearance will be locked up by this mechanism.

■How to Grip

- Single Acting Type
- Double Acting Type



■App. Example

- Up and Down Floating Function