

# 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 (mm²)	Instroke Side	377	603	1055	1649
	Outstroke Side	490	804	1256	1963
Service Life	1 Million Times				

## Stroke

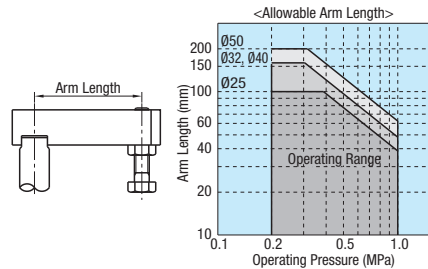
Tube I.D. (mm)	Stroke	Stroke on Rotating (mm)	Stroke on Clamping (mm)	Rotating Direction
Ø25	31	11	20	Counterclockwise Clockwise
Ø32	35	15	20	
Ø40	35	15	20	
Ø50	70	20	50	

## 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.

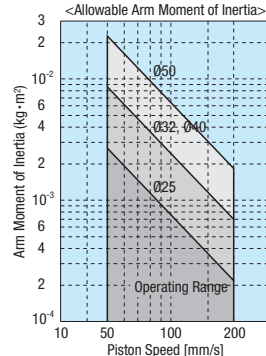


## Clamping Position

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<sup>-4</sup>kg·m<sup>2</sup>
- Calculate a required pressure area.  
 Required Pressure Area (mm<sup>2</sup>) = Required Clamping Force (N) / Operating Pressure (MPa) = 500 / 0.5 = 1000 (mm<sup>2</sup>).  
 Ø40 Pressure Area: 1055 (mm<sup>2</sup>) > Required Pressure Area 1000 (mm<sup>2</sup>)
  - Select a cylinder size based on the list and the pressure area (instroke side).  
 Operating Pressure 0.5MPa - Arm Length 80mm: Within the Operating Range
  - 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
  - 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<sup>-4</sup>kg·m<sup>2</sup> - Piston Speed 100mm/s: Within the Operating Range

## [IMPORTANT] Precautions for Handling Rotary Clamp Cylinders

\*Be sure to read the precautions [IMPORTANT!] in the "Compact Air Cylinder Overview" on P1484.  
**(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 Clamp Cylinder) NOTE

- Protect the sliding sections of the piston rods and piston guide rods from being scratched and dented.
- 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.
- 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.
- Space  
 Provide sufficient space around the equipment to ensure easy handling.
- Flushing  
 Before plumbing, flush the pipe thoroughly to protect it from solids or seal tape fragments.
- 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.

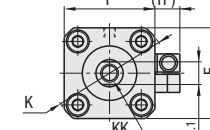
# Rotary Clamp Cylinders

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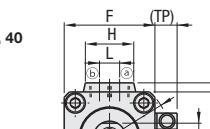


## MKRCA

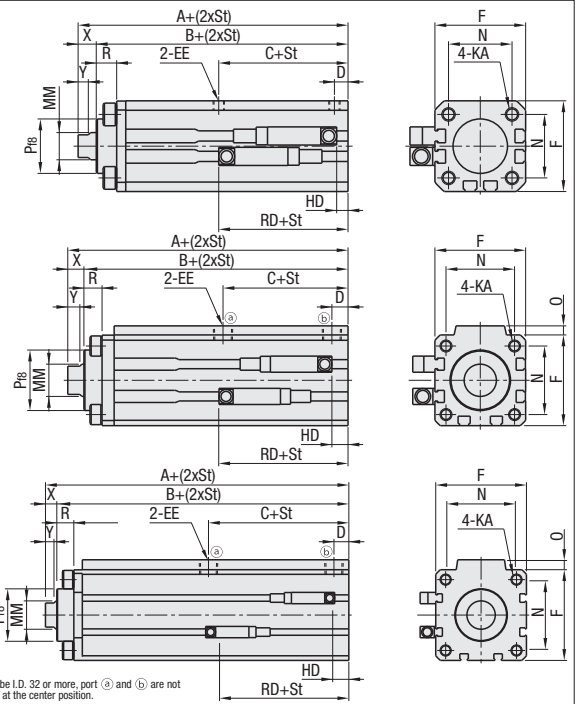
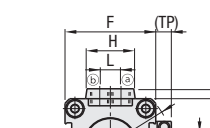
Ø25



Ø32, 40



Ø50



\* For tube I.D. 32 or more, port ③ and ④ 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

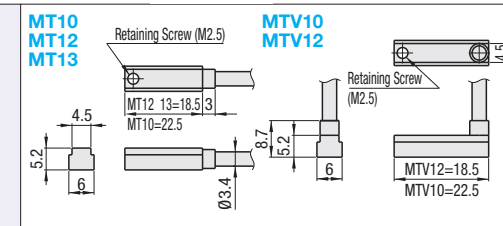
For selections, be sure to check the "Specifications" and "Precautions" on P1497.

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

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



Part Number	Type	L Selection	Load Voltage	Load Current	Sensor Type	Line	Wire Exit	Unit Price	
								L1 (1m)	L3 (3m)
MT10			12/24VDC 110VAC	5~50mA(DC) 7~20mA(AC)	Contact	2	Rear		
MT12	L1 (1m)	L3 (3m)	10~30VDC	*5~20mA	No Contact	2			
MT13					No Contact	3			
MTV10			12/24VDC 110VAC	5~50mA(DC) 7~20mA(AC)	Contact	2	Top		
MTV12			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  
 MT10L1

## Rotary Clamp Cylinder Sensors Specifications

Item	Contact Point 2 Wire Type		No Contact Point 2 Wire Type		No Contact Point 3 Wire Type	
	MT10, MTV10	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	
Insulation Resistance					3V or Less	
Internal Voltage Drop					4V or Less	
Lamp					0.5V or Less	
Leakage Current					LED (Lights when ON)	
Lead Wire Length					0mA, 1mA or Less, 10µA or Less	
Max. Impact					1m (Oil Resistant Vinyl Cab Tire Cord 0.2mm <sup>2</sup> )	
Insulation Resistance					294m/s <sup>2</sup> , 980m/s <sup>2</sup>	
Temperature Strength Voltage					20mΩ or more with 500VDC high resistance meter	
Ambient Temperature					No anomaly to be recognized after application of 1000VAC for 1 minute.	
Prediction Structure					-10 ~ +60°C	
Mass					IEC Standards IP67 JIS C0920 (Water-resistant) Oil-proof	
					1m:20g 3m:50g	
Circuit						