Rotary Clamp Cylinder: Standard

Series MK

See MK-Z

ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63

How to Order

MK A 20 ☐ – 10 R F – M9BW ☐ – ☐

Rotary clamp cylinder
Standard

Mounting bracket

Symbol	Mounting	Applicable bore size (mm)
B	Through-hole/Both ends tapped common (Standard)	ø12, ø16
A	Both ends tapped	ø20 to ø63
B	Through-hole	
G	Head end flange	

∗ Head end flange is equipped with a boss mounting. Be sure to specify body option "F".
∗ Mounting bracket is included, (but not assembled).

Bore size

12	12 mm	**32**	32 mm
16	16 mm	**40**	40 mm
20	20 mm	**50**	50 mm
25	25 mm	**63**	63 mm

Port thread type

Nil	M thread	ø12 to ø25
	Rc	ø32 to ø63
TN	NPT	
TF	G	

Clamp stroke

Symbol	Clamp stroke	Applicable bore size
10	10 mm	ø12 to ø40
20	20 mm	ø12 to ø63
50	50 mm	ø50 to ø63

Number of auto switches

Nil	2 pcs.
S	1 pc.

Auto switch type

Nil	Without auto switch (Built-in magnet)

∗ For applicable auto switch models, refer to the below table.

Body option

Nil	Standard (Female thread)
M	Rod end width across flats ∗
F	With boss on head end ∗
N	With arm

∗ Regarding body option manufacturable range, refer to the below table.

Made to Order
(Refer to page 2 and 40.)

Body Option Manufacturable Range

Bore size	Nil	M	F	N	MF	FN
ø12, ø16	●	—	—	●	—	—
ø20 to ø63	●	●	●	●	●	●

∗ Arms are assembled at the time of shipment.

Rotary direction (Unclamp → Clamp)

R	Clockwise
L	Counterclockwise

Applicable Auto Switches

/Refer to page 29 through to 39 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular ø12, ø16	Perpendicular ø20 to ø63	In-line ø12, ø16	In-line ø20 to ø63	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	—	M9N	●	—	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)			—	M9PV	—	M9P	●	—	●	○	—	○		
				2-wire		12 V	—	M9BV	—	M9B	●	—	●	○	—	○	—	
		Connector					—	J79C	—		●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V	—	M9NWV	—	M9NW	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)			—	M9PWV	—	M9PW	●	●	●	○	—	○		
				2-wire		12 V	—	M9BWV	—	M9BW	●	●	●	○	—	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5 V, 12 V	—	M9NAV	—	M9NA	○	○	●	○	—	○	IC circuit	
				3-wire (PNP)			—	M9PAV	—	M9PA	○	○	●	○	—	○		
				2-wire		12 V	—	M9BAV	—	M9BA	○	○	●	○	—	○	—	
	Diagnostic output (2-color indication)			4-wire		5 V, 12 V	—		—	F79F	●	—	●	○	—	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire (No polarity)		—	—		—	P4DW	—	—	●	●	—	○	—	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96V	—	A96	●	—	●	—	—	—	IC circuit	—
				2-wire		—	200 V	—	A72	—	A72H	●	—	●	—	—	—	—	Relay, PLC
			No		24 V	12 V	100 V	A93V		A93	●	—	●	—	—	—		
						5 V, 12 V	100 V or less	A90V		A90	●	—	●	—	—	—	IC circuit	
		Connector	Yes			12 V	—	—	A73C	—	●	—	●	●	●	—	—	
			No			5 V, 12 V	24 V or less	—	A80C	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color indication)	Grommet	Yes			—	—	—	A79W	—	●	—	●	—	—	—	—	

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ
None ····· N (Example) J79CN

∗ Solid state switches marked with "○" are produced upon receipt of order.
∗ For D-P4DW, ø40 to ø63 are available.
∗ Only D-P4DW type is assembled at the time of shipment.

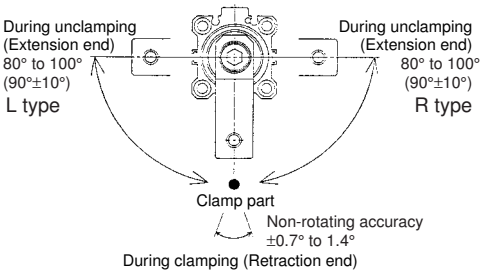
∗ Since there are other applicable auto switches than listed, refer to page 18 for details.
∗ For details about auto switches with pre-wired connector, refer to page "Best Pneumatics 2004" catalog.
∗ When mounting models D-M9□(V), M9□W(V), M9□A(V), and A9□(V) with between ø32 and ø50 on sides other than the port side, please order a switch mounting bracket separately as per the instructions on page 17, and refer to cases CDQP2B32 to 100 in Information (04-E514) "Cylinder with Compact Auto Switch."
∗ Auto switches are included, (but not assembled).

Specifications

Bore size (mm)	12	16	20	25	32	40	50	63
Action	Double acting							
Rotation angle Note 1)	90° ±10°							
Rotary direction Note 2)	Clockwise, Counterclockwise							
Rotary stroke (mm)	7.5		9.5		15		19	
Clamp stroke (mm)	10, 20						20, 50	
Theoretical clamp force (N) Note 3)	40	75	100	185	300	525	825	1400
Fluid	Air							
Proof pressure	1.5 MPa							
Operating pressure range	0.1 to 1 MPa							
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing)							
	With auto switch: –10 to 60°C (No freezing)							
Lubrication	Non-lube							
Piping port size	M5 x 0.8				Rc1/8, NPT1/8, G1/8		Rc1/4, NPT1/4, G1/4	
Mounting	Through-hole/Both ends tapped common	Both ends tapped, Through-hole, Head end flange						
Cushion	Rubber bumper							
Stroke length tolerance	$^{+0.6}_{-0.4}$							
Piston speed	50 to 200 mm/s							
Non-rotating accuracy (Clamp part) Note 1)	±1.4°	±1.2°			±0.9°		±0.7°	

Note 1) Refer to "Rotary Angle" figure.
Note 2) Direction of rotation viewed from the rod end when the piston rod is retracting.
Note 3) At 0.5 MPa.

Rotary Angle



Made to Order
(For details, refer to page 40.)

Symbol	Description
XB6	Head resistant cylinder (150°C)

Theoretical Output

Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (cm^2)	Operating pressure (MPa) 0.3	0.5	0.7	1.0
12	6	R	0.8	24	40	56	80
		H	1.1	33	55	77	110
16	8	R	1.5	45	75	105	150
		H	2	60	100	140	200
20	12	R	2	60.8	100	139	200
		H	3	90.2	149	208	298
25	12	R	3.7	112	185	258	370
		H	4.9	149	245	341	490
32	16	R	6	182	300	418	600
		H	8	243	400	557	800
40	16	R	10.5	319	525	731	1050
		H	12.5	380	625	870	1250
50	20	R	16.5	502	825	1149	1648
		H	19.6	596	980	1365	1961
63	20	R	28	851	1400	1950	2801
		H	31.2	948	1560	2172	3121

Note) Theoretical output (N) = Pressure (MPa) x Piston area (cm^2) x 100

Operating direction
R: Rod end (Clamp)
H: Head end (Unclamp)

Option/Arm

Bore size (mm)	Part no.	Accessories
12	**MK-A012**	Clamp bolt, Hexagon socket head cap screw, Hexagon nut, Spring washer
16	**MK-A016**	
20	**MK-A020**	
25		
32	**MK-A032**	
40		
50	**MK-A050**	
63		

Mounting Bracket/Flange

Bore size (mm)	Part no.	Accessories
20	**MK-F020**	Centering location ring, Set pin, Bolt for cylinder body
25	**MK-F025**	
32	**MK-F032**	
40	**MK-F040**	
50	**MK-F050**	
63	**MK-F063**	

Weight/Through-hole Mounting

Unit: g

Clamp stroke (mm)	Bore size (mm) 12	16	20	25	32	40	50	63
10	70	100	250	280	500	595	—	—
20	87	123	290	320	525	640	1100	1520
50	—	—	—	—	—	—	1350	1805

Additional Weight

Unit: g

Bore size (mm)	12	16	20	25	32	40	50	63
Both ends tapped	—	—	6	7	7	6	7	17
Rod end width across flats	—	—	10	10	21	21	46	46
With boss on head end	—	—	2	3	5	7	13	25
With arm	13	32	100	100	200	200	350	350
Head end flange(including mounting bolt)	—	—	133	153	166	198	345	531

Calculation: (Example) MKG20-10RFN

• Standard calculation:	MKB20-10R	250 g
• Extra weight calculation:	Both ends tapped	6 g
	Head end flange	133 g
	With boss on head end	2 g
	With arm	100 g
		491 g

⚠ Precautions

Be sure to read this before handling.
Refer to the back of page 1 for Safety Instructions and "Precautions for Handling Pneumatic Devices" (M-03-E3A) for Common Precautions.

⚠ Caution

Clamp Arm Mounting

1. Use a clamp arm that is available as an option.
To fabricate a clamp arm, make sure that the allowable bending moment and the inertial moment will be within the specified range.
If a clamp arm that exceeds the specified value is installed, the internal mechanism in the cylinder could become damaged.

Ensuring Safety

1. If one side of the piston is pressurized by supplying air with the clamp arm attached, the piston will move vertically while the clamp arm rotates. This operation could be hazardous to personnel, as their hands or feet could get caught by the clamp arm, or could lead to equipment damage. Therefore, it is important to secure as a danger zone a cylindrical area with the length of the clamp arm as its radius, and the stroke plus 20 mm as its height.

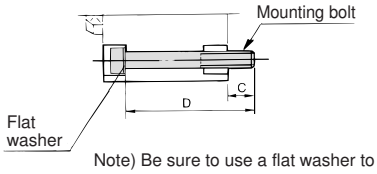
Installation and Adjustment/ Clamp Arm Removal and Reinstallation

1. During the removal or reinstallation of the clamp arm, make sure to use a wrench or a vise to secure the clamp arm before removing or tightening the bolt.
This is to prevent the bolt tightening torque from being applied to the piston rod, which could damage the cylinder's internal mechanism.

Mounting Bolt for MKB

Mounting: Mounting bolt for through-hole type is available.
Ordering: Add the word "MKB" to the mounting bolt size.

Example) **M5 x 75 L (MKB)**



Note) Be sure to use a flat washer to mount ø12 and ø16 cylinders via through-holes.

Cylinder model	C	D	Mounting bolt size
MKB12-10	8	50	**M3 x 50 L**
MKB12-20	8	60	**M3 x 60 L**
MKB16-10	8	50	**M3 x 50 L**
MKB16-20	8	60	**M3 x 60 L**
MKB20-10	10	75	**M5 x 75 L**
MKB20-20		85	**M5 x 85 L**
MKB25-10	9	75	**M5 x 75 L**
MKB25-20		85	**M5 x 85 L**
MKB32-10	10.5	85	**M5 x 85 L**
MKB32-20		95	**M5 x 95 L**
MKB40-10	7	75	**M5 x 75 L**
MKB40-20		85	**M5 x 85 L**
MKB50-20	6.5	95	**M6 x 95 L**
MKB50-50	11.5	130	**M6 x 130 L**
MKB63-20	10.5	100	**M8 x 100 L**
MKB63-50		130	**M8 x 130 L**

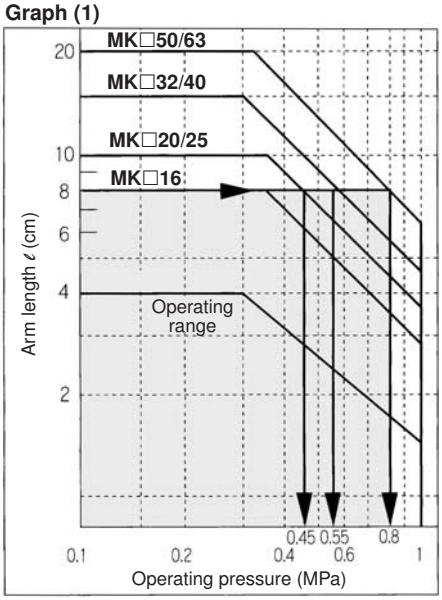
Precautions for Designing and Mounting Arms

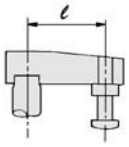
When arms are to be made separately, their length and weight should be within the following range.

1. Allowable bending moment

Use the arm length and operating pressure within Graph (1) for allowable bending moment loaded piston rod.

Graph (1)



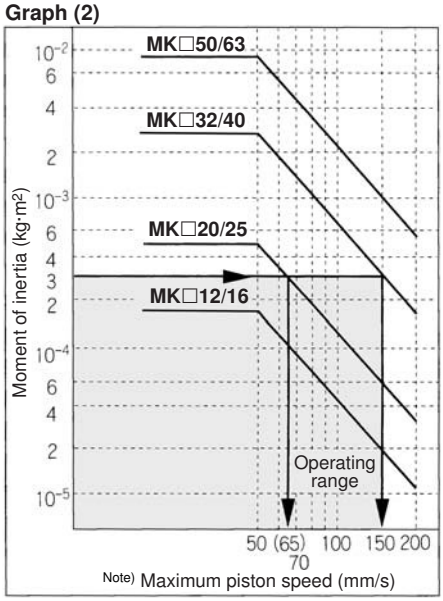


When arm length is 8 cm, pressure should be less than
MK□20/25: 0.45 MPa
MK□32/40: 0.55 MPa
MK□50/63: 0.8 MPa.

2. Moment of inertia

When the arm is long and heavy, damage of internal parts may be caused due to inertia. Use the inertia moment and cylinder speed within Graph (2) based on arm requirements.

Graph (2)



When arm's moment of inertia is 3 x 10^{-4} kg·m², cylinder speed should be less than
MK□20/25: 65 mm/s
MK□32/40: 150 mm/s.
For calculating moment of inertia, refer to front matter 1, 2, back page 8.

Note) Maximum piston speed is equivalent to approximately 1.6x the average piston speed. (Rough indication)

• To attach and detach the arm to and from the piston rod, fix the arm with a wrench or vise and then tighten the bolt.
(If an excessive force is applied in the rotary direction, it may bring about the damage to the internal mechanism.)
Refer to the following table for the tightening torque for mounting.

(N·m)

Bore size (mm)	Proper tightening torque
12	0.4 to 0.6
16	2 to 2.4
20, 25	4 to 6
32, 40	8 to 10
50, 63	14 to 16