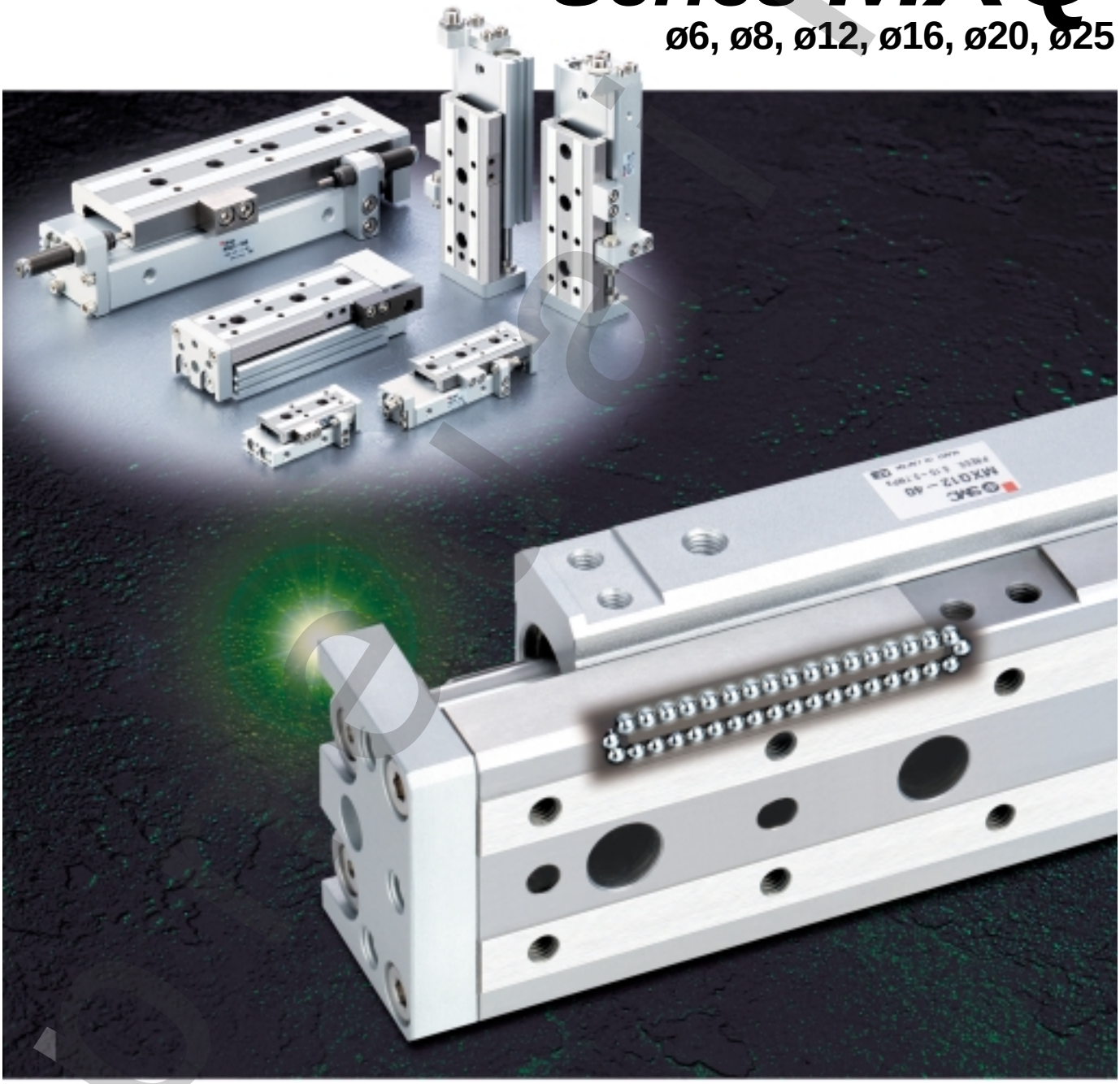
Air Slide Table

Series MXQ

ø6, ø8, ø12, ø16, ø20, ø25



Uses a recirculating linear guide for high rigidity and high precision

Integrated guide rails and table

Uses recirculating linear guide for high rigidity and high precision

Air slide table for precision assembly processes

High precision compact design

Comparison of MXQ and MXS

(mm)

Model	Accuracy		Dimensions		
	Parallelism	Height tolerance	Width	Height	Overall length
MXQ12-30	**0.035**	**±0.08**	**46**	**30**	**86**
MXS12-30	0.2	±0.2	50	32	80

Improved load resistance

Load resistance against sudden and excessive external forces is nearly three times greater than series MXS.

Symmetric type standardized

Available with all options

Wide variety of adjuster options

Positioning pin holes

Improved work piece mounting repeatability

Work piece mounting taps

Improved strength

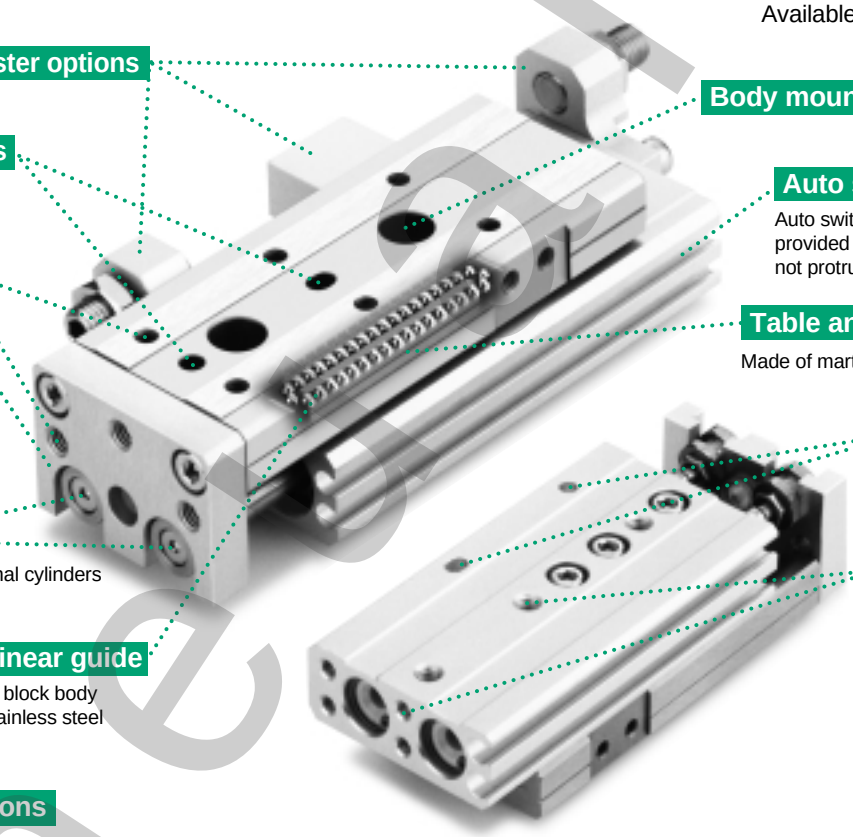
End plate uses extra super duralumin

Dual rods

Twice the output of conventional cylinders

Recirculating linear guide

Wide type linear guide block body made of martensitic stainless steel



Body mounting through holes

Auto switch mounting grooves

Auto switches can be mounted in grooves provided on the side of the body where they do not protrude

Table and guide rail integrated

Made of martensitic stainless steel

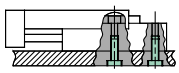
Positioning pin holes

Body mounting repeatability improved

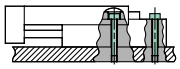
Body mounting taps

Can be mounted from 3 directions

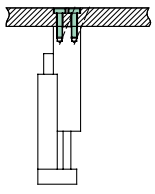
1. Side mount type (using tapped holes)



2. Side mount (using through holes)

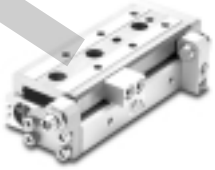


3. Perpendicular mount (using tapped holes)



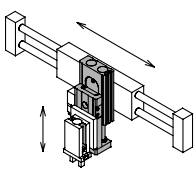
Wide variety of options

Adjuster options and function options can be combined

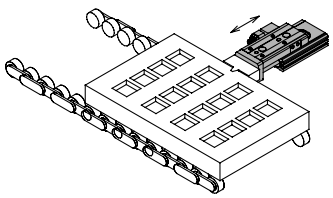
Symmetric type	Adjuster options	Function options
	With stroke adjuster  With shock absorber 	With buffer mechanism  With end lock  Axial piping type 

Applications

As Z-axis for picking and placing



For positioning of pallets on a conveyor



Series variations

Model		Bore size
Standard type	Symmetric type	(mm)
MXQ 6	MXQL 6	6
MXQ 8	MXQL 8	8
MXQ12	MXQL12	12
MXQ16	MXQL16	16
MXQ20	MXQL20	20
MXQ25	MXQL25	25

Standard strokes (mm): 10 20 30 40 50 75 100 125 150

Adjuster options: Rubber stopper | Shock absorber | Metal stopper

Function options: Front end, Rear end, Both ends, Front end, Rear end, Both ends, Front end, Rear end, Both ends, Buffer, End lock, Axial piping

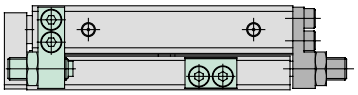
Auto switches

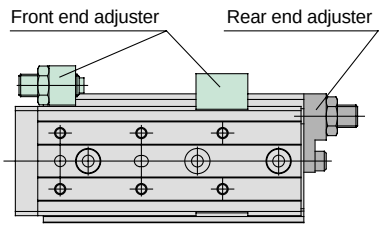
Reed switches
- D-A9□
- D-A9□V

Solid state switches
- D-F9□
- D-F9□V

2 color indication solid state
- D-F9□W
- D-F9□WV

Adjuster Options





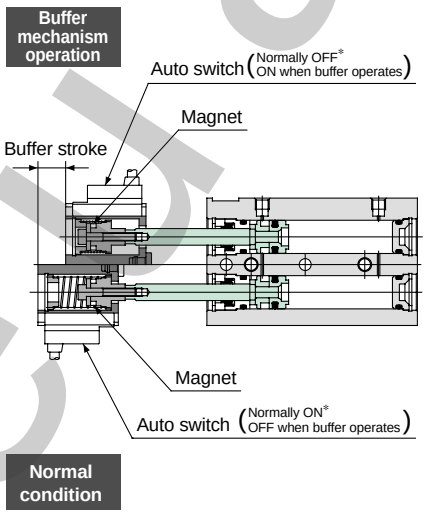
Three different types of adjusting bolt have been standardized for front end rear end and double end adjusters and cushion mechanisms.

- Rubber stopper
  Standard stroke adjuster
- Shock absorber
  For use in harsh conditions
  Absorbs the impact at the stroke end for smooth stopping and improved stopping accuracy
- Metal stopper
  Improves stopping accuracy
  Without cushioning function for use with light loads and low speeds

Function Options

With Buffer Mechanism

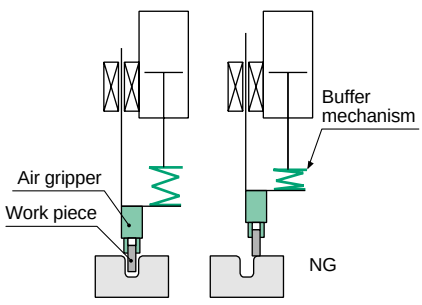
- Protects work pieces and tools, etc., by eliminating impact at the end of the extension stroke
- Buffer unit is auto switch capable



* The normally ON/OFF setting is changed by changing the direction of the auto switch mounting.

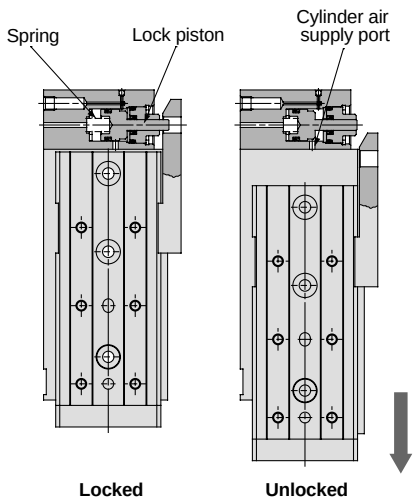
Application example

In work piece insertion processes when there is a problem such as faulty positioning, the buffer mechanism absorbs the shock from the work piece impact to prevent damage.



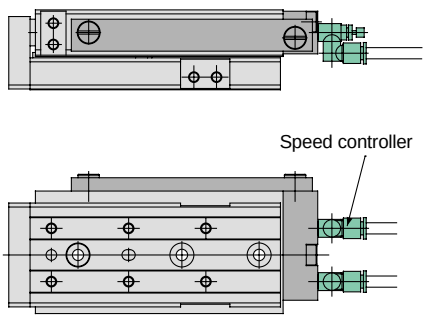
With End lock

- Holds the cylinder's home position to prevent dropping of the work piece even if the air supply is cut off.



Axial Piping Type

- Piping is concentrated in the axial direction to maintain clear space around the body.



Air Slide Table

Series MXQ

ø6, ø8, ø12, ø16, ø20, ø25

How to Order

MXQ | 12 | L | 50 | AS | FR | F9N | |

Symmetry

Nil	Standard type
L	Symmetric type

Number of auto switches

Nil	2 pcs.
S	1 pc.
n	"n" pcs.

Auto switch type

Nil	Without auto switch

∗ Refer to the table below for auto switch part numbers.

Cylinder bore size (stroke mm)

ø6	10, 20, 30, 40, 50
ø8	10, 20, 30, 40, 50, 75
ø12	10, 20, 30, 40, 50, 75, 100
ø16	10, 20, 30, 40, 50, 75, 100, 125
ø20	10, 20, 30, 40, 50, 75, 100, 125, 150
ø25	10, 20, 30, 40, 50, 75, 100, 125, 150

Functional option

Nil	Standard
F	With buffer
R Note 2)	With end lock
P	Axial piping type
FR Note 2)	With buffer & end lock
FP	With buffer, axial piping type

Note 2) Series MXQ6 is not available with end lock.

Adjuster option

Nil	Without adjuster	
AS	Rubber stopper	Extension end
AT		Retraction end
A		Both ends
BS Note 1)	Shock absorber	Extension end
BT Note 1)		Retraction end
B Note 1)		Both ends
CS	Metal stopper	Extension end
CT		Retraction end
C		Both ends

Note 1) Series MXQ6 is not available with shock absorber.

Option combinations

Adjuster option \ Functional option	Nil	F	R	P	FR	FP
Nil	○	○	○	○	○	○
AS, CS	○	○ Note 3)	○	○	○ Note 3)	○ Note 3)
AT, CT	○	○	x	x	x	x
A, C	○	○ Note 3)	x	x	x	x
BS	○	x	○	○	x	x
BT	○	○	x	x	x	x
B	○	x	x	x	x	x

○: Available, x: Not available

Note 3) With the combination of buffer mechanism and extension end stroke adjuster, the buffer stroke decreases by the amount of stroke adjusted with the extension end stroke adjuster.

Applicable auto swithces/Refer to pages 37 through 39 for detailed specifications of auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage DC	Load voltage AC	Auto switch model: Electrical entry direction Perpendicular	Auto switch model: Electrical entry direction In-line	Lead wire∗ length (m) 0.5 (Nil)	Lead wire∗ length (m) 3 (L)	Applicable load	
Reed switch	———	Grommet	No	2 wire	24V 5V, 12V	100V or less	A90V	A90	●	●	IC circuit	Relay, PLC
			Yes	2 wire	12V	100V	A93V	A93	●	●	——	
				3 wire (NPN equiv.)	——	5V	——	A96V	A96	●	●	IC circuit	——
Solid state switch	———	Grommet	Yes	3 wire (NPN)	24V	12V	——	F9NV	F9N	●	●	——	Relay, PLC
				3 wire (PNP)				F9PV	F9P	●	●		
				2 wire				F9BV	F9B	●	●		
	Diagnostic indication (2 color indicator)			3 wire (NPN)				F9NWV	F9NW	●	●		
				3 wire (PNP)				F9PWV	F9PW	●	●		
				2 wire				F9BWV	F9BW	●	●		

∗ Lead wire length symbols: 0.5m ..... Nil (Example) A93
3m ..... L A93L

Air Slide Table *Series MXQ*

Specifications

Cylinder bore size (mm)	6	8	12	16	20	25
Port size	M5 x 0.8				Rc 1/8	
Fluid	Air					
Action	Double acting					
Operating pressure	0.15 to 0.7MPa					
Proof pressure	1.05MPa					
Ambient and fluid temperature	–10 to 60°C					
Operating speed range	50 to 500mm/s (Adjuster option/Metal stopper: 50 to 200mm/s)					
Cushion	Rubber bumper (Standard, Adjuster option/Rubber stopper) Shock absorber (Adjuster option/Shock absorber) None (Adjuster option/Metal stopper)					
Lubrication	Non-lube					
Auto switch	Reed switches (2 wire, 3 wire) Solid state switches (2 wire, 3 wire) 2 color indication solid state switches (2 wire, 3 wire)					
Stroke length tolerance	$^{+1}_{0}$ mm					

Options

Adjuster option	Rubber stopper	Extension end (AS)	Stroke adjustment range 0 to 5mm
		Retraction end (AT)	
		Both ends (A)	
	Shock absorber	Extension end (BS)	Series MXQ6 is not available with shock absorber.
		Retraction end (BT)	
		Both ends (B)	
	Metal stopper	Extension end (CS)	Stroke adjustment range 0 to 5mm
		Retraction end (CT)	
		Both ends (C)	
Functional option	With buffer (F)		Series MXQ6 is not available with end lock.
	With end lock (R)		
	Axial piping type (P)		

∗ For detailed specifications of adjuster options and functional options, refer to option specifications on pages 3 and 4.

Order Made Specifications

For order made specifications of series MXQ, refer to page 42.

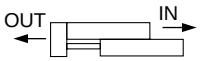
Standard Strokes

Model	Standard stroke (mm)
MXQ 6	10, 20, 30, 40, 50
MXQ 8	10, 20, 30, 40, 50, 75
MXQ12	10, 20, 30, 40, 50, 75, 100
MXQ16	10, 20, 30, 40, 50, 75, 100, 125
MXQ20	10, 20, 30, 40, 50, 75, 100, 125, 150
MXQ25	10, 20, 30, 40, 50, 75, 100, 125, 150

Series MXQ

Theoretical Output

Application of the dual rod system generates double the output of conventional cylinders.



(Unit: N)

Cylinder bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm²)	Operating pressure (MPa)					
				0.2	0.3	0.4	0.5	0.6	0.7
6	3	OUT	57	11	17	23	29	34	40
		IN	42	8	13	17	21	25	29
8	4	OUT	101	20	30	40	51	61	71
		IN	75	15	23	30	38	45	53
12	6	OUT	226	45	68	90	113	136	158
		IN	170	34	51	68	85	102	119
16	8	OUT	402	80	121	161	201	241	281
		IN	302	60	91	121	151	181	211
20	10	OUT	628	126	188	251	314	377	440
		IN	471	94	141	188	236	283	330
25	12	OUT	982	196	295	393	491	589	687
		IN	756	151	227	302	378	454	529

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²) 1N = Approx. 0.102kgf, 1MPa = Approx. 10.2kgf/cm²

Weights

(Unit: g)

Model	Standard stroke (mm)									Additional weight of adjuster option						Additional weight of functional option		
										Rubber stopper		Shock absorber		Metal stopper				
	10	20	30	40	50	75	100	125	150	Extension end	Retraction end	Extension end	Retraction end	Extension end	Retraction end	With buffer	With end lock	Axial piping type (S: Stroke mm)
MXQ 6	100	120	140	180	200	—	—	—	—	6	5	—	—	10	5	25	—	13 + 0.2S
MXQ 8	140	170	210	250	315	385	—	—	—	10	10	30	23	23	10	35	40	26 + 0.2S
MXQ12	335	340	380	450	490	655	745	—	—	25	23	47	30	35	23	70	100	43 + 0.2S
MXQ16	605	610	670	735	835	1000	1250	1400	—	45	40	75	53	60	40	105	160	55 + 0.2S
MXQ20	1100	1100	1100	1200	1400	1750	2350	2650	2900	80	65	170	120	115	65	130	310	166 + 0.5S
MXQ25	1750	1750	1750	1950	2400	2750	3450	4300	4700	130	110	220	140	180	110	200	560	240 + 0.5S

Option Specifications

Stroke Adjustment Range of Adjuster Options (Identical for extension and retraction ends)

Type	Stroke adjustment range
Rubber stopper	0 to 5mm
With shock absorber	Refer to dimensions on page 34.
Metal stopper	0 to 5mm

* Optional wide adjustment range adjusters are available with rubber stopper and metal stopper.

How to Order Stroke Adjusters (Accessories)

MXQ — AS | 12 | L — X11

Adjuster option

AS	Rubber stopper	Extension end
AT		Retraction end
BS	Shock absorber	Extension end
BT		Retraction end
CS	Metal stopper	Extension end
CT		Retraction end

Applicable cylinder bore size

6	ø6
8	ø8
12	ø12
16	ø16
20	ø20
25	ø25

Symmetry

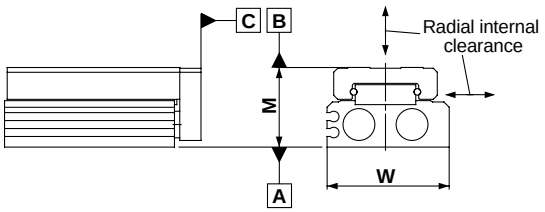
Nil	Standard type
L	Symmetric type

Adjustment range

Nil	5mm	Standard
-X11	15mm	Optional
-X12	25mm	

Note 1) -X12 (adjustment range: 25mm) is not available with series MXQ6.
Note 2) -X11 and -X12 are not available with shock absorber.
Note 3) Series MXQ6 is not available with shock absorber.
Note 4) -X11 and -X12 are not available as built-in types.
Note 5) Refer to pages 33 and 35 for dimensions.

Table Accuracy



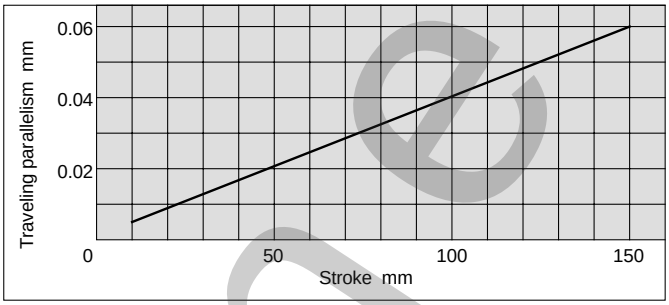
Model	MXQ6	MXQ8	MXQ12	MXQ16	MXQ20	MXQ25
B side parallelism to **A** side	Refer to Table 1.					
B side traveling parallelism to **A** side	Refer to Graph 1.					
C side perpendicularity to **A** side	0.05mm					
M dimension tolerance	±0.08mm (±0.1mm)*1					
W dimension tolerance	±0.1mm					
Radial internal clearance (μm)	– 4 to 0	– 4 to 0	– 6 to 0	–10 to 0	–12 to 0	–14 to 0

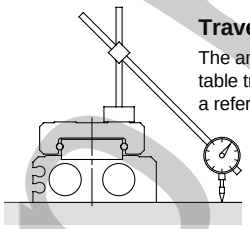
*1 ±0.1mm for 75mm or longer stroke

Table 1 B side parallelism to A side (Unit: mm)

Model	Stroke (mm)								
	10	20	30	40	50	75	100	125	150
MXQ 6	0.025	0.03	0.035	0.04	0.045	—	—	—	—
MXQ 8	0.025	0.03	0.035	0.04	0.055	0.065	—	—	—
MXQ12	0.03	0.03	0.035	0.04	0.045	0.065	0.075	—	—
MXQ16	0.035	0.035	0.04	0.045	0.05	0.065	0.08	0.095	—
MXQ20	0.04	0.04	0.04	0.045	0.055	0.07	0.095	0.105	0.125
MXQ25	0.045	0.045	0.045	0.05	0.06	0.07	0.09	0.115	0.125

Graph 1 B side traveling parallelism to A side (Unit: mm)





Traveling parallelism:
The amount of deflection on a dial gauge when the table travels a full stroke with the body secured on a reference base surface.

Shock Absorber Specifications

Shock absorber model		RB0805	RB0806	RB1007	RB1411	RB1412
Applicable slide table		MXQ8	MXQ12	MXQ16	MXQ20	MXQ25
Max. absorbed energy J		0.98	2.94	5.88	14.7	19.6
Stroke absorption mm		5	6	7	11	12
Max. impact speed mm/s		50 to 500				
Max. operating frequency cycle/min		80	80	70	45	45
Max. allowable thrust N		245	245	422	814	814
Ambient temperature range °C		–10 to 60				
Spring force	Extended	1.96	1.96	4.22	6.86	6.86
	Compressed	3.83	4.22	6.86	15.30	15.98
Weight g		15	15	25	65	65

End Lock Type Specifications

Model	MXQ8	MXQ12	MXQ16	MXQ20	MXQ25
Cylinder bore size (mm)	8	12	16	20	25
Operating speed range	50 to 500mm/s				
Holding force (N)	25	60	110	160	250

Note) Refer to page 51 for end lock handling precautions.

Buffer Mechanism Type Specifications

Model		MXQ6	MXQ8	MXQ12	MXQ16	MXQ20	MXQ25
Cylinder bore size (mm)		6	8	12	16	20	25
Operating speed range		50 to 500mm/s (50 to 300mm/s with horizontal operation)					
Buffer stroke (mm)		5		10			
Buffer stroke load (N)	At 0mm stroke	3	5	10	13	17	21
	At maximum stroke	6	8	13	17	25	29

Note 1) Refer to page 51 for buffer mechanism handling precautions.
Note 2) The buffer stroke decreases by the amount of stroke adjusted with the extension end stroke adjuster.

Auto Switches for Buffer Mechanism

Type	Part no.	Specifications	Electrical entry direction
Solid state switch	**D-F9BV**	2 wire with indicator light	Perpendicular
	D-F9NV	3 wire with indicator light, Output: NPN	
	D-F9PV	3 wire with indicator light, Output: PNP	

* Order buffer mechanism auto switches separately using the part numbers listed above.

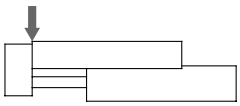
With buffer mechanism With end lock

Series MXQ

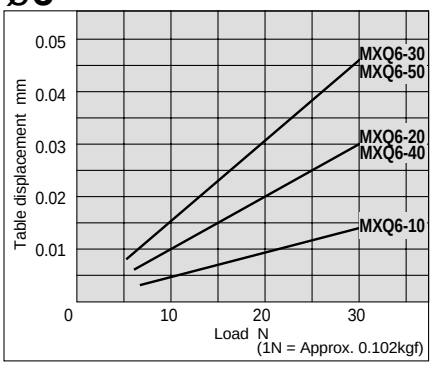
Table Deflection (Reference Values)

Table displacement due to pitch moment load

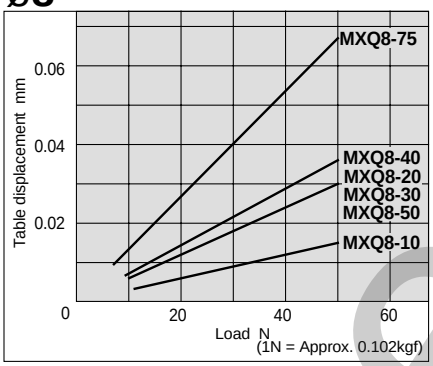
Displacement at the section indicated by the arrow when a load is applied to this section with the slide table fully extended.



ø6



ø8



ø12

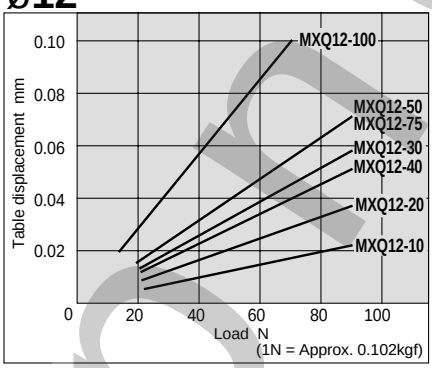
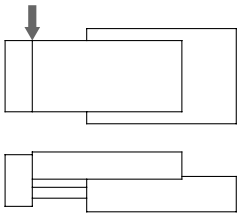
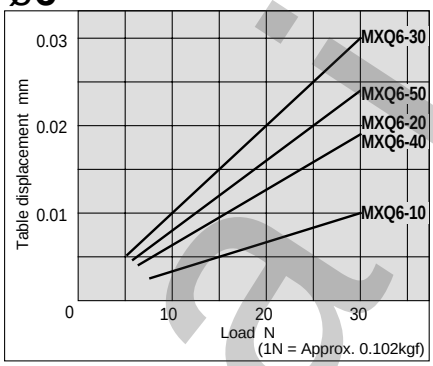


Table displacement due to yaw moment load

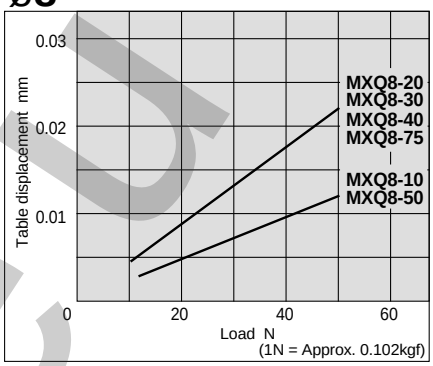
Displacement at the section indicated by the arrow when a load is applied to this section with the slide table fully extended.



ø6



ø8



ø12

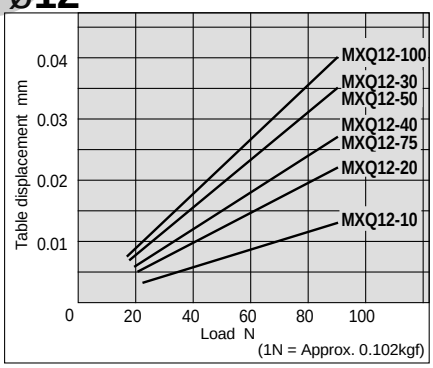
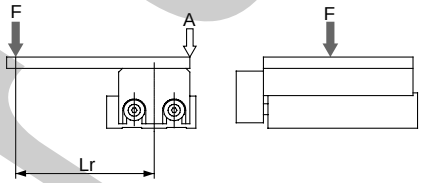
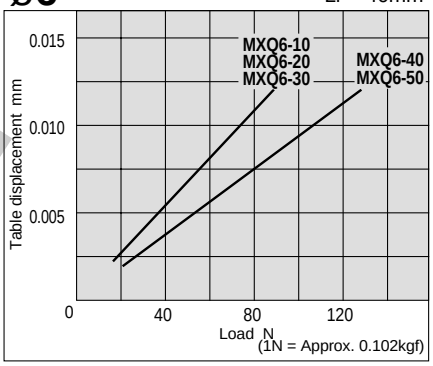


Table displacement due to roll moment load

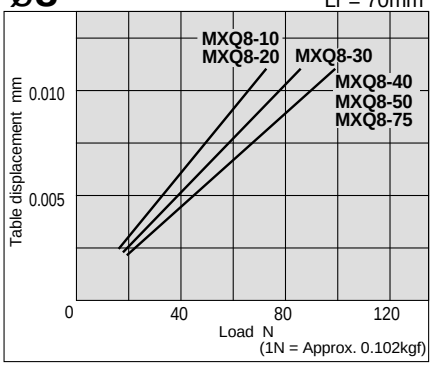
Displacement at "A" when a load is applied to "F" with the slide table retracted.



ø6 Lr = 40mm



ø8 Lr = 70mm



ø12 Lr = 90mm

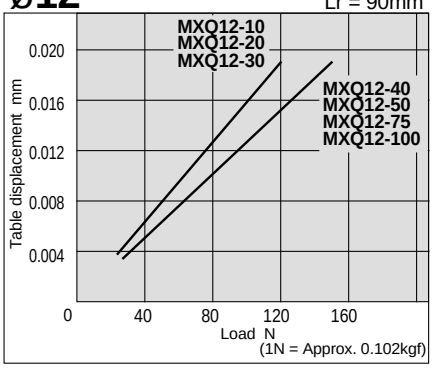
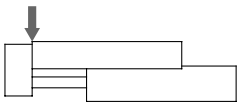
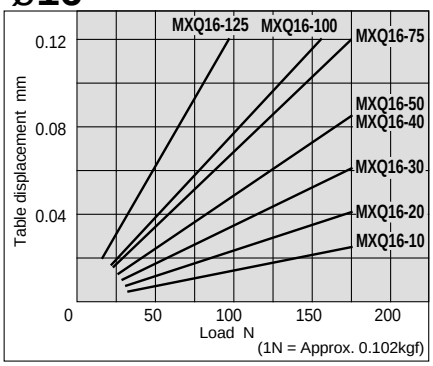


Table displacement due to pitch moment load

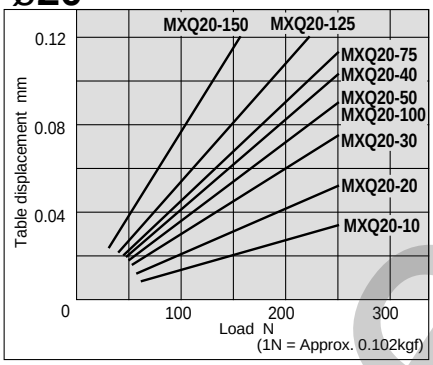
Displacement at the section indicated by the arrow when a load is applied to this section with the slide table fully extended.



ø16



ø20



ø25

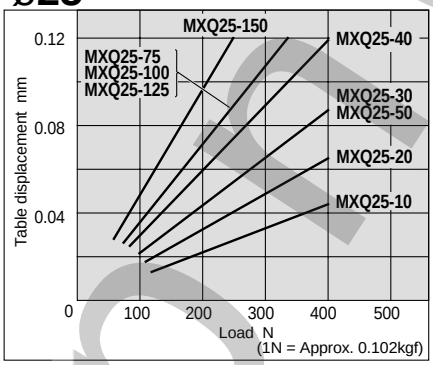
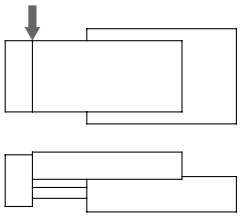
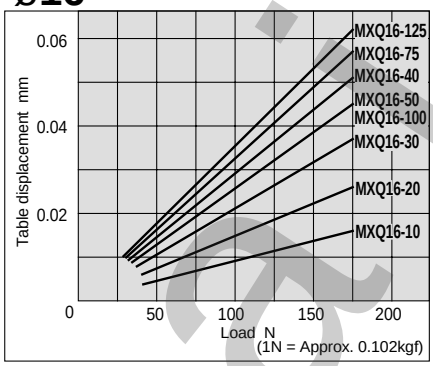


Table displacement due to yaw moment load

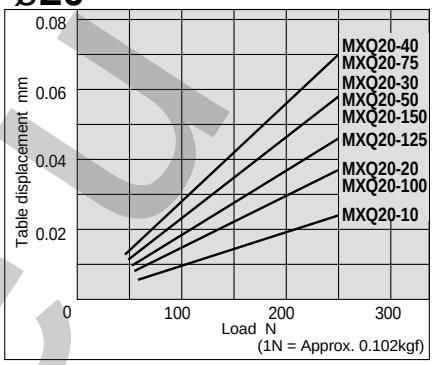
Displacement at the section indicated by the arrow when a load is applied to this section with the slide table fully extended.



ø16



ø20



ø25

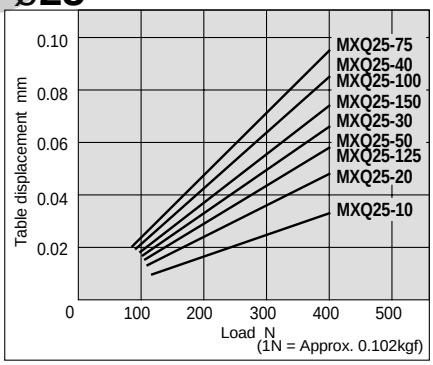
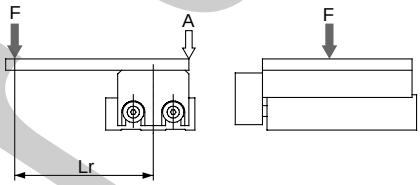


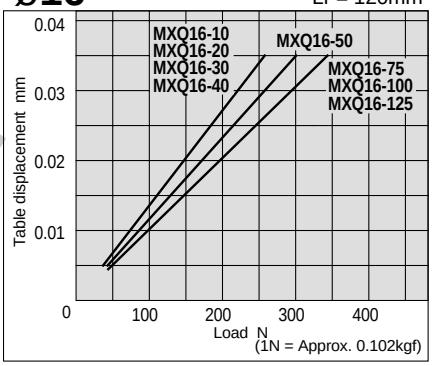
Table displacement due to roll moment load

Displacement at "A" when a load is applied to "F" with the slide table retracted.



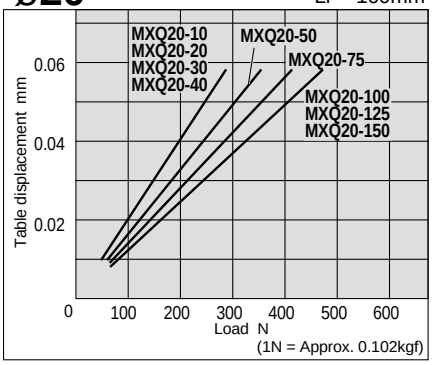
ø16

Lr = 120mm



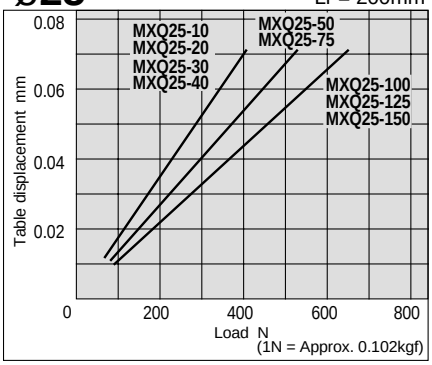
ø20

Lr = 160mm



ø25

Lr = 200mm



Series MXQ
Model Selection

Model Selection Procedure	Formulae/Data	Selection Examples

1 Operating conditions

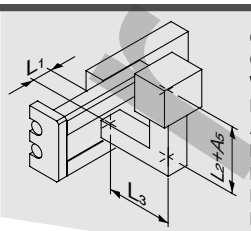
Model Selection Procedure

Enumerate the operating conditions considering the mounting position and work piece configuration.

Formulae/Data

- Model to be used
- Type of cushion
- Work piece mounting position
- Mounting orientation
- Average speed Va (mm/s)
- Load weight W (kg) **Fig. 1**
- Overhang Ln (mm) **Fig. 2**

Selection Examples



Cylinder: MXQ16-50
Cushion: Rubber stopper
Work piece table mounting
Mounting: Horizontal wall mounting
Average speed: Va = 300 [mm/s]
Load weight: W = 0.2 [kg]
L_1 = 10mm
L_2 = 30mm
L_3 = 30mm

2 Kinetic energy

Model Selection Procedure

Find the kinetic energy E (J) of the load.

Find the allowable kinetic energy Ea (J).

Confirm that the kinetic energy of the load does not exceed the allowable kinetic energy.

Formulae/Data

$$E = \frac{1}{2} \cdot W \left(\frac{V}{1000}\right)^2$$

Collision speed $V = 1.4 \cdot \underline{Va}^{*}$ * Correction factor (reference value)

$Ea = K \cdot E\ max$

Work piece mounting coefficient K: **Fig. 3**

Max. allowable kinetic energy Emax: **Fig. 1**

Kinetic energy (E) ≤ Allowable kinetic energy (Ea)

Selection Examples

$$E = \frac{1}{2} \cdot 1 \left(\frac{420}{1000}\right)^2 = 0.088$$

V = 1.4 x 300 = 420

Ea = 1 x 0.11 = 0.11

Can be used based on E = 0.088 ≤ Ea = 0.11

3 Load factor

3-1 Load factor of load weight

Model Selection Procedure

Find the allowable load weight Wa (kg).

Find the load factor of the load weight α_1.

Formulae/Data

$Wa = K \cdot \beta \cdot Wmax$

Work piece mounting coefficient K: **Fig. 3**

Allowable load weight coefficient β: **Graph 1**

Max. allowable load weight Wmax: **Table 2**

$\alpha_1 = W/Wa$

Selection Examples

Wa = 1 x 1 x 4 = 4
K = 1
β = 1
Wmax = 4
α_1 = 1/4 = 0.25

3-2 Load factor of static moment

Model Selection Procedure

Find the static moment M (N·m).

Find the allowable static moment Ma (N·m).

Find the load factor α_2 of the static moment.

Formulae/Data

$M = W \times 9.8\ (Ln + An) / 1000$

Corrected value of moment center position distance An: **Table 3**

$Ma = K \cdot \gamma \cdot Mmax$

Work piece mounting coefficient K: **Fig. 3**

Allowable moment coefficient γ: **Graph 2**

Max. allowable moment Mmax: **Table 4**

$\alpha_2 = M/Ma$

Selection Examples

Yawing

Examine My.

My = 1 x 9.8 (10 + 30)/1000
= 0.39
A_3 = 30

May = 1 x 1 x 18=18
Mymax = 18
K = 1
γ = 1

α_2 = 0.39/18 = 0.022

Rolling

Examine Mr.

Mr = 1 x 9.8 (30 + 10.5) / 1000
= 0.39
A_6 = 10.5

Mar = 36
Mrmax = 36
K = 1
γ = 1

α'_2 = 0.39/36 = 0.011

3-3 Load factor of dynamic moment

Model Selection Procedure

Find the dynamic moment Me (N·m).

Find the allowable dynamic moment Mea (N·m).

Find the load factor α_3 of the dynamic moment.

Formulae/Data

$Me = 1/3 \cdot We \times 9.8 \dfrac{(Ln + An)}{1000}$

Weight equivalent to impact $We = \delta \cdot W \cdot V$

δ: Bumper coefficient

Rubber stopper without adjuster = 4/100

Shock absorber = 1/100

Metal stopper = 16/100

Corrected value of moment center position distance An: **Table 3**

$Mea = K \cdot \gamma \cdot Mmax$

Work piece mounting coefficient K: **Fig. 3**

Allowable moment coefficient γ: **Graph 2**

Max. allowable moment Mmax: **Table 4**

$\alpha_3 = Me/Mea$

Selection Examples

Pitching Examine Mep.

$$Mep = 1/3 \times 16.8 \times 9.8 \times \frac{(30 + 10.5)}{1000} = 2.2$$

We = 4/100 x 1 x 420 = 16.8
A_2 = 10.5
Meap = 1 x 0.7 x 18 = 12.6
K = 1
γ = 0.7
Mpmax = 18
α_3 = 2.2/12.6 = 0.17

Yawing Examine Mey.

$$Mey = 1/3 \times 16.8 \times 9.8 \times \frac{(30 + 24.5)}{1000} = 3.0$$

We = 168
A_4 = 24.5
Meay = 12.6 (same value as Meap)
α'_3 = 3.0/12.6 = 0.24

3-4 Sum of the load factors

Model Selection Procedure

Use is possible if the sum of the load factors does not exceed 1.

Formulae/Data

$\Sigma\alpha n = \alpha_1 + \alpha_2 + \ldots\ldots\ldots + \alpha_n \leq 1$

Selection Examples

Can be used based on
$\Sigma\alpha n = \alpha_1 + \alpha_2 + \alpha'_2 + \alpha_3 + \alpha'_3$
= 0.25 + 0.022 + 0.011 + 0.17 + 0.24 = 0.693 ≤ 1

Fig. 1 Load weight: W (kg)

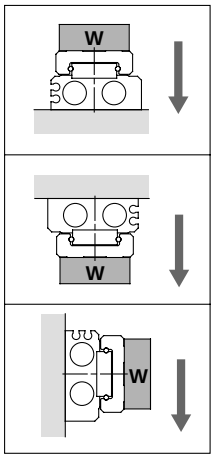
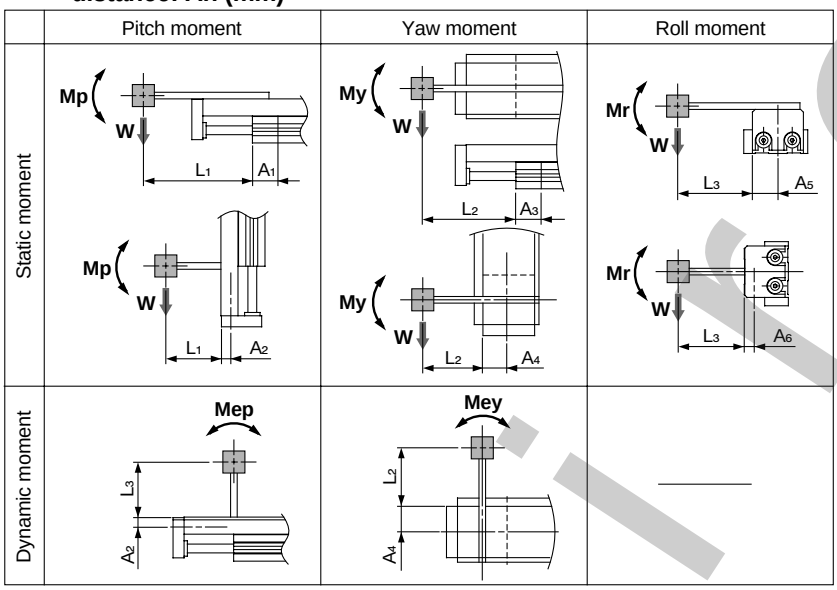


Fig. 2 Overhang: Ln (mm), Corrected value of moment center position distance: An (mm)



Note 1) Static moment: Moment generated by gravity
Dynamic moment: Moment generated by impact when colliding with stopper

Fig. 3 Work piece mounting coefficient: K

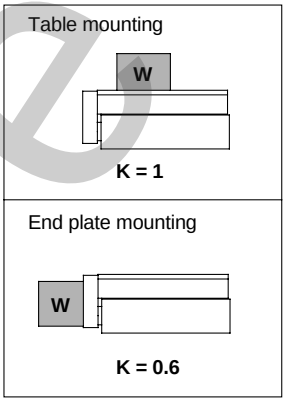


Table 1 Allowable kinetic energy: Emax (J)

Model	Allowable kinetic energy			
	Without adjuster	Adjuster option		
		Rubber stopper	Shock absorber	Metal stopper
MXQ 6	0.018	0.018	——	0.009
MXQ 8	0.027	0.027	0.054	0.013
MXQ12	0.055	0.055	0.11	0.027
MXQ16	0.11	0.11	0.22	0.055
MXQ20	0.16	0.16	0.32	0.080
MXQ25	0.24	0.24	0.48	0.12

⚠ **Caution** The maximum operating speed for metal stopper is 200mm/s.

Table 2 Max. allowable load weight: Wmax(kg)

Model	Max. allowable load weight
MXQ 6	0.6
MXQ 8	1
MXQ12	2
MXQ16	4
MXQ20	6
MXQ25	9

Graph 1 Allowable load weight coefficient: β

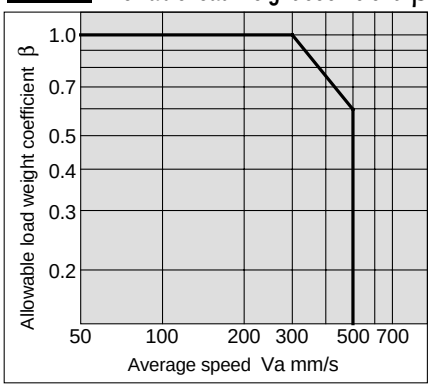
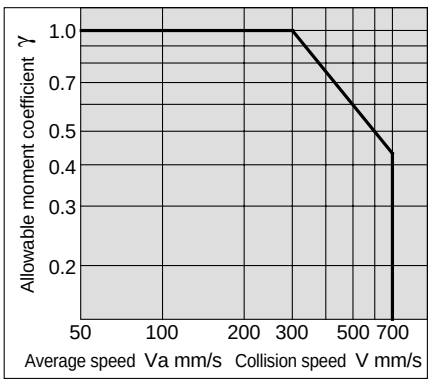


Table 3 Corrected value of moment center position distance: An (mm)

Model	Corrected value of moment center position distance (Refer to Figure 2.)												
	A1, A3 Stroke (mm)									A2	A4	A5	A6
	10	20	30	40	50	75	100	125	150				
MXQ 6	14.5	14.5	14.5	18.5	18.5	——	——	——	——	6	13.5	13.5	6
MXQ 8	16.5	16.5	18.5	20.5	28	28.5	——	——	——	7	16	16	7
MXQ12	21	21	21	25	25	34	34	——	——	9	19.5	19.5	9
MXQ16	27	27	27	27	30	33	42.5	42.5	——	10.5	24.5	24.5	10.5
MXQ20	29.5	29.5	29.5	29.5	33.5	37.5	53.5	55	56.5	14	30	30	14
MXQ25	35.5	35.5	35.5	35.5	43	43	50	64	64	16.5	37	37	16.5

Note) For A2, A4, A5 and A6, there is no difference in the corrected values due to the stroke.

Graph 2 Allowable moment coefficient: γ



Note) Use the average speed when calculating static moment.
Use the collision speed when calculating dynamic moment.

Table 4 Maximum allowable moment: Mmax (N·m)

Model	Pitch/Yaw moment: Mpmax/Mymax Stroke (mm)									Roll moment: Mrmax Stroke (mm)								
	10	20	30	40	50	75	100	125	150	10	20	30	40	50	75	100	125	150
MXQ 6	1.4	1.4	1.4	2.8	2.8	—	—	—	—	3.5	3.5	3.5	5.1	5.1	—	—	—	—
MXQ 8	2.0	2.0	2.8	3.7	7.9	7.9	—	—	—	5.1	5.1	6.0	6.9	7.4	7.4	—	—	—
MXQ12	4.7	4.7	4.7	7.2	7.2	15	15	—	—	11	11	11	13	13	14	14	—	—
MXQ16	13	13	13	13	18	23	42	42	—	31	31	31	31	36	41	41	41	—
MXQ20	19	19	19	19	27	36	84	84	84	47	47	47	47	57	66	75	75	75
MXQ25	32	32	32	32	52	52	78	140	140	81	81	81	81	110	110	130	130	130

Symbols

Symbol	Definition	Unit
An (n = 1 to 6)	Corrected value of moment center position distance	mm
E	Kinetic energy	J
Emax	Allowable kinetic energy	J
Ln (n = 1 to 3)	Overhang	mm
M (Mp, My, Mr)	Static moment (pitch, yaw, roll)	N·m
Ma (Map, May, Mar)	Allowable static moment (pitch, yaw, roll)	N·m
Me (Mep, Mey)	Dynamic moment (pitch, yaw)	N·m
Mea (Meap, Meay)	Allowable dynamic moment (pitch, yaw)	N·m
Mmax (Mpmax, Mymax, Mrmax)	Max. allowable moment (pitch, yaw, roll)	N·m
V	Collision speed	mm/s

Symbol	Definition	Unit
Va	Average speed	mm/s
W	Load weight	kg
Wa	Allowable load weight	kg
We	Weight equivalent to impact	kg
Wmax	Max. allowable load weight	kg
α	Load factor	——
β	Allowable load weight coefficient	——
γ	Allowable moment coefficient	——
K	Work piece mounting coefficient	——