Model Selection

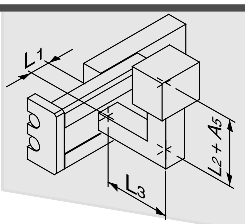
Model Selection Steps	Formula/Data	Selection Examples

① Operating Conditions

Model Selection Steps: List the operating conditions considering the mounting position and workpiece configuration.

Formula/Data:
- Model to be used
- Type of cushion
- Workpiece mounting position
- Mounting orientation
- Average speed Va (mm/s)
- Load mass W (kg): Fig. (1)
- Overhang Ln (mm): Fig. (2)

Selection Examples:



Cylinder: MXS16-50
Cushion: Rubber bumper
Workpiece table mounting
Mounting: Horizontal wall mounting
Average speed: Va = 300 [mm/s]
Load mass: W = 1 [kg]
L_1 = 10 mm
L_2 = 30 mm
L_3 = 30 mm

② Kinetic Energy

Model Selection Steps:

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.

Formula/Data:

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

Collision speed $V = \underline{1.4} \cdot Va$
*) Correction factor (Reference values)

Ea = K·Emax
Workpiece mounting coefficient K: Fig. (3)
Max. allowable kinetic energy Emax: Table (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 Mass

Model Selection Steps:

Find the allowable load mass Wa (kg).
Note) There is no need to consider this load factor in the case of using perpendicularly in a vertical position.
(Define α_1 =0.)

Find the load factor of the load mass α_1.

Formula/Data:

$Wa = K \cdot \beta \cdot Wmax$
Workpiece mounting coefficient K: Fig. (3)
Allowable load mass coefficient β: Graph (1)
Max. allowable load mass 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 Steps:

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.

Formula/Data:

M = W x 9.8 (Ln + An)/1000
Correction value of moment center position distance An: Table (3)

$Ma = K \cdot \gamma \cdot Mmax$
Workpiece mounting coefficient K: Fig. (3)
Allowable moment coefficient γ: Graph (2)
Maximum allowable moment Mmax: Table (4)

$\alpha_2 = M/Ma$

Selection Examples:

Yawing	Rolling
Examine My.	Examine Mr.
My = 1 x 9.8 (10 + 30)/1000 = 0.39	Mr = 1 x 9.8 (30 + 10)/1000 = 0.39
A_3 = 30	A_6 = 10
May = 1 x 1 x 15.9 = 15.9	Mar = 15.9 (Same value as May)
Mymax = 15.9	
K = 1	
γ = 1	
α_2 = 0.39/15.9 = 0.025	α'_2 = 0.39/15.9 = 0.025

3-3 Load Factor of Dynamic Moment

Model Selection Steps:

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.

Formula/Data:

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

Collision equivalent to impact $We = \delta \cdot W \cdot V$
δ: Bumper coefficient
With urethane bumper (Standard) = 4/100
With shock absorber = 1/100
Correction value of moment center position distance An: Table (3)

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

$Mep = 1/3 \times 16.8 \times 9.8 \times \frac{(30 + 10)}{1000} = 2.2$

We = 4/100 x 1 x 420 = 16.8
A_2 = 10
Meap = 1 x 0.7 x 15.9 = 11.1
K = 1
γ = 0.7
Mpmax = 15.9
α_3 = 2.2/11.1 = 0.20

Yawing Examine Mey.

$Mey = 1/3 \times 16.8 \times 9.8 \times \frac{(30 + 31)}{1000} = 3.3$

We = 16.8
A_4 = 31
Meay = 11.1 (Same value as Meap)
α'_3 = 3.3/11.1 = 0.30

3-4 Sum of Load Factors

Model Selection Steps: Possible to use if the sum of the load factors does not exceed 1.

Formula/Data:

$\Sigma\alpha n = \alpha_1 + \alpha_2 + \alpha_3 \leq 1$

Selection Examples:

$\Sigma\alpha n = \alpha_1 + \alpha_2 + \alpha'_2 + \alpha_3 + \alpha'_3$
= 0.25 + 0.025 + 0.025 + 0.20 + 0.30 = 0.80 ≤ 1
And it is possible to use.

The graphs below show the table displacement when the static moment load is applied to the table. The graphs do not show the loadable mass. Refer to the Model Selection for the loadable mass.

Table displacement due to pitch moment load

Table displacement when loads are applied to the section marked with the arrow at the full stroke.

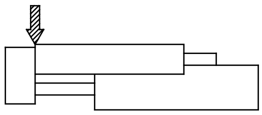


Table displacement due to yaw moment load

Table displacement when loads are applied to the section marked with the arrow at the full stroke.

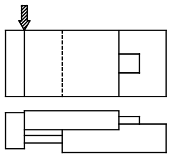
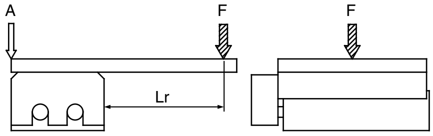
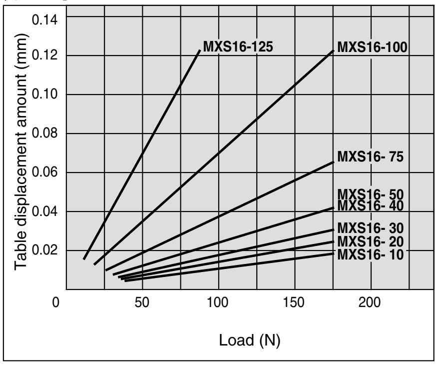


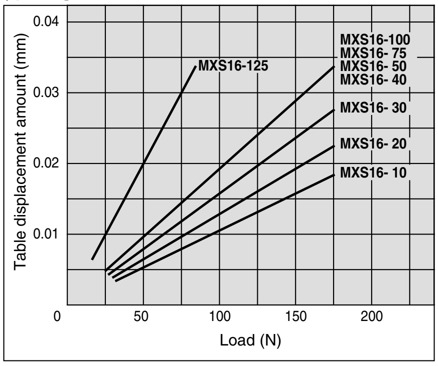
Table displacement due to roll moment load

Table displacement of section A when loads are applied to the section F with the slide table retracted.

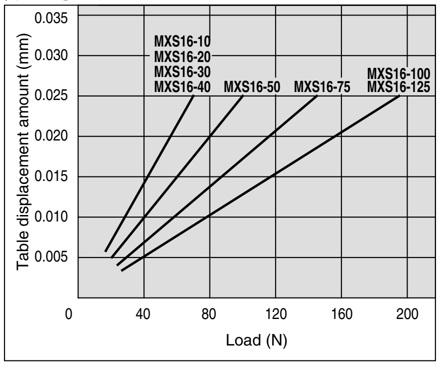


ø16

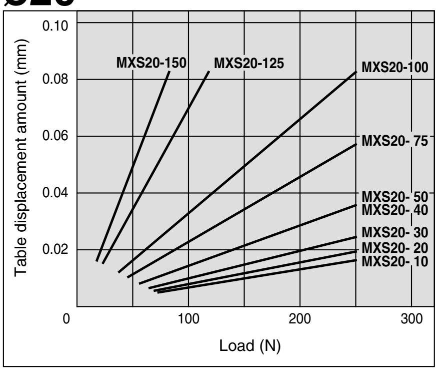


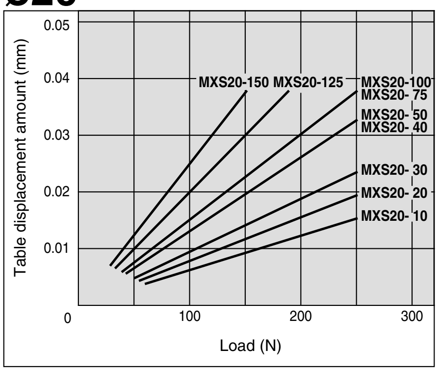


Lr=89 mm

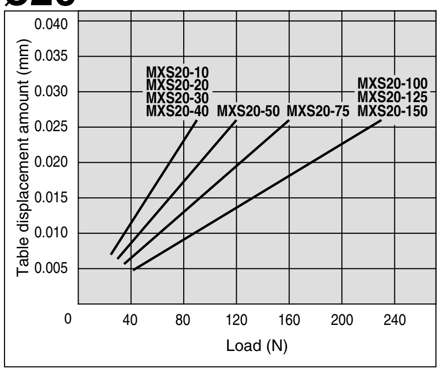


ø20

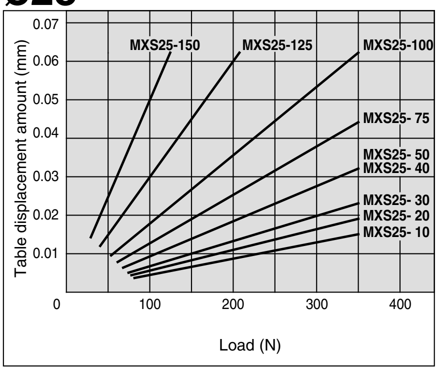


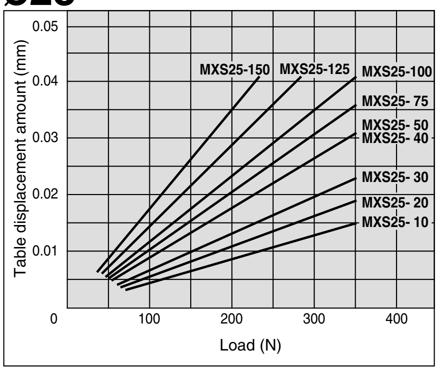


Lr=122 mm

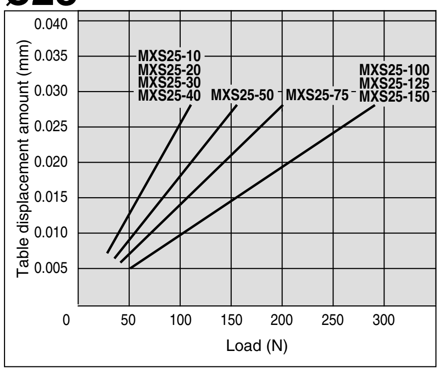


ø25



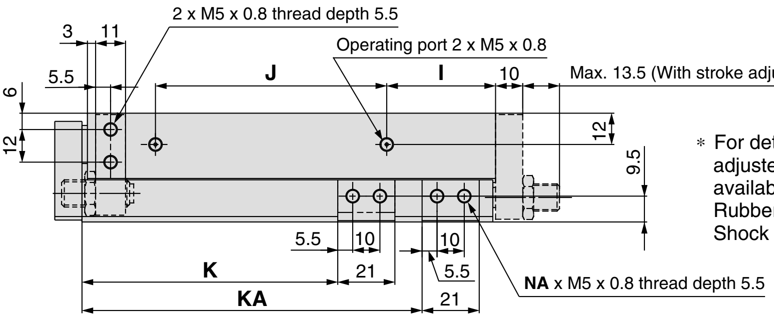


Lr=154 mm

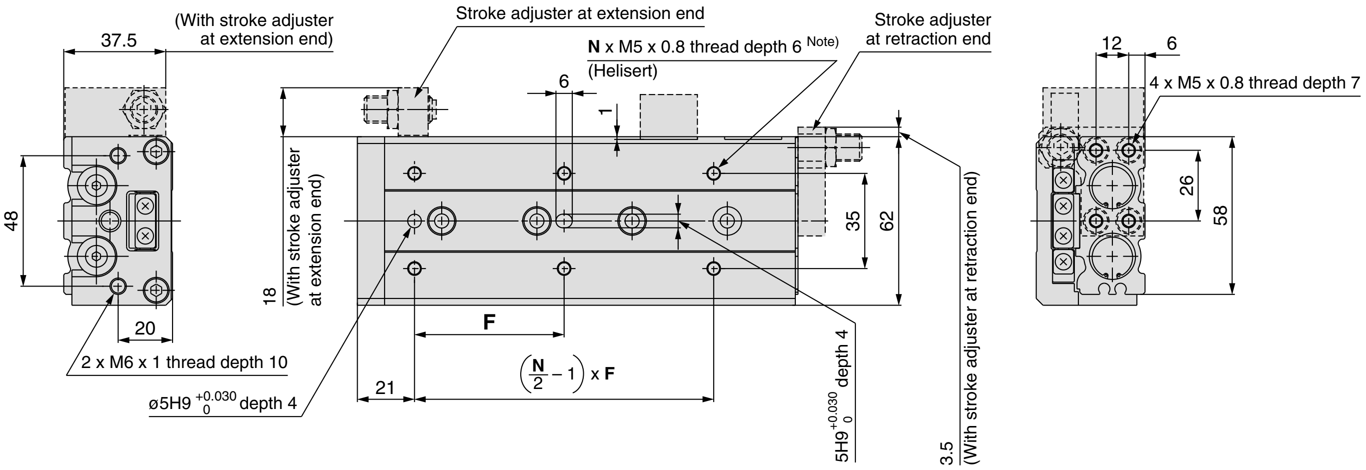


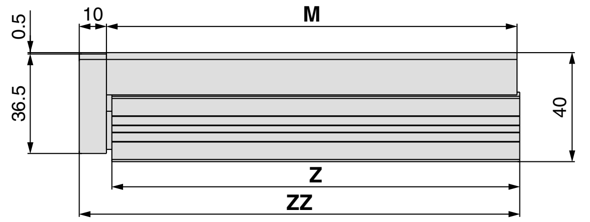
Dimensions: MXS16

Basic style

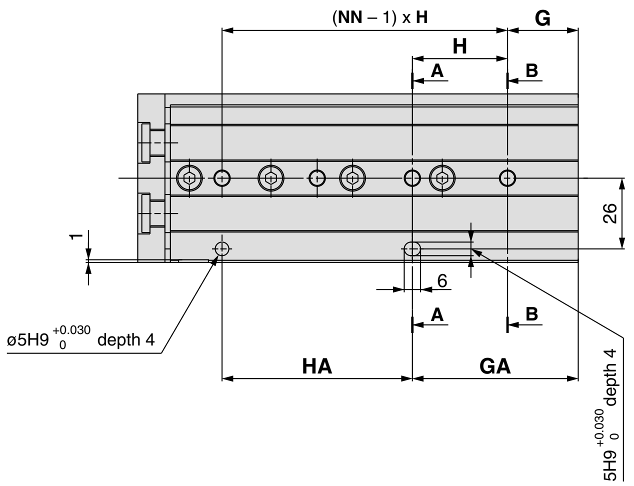


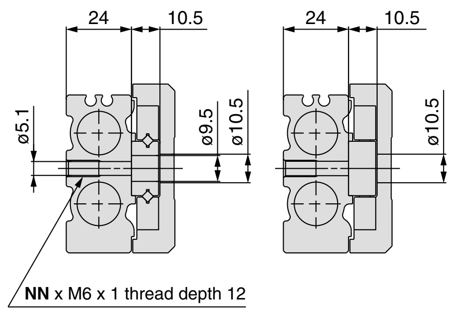
∗ For detailed dimensions on stroke adjusters, refer to the options available with adjusters.
Rubber stopper (Refer to page 70.)
Shock absorber (Refer to page 71.)





Note) If long bolts are used, they can touch the guide block and cause malfunction, etc. Refer to the Specific Product Precautions.



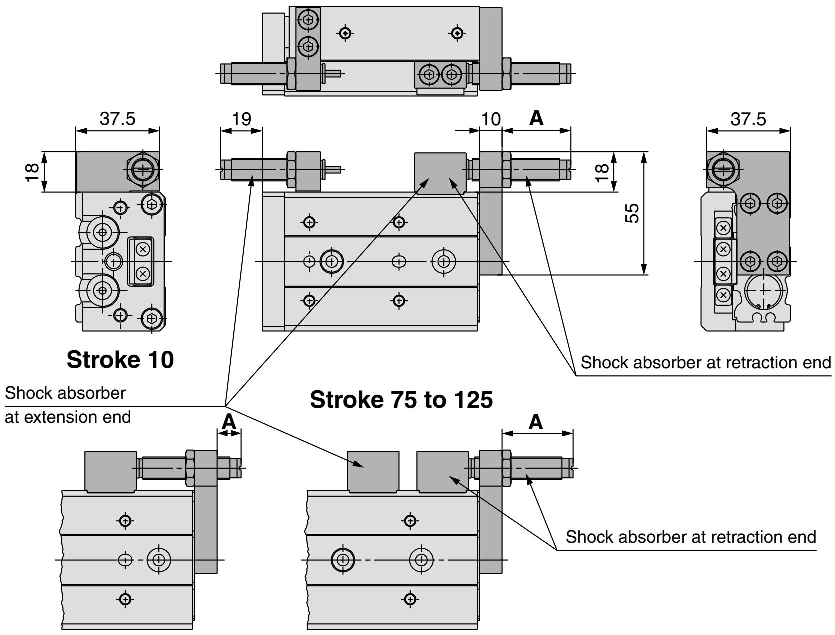


Section AA **Section BB**

(mm)

Model	F	N	G	H	NN	GA	HA	I	J	K	KA	NA	M	Z	ZZ
MXS16-10	35	4	16	40	2	16	40	10	40	29	—	2	76	75	87
MXS16-20	35	4	16	40	2	16	40	10	40	39	—	2	76	75	87
MXS16-30	35	4	16	40	2	16	40	10	40	49	—	2	76	75	87
MXS16-40	40	4	16	50	2	16	50	10	50	59	—	2	86	85	97
MXS16-50	30	6	21	30	3	51	30	15	60	69	—	2	101	100	112
MXS16-75	55	6	26	35	4	61	70	40	85	94	125	4	151	150	162
MXS16-100	65	6	39	35	5	109	70	55	118	119	173	4	199	198	210
MXS16-125	70	8	19	35	7	159	70	68	155	144	223	4	249	248	260

With shock absorber (ø16) MXS16-□□BS/BT/B

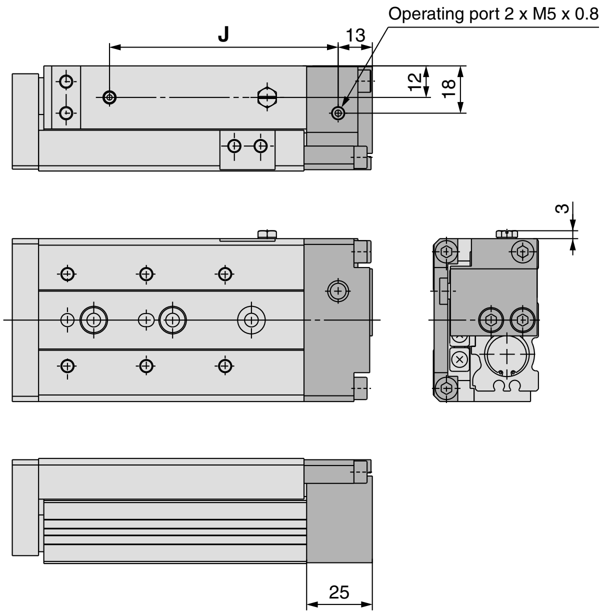


(mm)

Model	Stroke adjustment range		A dimension (Retracted side mounting)
	Extension end	Retraction end	
MXS16-10	Maximum 25	5	11
MXS16-20		10	21
MXS16-30		20	31
MXS16-40		20	31
MXS16-50		15	26
MXS16-75		20	32
MXS16-100		20	32
MXS16-125		20	32

∗ Other dimensions are the same as the basic style.

With end lock (ø16) MXS16-□□R

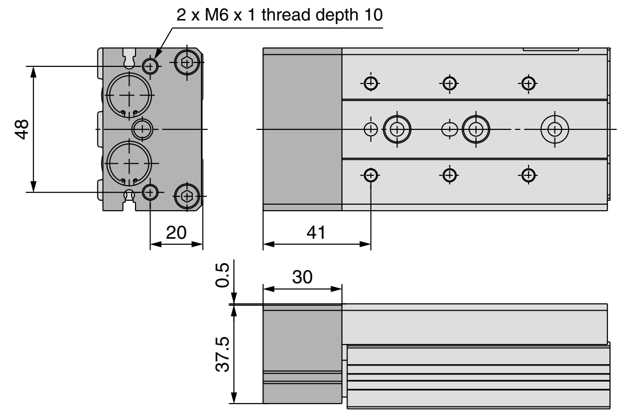


(mm)

Model	J
MXS16-10R	62
MXS16-20R	62
MXS16-30R	62
MXS16-40R	72
MXS16-50R	87
MXS16-75R	137
MXS16-100R	185
MXS16-125R	235

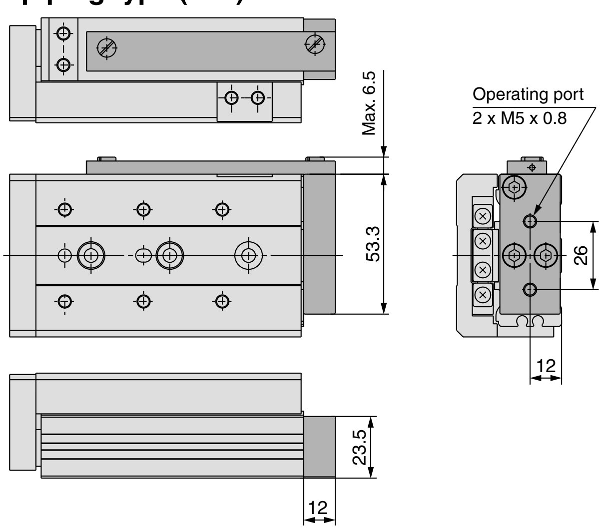
∗ Other dimensions are the same as the basic style.

With buffer (ø16) MXS16-□□F



∗ Other dimensions are the same as the basic style.

Axial piping type (ø16) MXS16-□□P



∗ Other dimensions are the same as the basic style.