

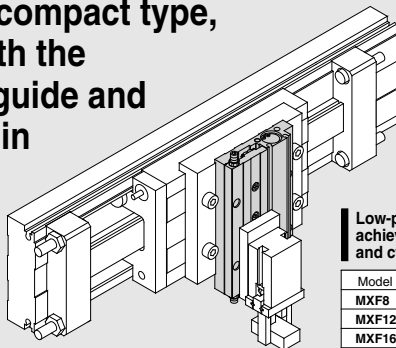
Low Profile Slide Table

MXF Series

ø8, ø12, ø16, ø20

RoHS

Low-profile and compact type, air slide table with the construction of guide and cylinder aligned in parallel.



Low-profile and compactness have been achieved with the construction of guide and cylinder aligned in parallel.

| Model | Height x Width (mm) | Height comparison to MXS |
|-------|---------------------|--------------------------|
| MXF8 | 16 x 58 | 67% |
| MXF12 | 18.5 x 68 | 59% |
| MXF16 | 21 x 80 | 53% |
| MXF20 | 27 x 92 | 54% |

Neat appearance

Protecting stopper section with cover realizes neat appearance.

Standard adjustment

Stroke can be adjusted at each stroke end within 5 mm each end and 10 mm is total.

Body mounting (Body tapped)

Auto switch is mountable

Auto switch is recessed in the groove to save space.

Slim body

Low-profile has been achieved with the construction of guide and cylinder aligned in parallel.

Reproducibility for mounting and dismounting

Positioning pin holes on table top allows precise and easy mounting to change workpiece.

High rigidity

Cross roller guide allows smooth operation without vibration.

Optional porting

Lateral and axial piping from 2 directions is possible.

Reproducibility for mounting and dismounting

Pin holes for positioning on bottom of slide allows precise and accurate mounting of actuator.

Body mounting (Body tapped)

Mounting can be done from 2 directions top side (through-hole) and bottom side (body tapped).

1. Body tapped



2. Body through-hole



Series Variations

| Model | Bore size (mm) | Stroke (mm) | Auto switch |
|-------|----------------|--------------------|---|
| MXF8 | 8 | 10 20 30 50 75 100 | Reed auto switch D-A9□, D-A9□V |
| MXF12 | 12 | | Solid state auto switch D-M9□, D-M9□V |
| MXF16 | 16 | | 2-color indicator solid state auto switch D-M9□W, D-M9□WV |
| MXF20 | 20 | | |

Model Selection

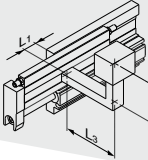
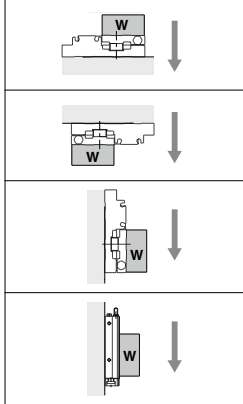
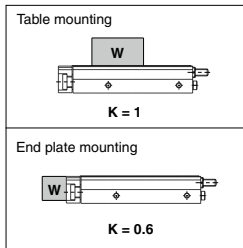
| Model Selection Step | Formula/Data | Selection Example |
|---|--|--|
| 1 Operating Conditions Enumerate the operating conditions considering the mounting position and workpiece configuration. Check that the load weight does not exceed the maximum allowable load weight and that the average operating speed does not exceed the operating speed range. | <ul style="list-style-type: none"> Model to be used Type of cushion Workpiece mounting position Mounting orientation Average operating speed V_a (mm/s) Load mass W (kg): Fig. (1) - Table (2) Overhang L_n (mm): Fig. (2) |  <p> Cylinder: MXF20-50 Cushion: Rubber bumper Workpiece table mounting Mounting: Horizontal wall mounting Average operating speed: $V_a = 300$ [mm/s] Allowable load: $W = 0.5$ [kg] $L_1 = 10$ mm $L_2 = 30$ mm $L_3 = 30$ mm </p> |
| 2 Kinetic Energy Find the kinetic energy E (J) of the load. Find the allowable kinetic energy E_a (J). Confirm that the kinetic energy of the load does not exceed the allowable kinetic energy. | $E = \frac{1}{2} \cdot W \left(\frac{V}{1000} \right)^2$ <p> Collision speed $V = 1.4 \cdot V_a$ *) Correction factor (Reference values) $E_a = K \cdot E_{max}$ Workpiece mounting coefficient K: Fig. (3) Max. allowable kinetic energy E_{max}: Table (1) Kinetic energy (E) \leq Allowable kinetic energy (E_a) </p> | $E = \frac{1}{2} \cdot 0.5 \left(\frac{420}{1000} \right)^2 = 0.044$ <p> $V = 1.4 \times 300 = 420$ $E_a = 1 \cdot 0.16 = 0.16$ Can be used based on $E = 0.044 \leq E_a = 0.16$ </p> |
| 3 Load Factor | | |
| 3-1 Load factor of load mass Find the allowable load mass W_a (kg). (Note) No need to consider this load factor in the case of using perpendicularly in a vertical position. (Define $\alpha_1 = 0$.) Find the load factor of the load mass α_1 . | $W_a = K \cdot \beta \cdot W_{max}$ Workpiece mounting coefficient K : Fig. (3) Allowable load mass coefficient β : Graph (1) Max. allowable load mass W_{max} : Table (2) $\alpha_1 = W/W_a$ | $W_a = 1 \times 1 \times 4 = 4$ $K = 1$ $\beta = 1$ $W_{max} = 4$ $\alpha_1 = 0.5/4 = 0.125$ |
| 3-2 Load factor of the static moment Find the static moment M (N-m). Find the allowable static moment M_a (N-m). Find the load factor α_2 of the static moment. | $M = W \times 9.8 (L_n + A_n)/1000$ Moment center position distance compensation amount A_n : Table (3) $M_a = K \cdot \gamma \cdot M_{max}$ Workpiece mounting coefficient K : Fig. (3) Allowable moment coefficient γ : Graph (2) Maximum allowable moment M_{max} : Table (4) $\alpha_2 = M/M_a$ | <div> <div>Yawing</div> <div> Examine My. $My = 0.5 \times 9.8 (10 + 11)/1000 = 0.11$ $A_3 = 11$ $May = 1 \times 1 \times 9.14 = 9.14$ $K = 1$ $\gamma = 1$ $\alpha_2 = 0.11/9.14 = 0.012$ </div> </div> <div> <div>Rolling</div> <div> Examine Mr. $Mr = 0.5 \times 9.8 (30 + 17)/1000 = 0.23$ $A_6 = 17$ $Mar = 9.14$ (Same as May) $\alpha_2' = 0.23/9.14 = 0.025$ </div> </div> |
| 3-3 Load factor of dynamic moment Find the dynamic moment Me (N-m). Find the allowable dynamic moment Me_a (N-m). Find the load factor α_3 of the dynamic moment. | $Me = 1/3 \cdot We \times 9.8 \frac{(L_n + A_n)}{1000}$ Collision equivalent to impact $We = \delta \cdot W \cdot V$ δ : Bumper coefficient With urethane bumper (Standard) = 4/100 Corrected value for moment center position distance A_n : Table (3) $Me_a = K \cdot \gamma \cdot M_{max}$ Workpiece mounting coefficient K : Fig. (3) Allowable moment coefficient γ : Graph (2) Max. allowable moment M_{max} : Table (4) $\alpha_3 = Me/Me_a$ | <div> <div>Pitching</div> <div> Examine Mep. $Mep = 1/3 \times 8.4 \times 9.8 \times \frac{(30 + 17)}{1000} = 1.3$ $We = 4/100 \times 0.5 \times 420 = 8.4$ $A_2 = 17$ $Meap = 1 \times 0.7 \times 9.14 = 6.40$ $K = 1$ $\gamma = 0.7$ $Mp_{max} = 9.14$ $\alpha_3 = 1.3/6.40 = 0.20$ </div> </div> <div> <div>Yawing</div> <div> Examine Mey. $Mey = 1/3 \times 8.4 \times 9.8 \times \frac{(30 + 34)}{1000} = 1.8$ $We = 8.4$ $A_4 = 34$ $Meay = 6.40$ (Same value as Meap) $\alpha_3' = 1.8/6.4 = 0.28$ </div> </div> |
| 3-4 Sum of the load factors Use is possible if the sum of the load factors does not exceed 1. | $\sum \alpha_n = \alpha_1 + \alpha_2 + \alpha_3 \leq 1$ | $\sum \alpha_n = \alpha_1 + \alpha_2 + \alpha_2' + \alpha_3 + \alpha_3' = 0.125 + 0.012 + 0.025 + 0.20 + 0.28 = 0.642 \leq 1$ <p>And it is possible to use.</p> |

Fig. (1) Load Mass: W (kg)


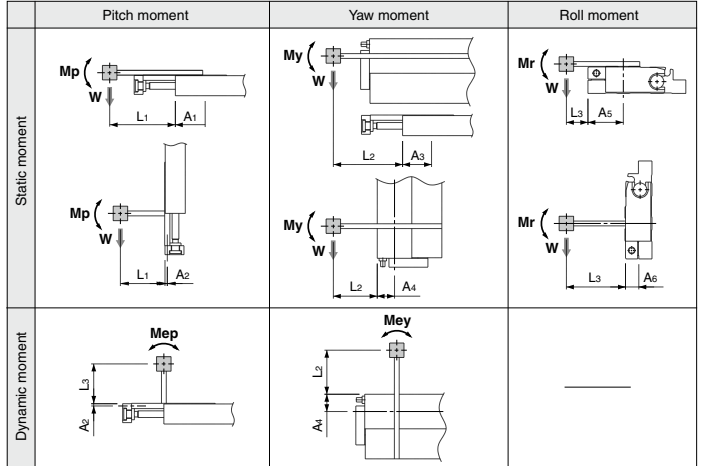
Note) No need to consider this load factor in the case of using perpendicularly in a vertical position.

Fig. (3) Workpiece Mounting Coefficient: K

Table (2) Maximum Allowable Load Mass: Wmax (kg)

| Model | Maximum allowable load mass |
|-------|-----------------------------|
| MXF8 | 0.6 |
| MXF12 | 1 |
| MXF16 | 2 |
| MXF20 | 4 |

Table (4) Maximum Allowable Moment: Mmax (N·m)

| Model | Stroke (mm) | | | | | |
|-------|-------------|------|------|------|-------|-------|
| | 10 | 20 | 30 | 50 | 75 | 100 |
| MXF8 | 0.56 | 0.78 | 0.98 | — | — | — |
| MXF12 | — | 1.65 | 2.22 | 3.34 | — | — |
| MXF16 | — | — | 3.41 | 5.69 | 7.96 | — |
| MXF20 | — | — | 6.66 | 9.14 | 13.70 | 18.27 |

Fig. (2) Overhang: Ln (mm), Correction Values for Moment Center Distance: An (mm)


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

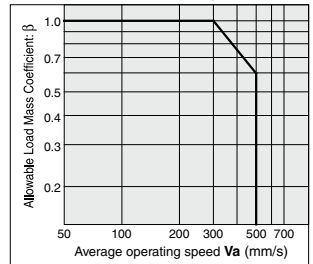
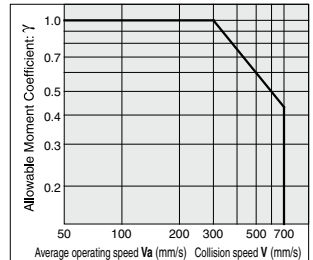
Table (1) Maximum Allowable Kinetic Energy: Emax (J)

| Model | Allowable kinetic energy |
|-------|--------------------------|
| | Rubber bumper |
| MXF8 | 0.027 |
| MXF12 | 0.055 |
| MXF16 | 0.11 |
| MXF20 | 0.16 |

Table (3) Moment Center Position Distance Compensation Amount: An (mm)

| Model | Moment center position distance compensation amount (Refer to Fig. (2)) | | | | | |
|-------|---|----|---------------------|----|----|----|
| | A1 | A2 | A3 | A4 | A5 | A6 |
| MXF8 | 6 ^(Note) | 10 | 6 ^(Note) | 21 | 21 | 10 |
| MXF12 | 10 | 11 | 10 | 23 | 23 | 11 |
| MXF16 | 10 | 12 | 10 | 28 | 28 | 12 |
| MXF20 | 11 | 17 | 11 | 34 | 34 | 17 |

Note) 16 mm for MXF8-10 only.

Graph (1) Allowable Load Mass Coefficient: β

Graph (2) Allowable Moment Coefficient: γ


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

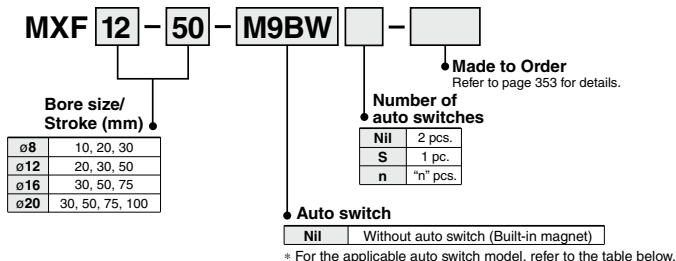
Symbol

| Symbol | Definition | Unit | Symbol | Definition | Unit |
|----------------------------|--|------|--------|---------------------------------|------|
| An (n = 1 to 6) | Correction values of moment center position distance | mm | Va | Average operating speed | mm/s |
| E | Kinetic energy | J | W | Load mass | kg |
| Ea | Allowable kinetic energy | J | Wa | Allowable load mass | kg |
| Emax | Max. allowable kinetic energy | J | We | Mass equivalent to impact | kg |
| Ln (n = 1 to 3) | Overhang | mm | Wmax | Max. allowable load mass | kg |
| M (Mp, My, Mr) | Static moment (pitch, yaw, roll) | N·m | α | Load factor | — |
| Ma (Map, May, Mar) | Allowable static moment (pitch, yaw, roll) | N·m | β | Allowable load mass coefficient | — |
| Me (Mep, Mey) | Dynamic moment (pitch, yaw) | N·m | γ | Allowable moment coefficient | — |
| Mea (Meap, Meay) | Allowable dynamic moment (pitch, yaw) | N·m | δ | Damper coefficient | — |
| Mmax (Mpmax, Mymax, Mrmax) | Maximum allowable moment (pitch, yaw, roll) | N·m | K | Workpiece mounting coefficient | — |
| V | Collision speed | mm/s | | | |

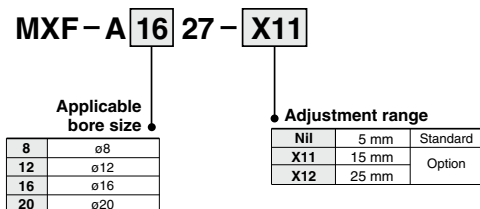
Low Profile Slide Table MXF Series

RoHS

How to Order



How to Order Adjusting Bolt Assembly (Accessory)



Applicable Auto Switches

Refer to pages 1289 to 1383 for the detailed specifications of auto switches.

| Type | Special function | Electrical entry | Indicator/light | Wiring (Output) | Load voltage | | Auto switch model | | Lead wire length (m) | | | | Pre-wired connector | Applicable load | | |
|-------------------------|------------------|------------------|-----------------|-----------------|---------------------|------|--------------------|------------------------|----------------------|-------|-------|------------|---------------------|-----------------|---|------------|
| | | | | | DC | AC | Perpendicular | In-line | 0.5 (Nil) | 1 (M) | 3 (L) | 5 (Z) | | | | |
| Solid state auto switch | — | Grommet | Yes | 3-wire (NPN) | 5V,12V | — | M9NV | M9N | ● | ● | ● | ○ | IC circuit | Relay, PLC | | |
| | 3-wire (PNP) | | | M9PV | | | M9P | ● | ● | ● | ○ | | | | | |
| | 2-wire | | | 12V | M9BV | | M9B | ● | ● | ● | ○ | — | | | | |
| | 3-wire (NPN) | | | 5V,12V | M9NVW | | M9NW | ● | ● | ● | ○ | IC circuit | | | | |
| | 3-wire (PNP) | | | 12V | M9PVW | | M9PW | ● | ● | ● | ○ | — | | | | |
| | 2-wire | | | 12V | M9BWW | | M9BW | ● | ● | ● | ○ | — | | | | |
| | 3-wire (NPN) | | | 5V,12V | M9NAV ^{*1} | | M9NA ^{*1} | ○ | ○ | ● | ○ | IC circuit | | | | |
| | 3-wire (PNP) | | | 12V | M9PAV ^{*1} | | M9PA ^{*1} | ○ | ○ | ● | ○ | — | | | | |
| | 2-wire | | | 12V | M9BAV ^{*1} | | M9BA ^{*1} | ○ | ○ | ● | ○ | — | | | | |
| | Reed auto switch | | | — | Grommet | | Yes | 3-wire (Equiv. to NPN) | — | 5V | — | A96V | A96 | | ● | — |
| None | | 2-wire | 24V | 12V | | 100V | | A93V ^{*2} | A93 | ● | ● | ● | — | — | — | Relay, PLC |
| | | | | | | | | 100V or less | A90V | A90 | ● | — | ● | — | — | IC circuit |

*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.

*2 1 m type lead wire is only applicable to D-A93.

* Lead wire length symbols: 0.5 m Nil (Example) M9NW
1 m M (Example) M9NWM
3 m L (Example) M9NWL
5 m Z (Example) M9NWW

* Solid state auto switches marked with " " are produced upon receipt of order.

* Since there are other applicable auto switches than listed, refer to page 361 for details.

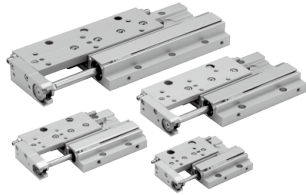
* For details about auto switches with pre-wired connector, refer to pages 1358 and 1359.

* Auto switches are shipped together (not assembled).

Specifications

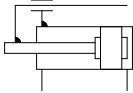
| Bore size (mm) | 8 | 12 | 16 | 20 |
|--|--|----------|----|----|
| Piping port size | M3 x 0.5 | M5 x 0.8 | | |
| Fluid | Air | | | |
| Action | Double acting | | | |
| Operating pressure | 0.15 to 0.7 MPa | | | |
| Proof pressure | 1.05 MPa | | | |
| Ambient and fluid temperature | -10 to 60 °C | | | |
| Operating speed range (Average operating speed) ^(Note) | 50 to 500 mm/s | | | |
| Cushion | Rubber bumper on both sides | | | |
| Lubrication | Non-lube | | | |
| Auto switch (Option) | Reed auto switch Solid state auto switch (2-wire, 3-wire) 2-color indicator solid state auto switch (2-wire, 3-wire) | | | |
| Stroke length tolerance | +1 0 mm | | | |
| Stroke adjustment range | Extension end 5 mm/Retraction end 5 mm | | | |

Note) Average operating speed: Speed that the stroke is divided by a period of time from starting the operation to reaching the end.

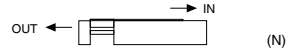


Symbol

Rubber bumper



Theoretical Output



| Bore size (mm) | Rod size (mm) | Operating direction | Piston area (mm ²) | Operating pressure (MPa) | | | | | | |
|----------------|---------------|---------------------|--------------------------------|--------------------------|-----|-----|-----|-----|-----|--|
| | | | | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | |
| 8 | 4 | OUT | 50 | 10 | 15 | 20 | 25 | 30 | 35 | |
| | | IN | 38 | 8 | 11 | 15 | 19 | 23 | 27 | |
| 12 | 6 | OUT | 113 | 23 | 34 | 45 | 57 | 68 | 79 | |
| | | IN | 85 | 17 | 26 | 34 | 43 | 51 | 60 | |
| 16 | 8 | OUT | 201 | 40 | 60 | 80 | 101 | 121 | 141 | |
| | | IN | 151 | 30 | 45 | 60 | 76 | 91 | 106 | |
| 20 | 10 | OUT | 314 | 63 | 94 | 126 | 157 | 188 | 220 | |
| | | IN | 236 | 47 | 71 | 94 | 118 | 142 | 165 | |

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²)



Made to Order: Individual Specifications
(For details, refer to pages 362 and 363.)

| Symbol | Specifications |
|--------|--|
| -X7 | PTFE grease |
| -X9 | Grease for food processing machines |
| -X11 | Adjusting bolt, long specification (Adjustment range: 15 mm) |
| -X33 | Without built-in auto switch magnet |
| -X39 | Fluororubber seal |
| -X42 | Anti-corrosive specifications for guide unit |

Standard Stroke

| Model | Standard stroke (mm) |
|-------|----------------------|
| MXF8 | 10, 20, 30 |
| MXF12 | 20, 30, 50 |
| MXF16 | 30, 50, 75 |
| MXF20 | 30, 50, 75, 100 |

Weight

(g)

| Model | Standard stroke (mm) | | | | | |
|-------|----------------------|-----|-----|-----|------|------|
| | 10 | 20 | 30 | 50 | 75 | 100 |
| MXF8 | 120 | 130 | 170 | — | — | — |
| MXF12 | — | 210 | 250 | 360 | — | — |
| MXF16 | — | — | 360 | 500 | 690 | — |
| MXF20 | — | — | 600 | 750 | 1060 | 1370 |

Moisture Control Tube IDK Series

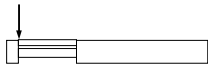


When operating an actuator with a small diameter and a short stroke at a high frequency, the dew condensation (water droplet) may occur inside the piping depending on the conditions. Simply connecting the moisture control tube to the actuator will prevent dew condensation from occurring. For details, refer to the [Web Catalog](#).

Table Deflection (Reference Values)

Table displacement due to pitch moment load

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



MXF8

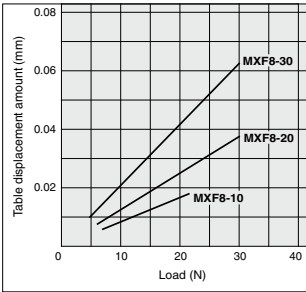


Table displacement due to yaw moment load

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

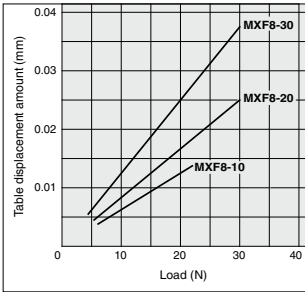
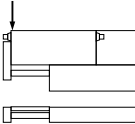
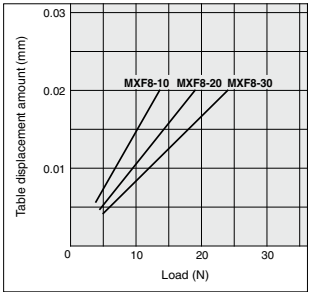
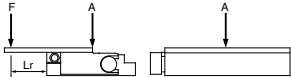
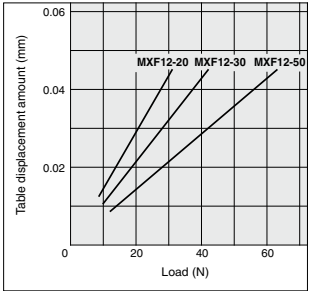
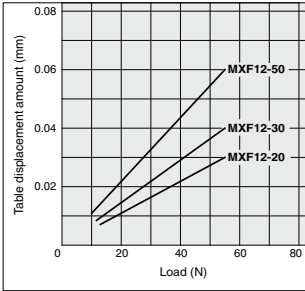
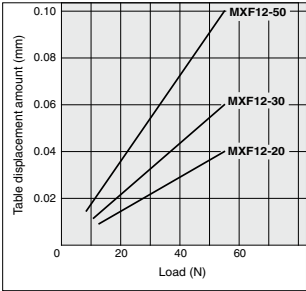


Table displacement due to roll moment load

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



MXF12

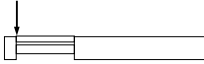


Low Profile Slide Table *MXF Series*

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.



MXF16

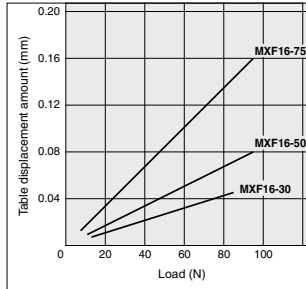


Table displacement due to yaw moment load

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

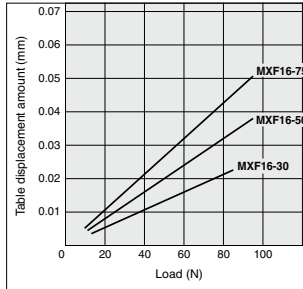
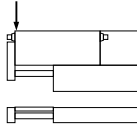
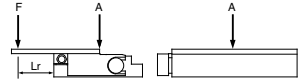
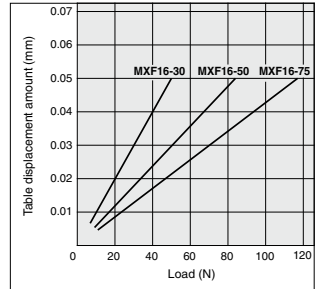


Table displacement due to roll moment load

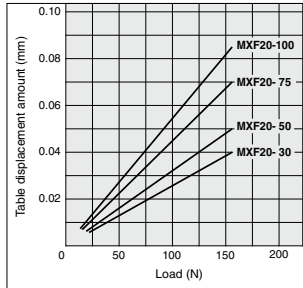
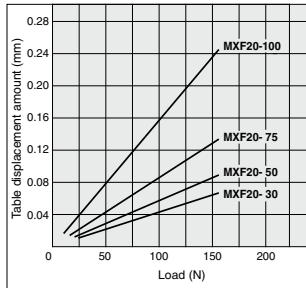
Table displacement of section A when loads are applied to the section F with the slide table retracted.



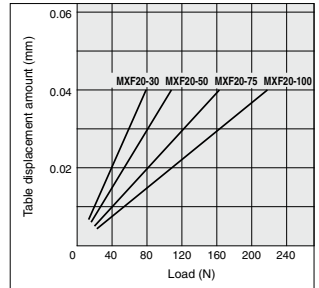
Lr = 40 mm



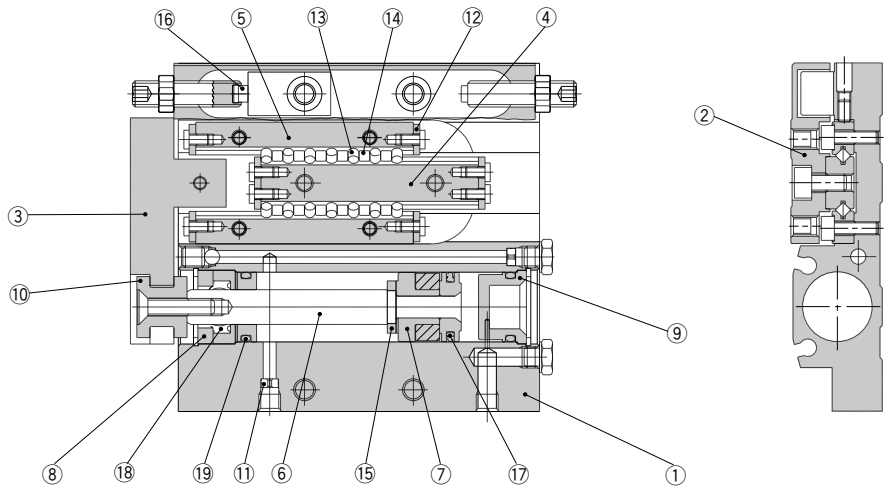
MXF20



Lr = 50 mm



Construction



Component Parts

| No. | Description | Material | Note |
|-----|--------------------|----------------------------------|---------------------------|
| 1 | Body | Aluminum alloy | Hard anodized |
| 2 | Table | Aluminum alloy | Hard anodized |
| 3 | End plate | Aluminum alloy | Hard anodized |
| 4 | Rail | Hardening steel | Heat treated |
| 5 | Guide | Hardening steel | Heat treated |
| 6 | Rod | Stainless steel | |
| 7 | Piston assembly | — | With magnet |
| 8 | Seal support | Brass | Electroless nickel plated |
| 9 | Head cap | Resin | |
| 10 | Floating bushing | Stainless steel | |
| 11 | Orifice | Brass | Electroless nickel plated |
| 12 | Roller stopper | Stainless steel | |
| 13 | Cylindrical roller | High carbon chrome bearing steel | |
| 14 | Roller spacer | Resin | |
| 15 | Rod bumper | Polyurethane | |

Component Parts

| No. | Description | Material | Note |
|-----|---------------|--------------|------|
| 16 | Adjust bumper | Polyurethane | |
| 17 | Piston seal | NBR | |
| 18 | Rod seal | NBR | |
| 19 | O-ring | NBR | |

Replacement Parts: Seal Kit

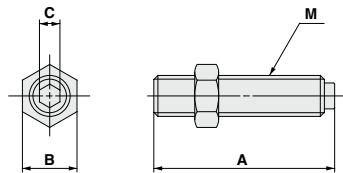
| Bore size (mm) | Kit no. | Contents |
|----------------|----------|----------------------------|
| 8 | MXF8-PS | Set of nos. above 17 to 19 |
| 12 | MXF12-PS | |
| 16 | MXF16-PS | |
| 20 | MXF20-PS | |

* Seal kit includes 17, 18, 19. Order the seal kit, based on each bore size.

Replacement Part: Grease Pack

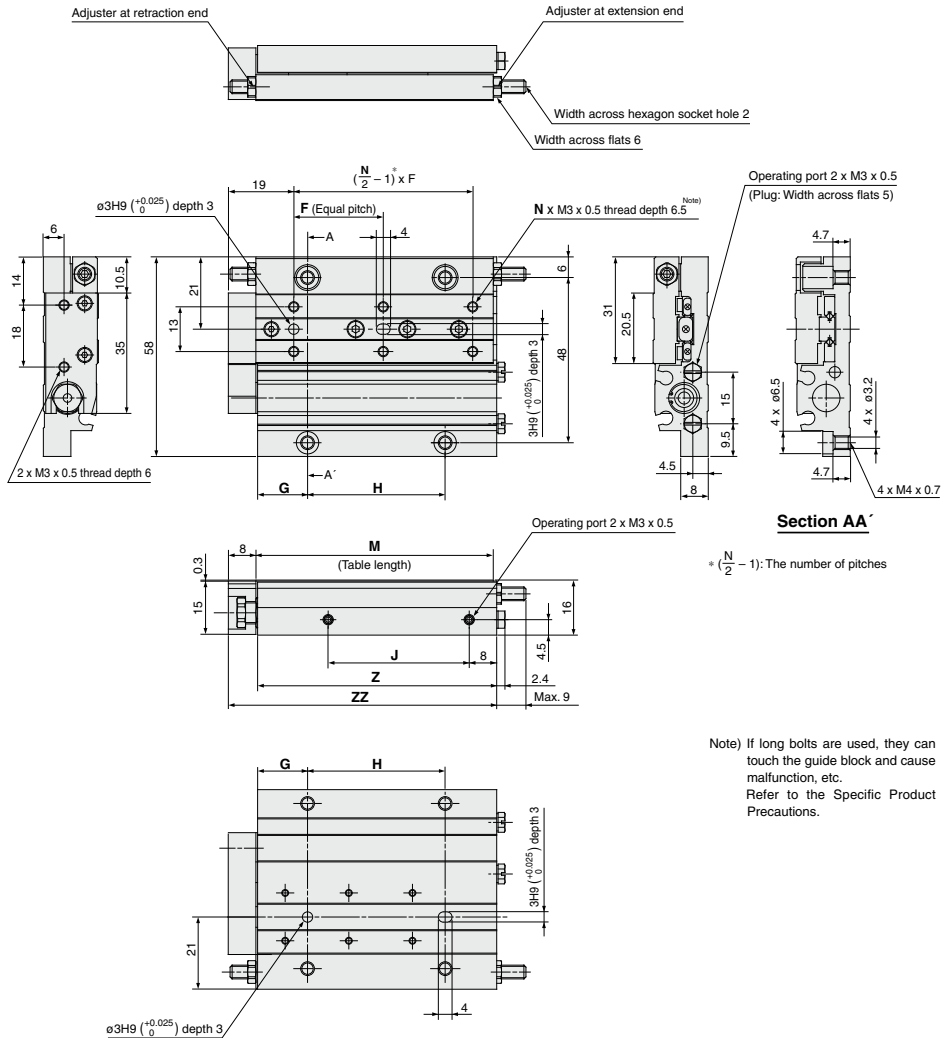
| Applied part | Grease pack part no. |
|--------------|----------------------------------|
| Guide | GR-S-010 (10g) GR-S-020 (20g) |
| Cylinder | GR-L-005 (5g) GR-L-010 (10g) |

Dimensions: Adjusting Bolt Assembly



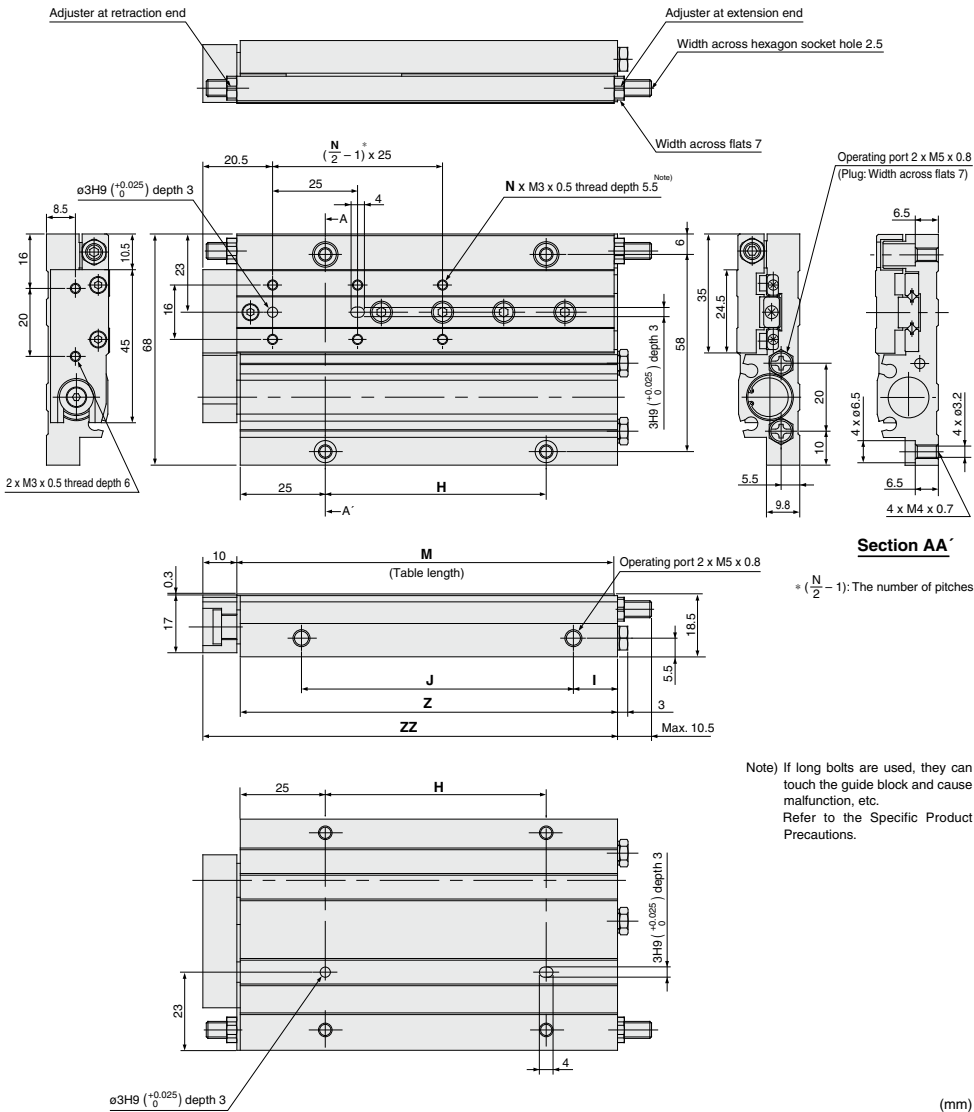
| Applicable size | Model | Stroke adjustment range (mm) | A | B | C | M |
|-----------------|---------------|------------------------------|------|----|-----|----------|
| MXF8 | MXF-A827 | 5 | 17 | 6 | 2 | M4 x 0.7 |
| | MXF-A827-X11 | 15 | 27 | | | |
| MXF12 | MXF-A1227 | 5 | 23.5 | 7 | 2.5 | M5 x 0.8 |
| | MXF-A1227-X11 | 15 | 33.5 | | | |
| | MXF-A1627 | 5 | 26.5 | | | |
| MXF16 | MXF-A1627-X11 | 15 | 36.5 | 8 | 3 | M6 x 1 |
| | MXF-A1627-X12 | 25 | 46.5 | | | |
| | MXF-A2027 | 5 | 30 | | | |
| MXF20 | MXF-A2027-X11 | 15 | 40 | 12 | 4 | M8 x 1 |
| | MXF-A2027-X12 | 25 | 50 | | | |

Dimensions: **MXF8**



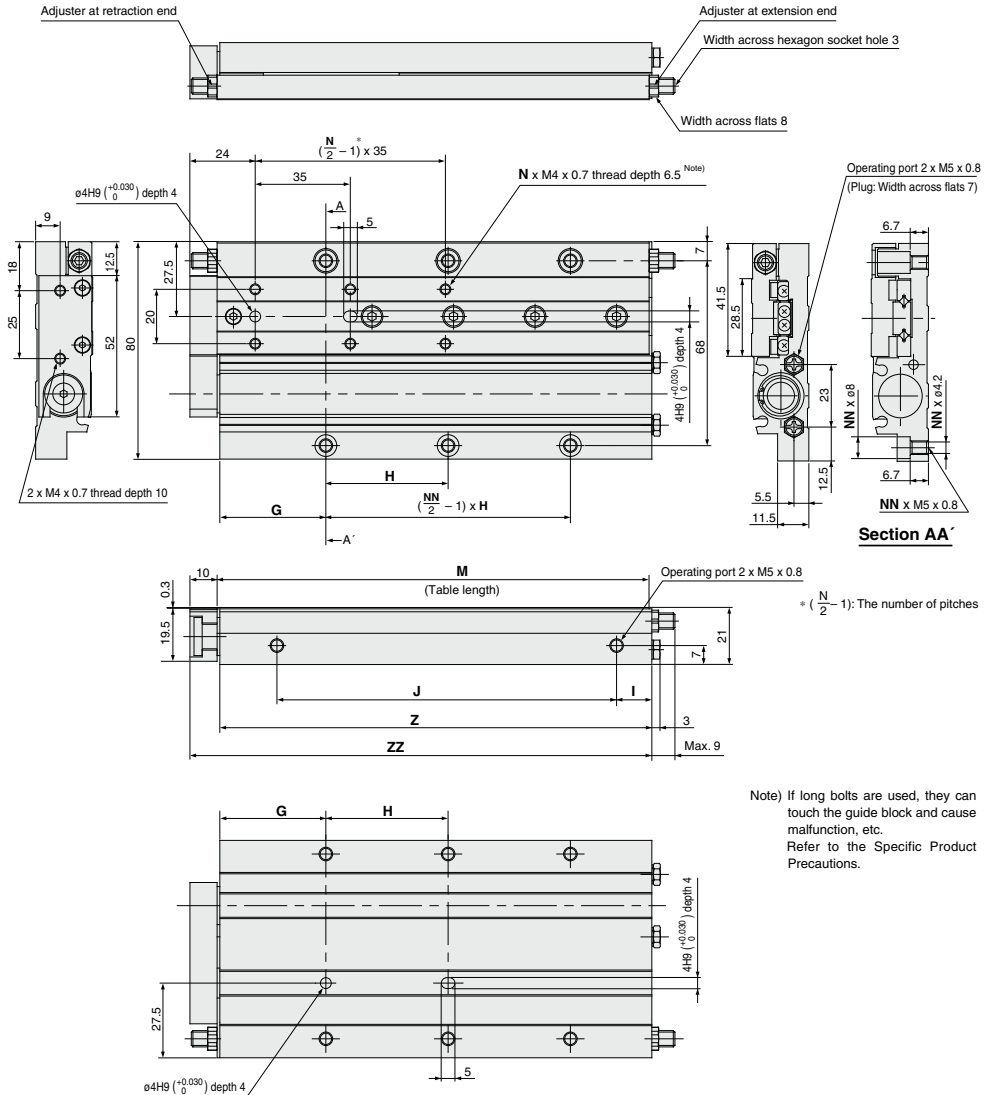
| Model | F | N | G | H | J | M | Z | ZZ |
|---------|----|---|------|----|----|----|------|----|
| MXF8-10 | 20 | 4 | 13.5 | 22 | 21 | 49 | 49.5 | 58 |
| MXF8-20 | 26 | 4 | 14.5 | 26 | 26 | 54 | 54.5 | 63 |
| MXF8-30 | 26 | 6 | 14.5 | 40 | 41 | 69 | 69.5 | 78 |

Dimensions: MXF12



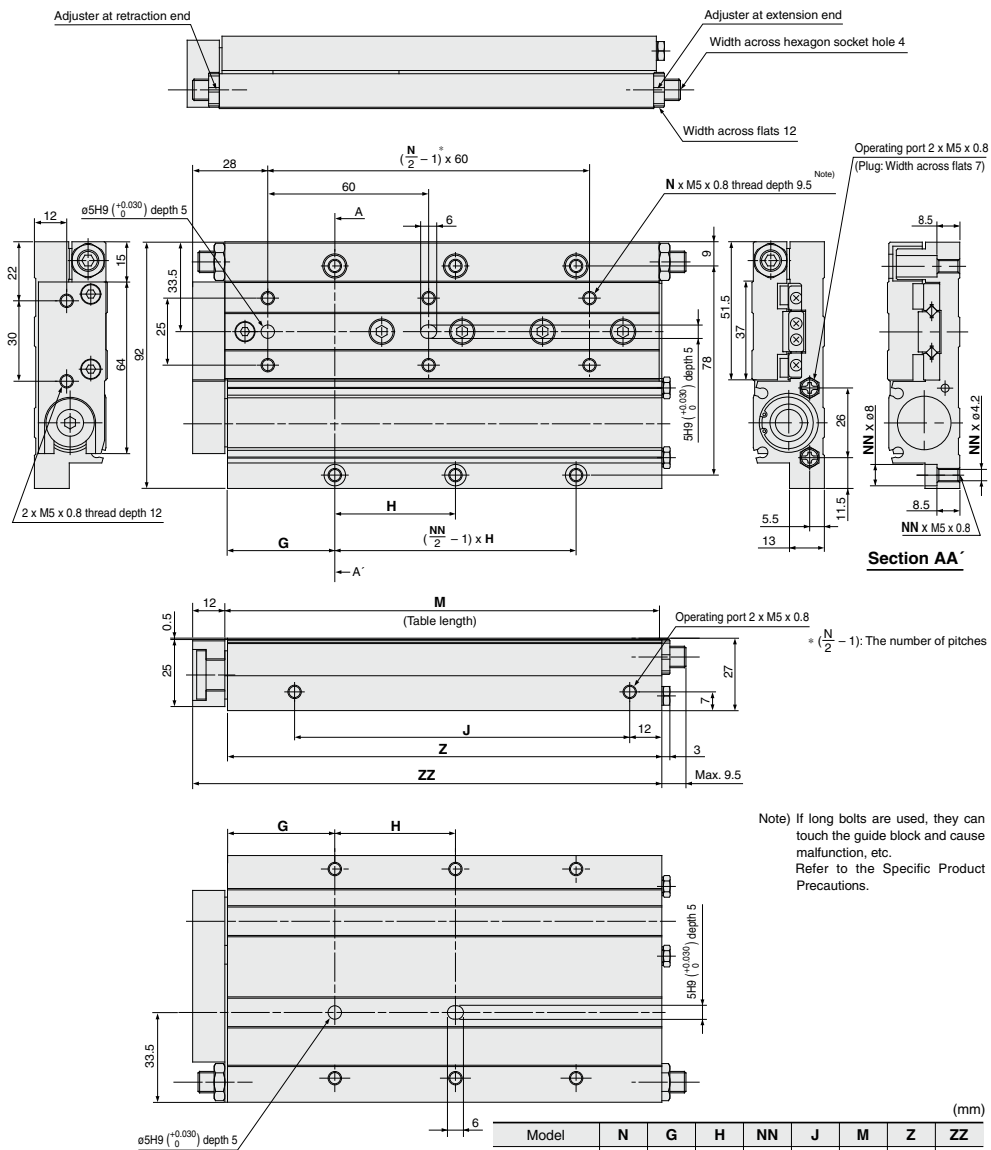
| Model | N | H | I | J | M | Z | ZZ |
|----------|---|----|----|----|-----|-----|-----|
| MXF12-20 | 4 | 22 | 11 | 36 | 65 | 65 | 76 |
| MXF12-30 | 4 | 30 | 12 | 45 | 75 | 75 | 86 |
| MXF12-50 | 6 | 65 | 13 | 80 | 111 | 111 | 122 |

Dimensions: MXF16



| (mm) | | | | | | | | | |
|-----------------|---|----|----|----|----|-----|-----|-----|-----|
| Model | N | G | H | NN | I | J | M | Z | ZZ |
| MXF16-30 | 4 | 29 | 25 | 4 | 12 | 50 | 83 | 83 | 94 |
| MXF16-50 | 6 | 29 | 55 | 4 | 12 | 80 | 113 | 113 | 124 |
| MXF16-75 | 6 | 39 | 45 | 6 | 13 | 125 | 159 | 159 | 170 |

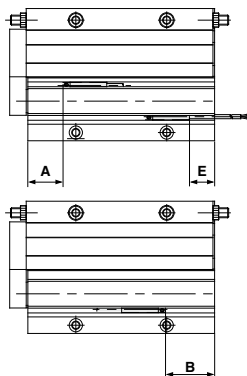
Dimensions: MXF20



| Model | N | G | H | NN | J | M | Z | ZZ |
|------------------|---|----|----|----|-----|-----|-----|-----|
| MXF20-30 | 4 | 29 | 30 | 4 | 57 | 91 | 91 | 104 |
| MXF20-50 | 4 | 36 | 45 | 4 | 77 | 113 | 113 | 126 |
| MXF20-75 | 6 | 40 | 45 | 6 | 125 | 162 | 162 | 175 |
| MXF20-100 | 6 | 59 | 60 | 6 | 175 | 211 | 211 | 224 |

Auto Switch Mounting

Auto Switch Proper Mounting Position (Detection at Stroke End)



Reed Auto Switch: D-A90, D-A93, D-A96, D-A90V, D-A93V, D-A96V (mm)

| Model | A | B | | | | | | E | | | | | |
|-------|------|--------|------|------|------|------|------|---------------|----------------|----------------|----------------|----------------|----------------|
| | | Stroke | | | | | | Stroke | | | | | |
| | | 10 | 20 | 30 | 50 | 75 | 100 | 10 | 20 | 30 | 50 | 75 | 100 |
| MXF8 | 9.5 | 10 | 5 | 10 | — | — | — | 8 (5.5) | 3 (0.5) | 8 (5.5) | — | — | — |
| MXF12 | 12 | — | 13.1 | 13.1 | 29.1 | — | — | 11.1 (8.6) | 11.1 (8.6) | 27.1 (24.6) | — | — | — |
| MXF16 | 17.2 | — | — | 15.8 | 25.8 | 46.8 | — | — | 13.9 (11.3) | 23.8 (21.3) | 44.8 (42.3) | — | — |
| MXF20 | 19.4 | — | — | 20.7 | 22.7 | 46.2 | 70.7 | — | — | 18.7 (16.2) | 20.7 (18.2) | 44.2 (41.7) | 68.7 (66.2) |

Solid State Auto Switch: D-M9B, D-M9N, D-M9P, D-M9BW, D-M9NW, D-M9PW, D-M9□A (mm)

| Model | A | B | | | | | | E | | | | | | E (D-M9□A) | | | | | |
|-------|------|--------|------|------|------|------|------|--------|------|------|------|------|-----|------------|------|------|------|----|-----|
| | | Stroke | | | | | | Stroke | | | | | | Stroke | | | | | |
| | | 10 | 20 | 30 | 50 | 75 | 100 | 10 | 20 | 30 | 50 | 75 | 100 | 10 | 20 | 30 | 50 | 75 | 100 |
| MXF8 | 13.5 | 14 | 9 | 14 | — | — | — | 4 | -1 | 4 | — | — | — | 2 | -3 | 2 | — | — | — |
| MXF12 | 16 | — | 17.1 | 17.1 | 33.1 | — | — | 7.1 | 7.1 | 23.1 | — | — | — | 5.1 | 5.1 | 21.1 | — | — | — |
| MXF16 | 21.2 | — | — | 19.8 | 29.8 | 50.8 | — | — | 9.8 | 19.8 | 40.8 | — | — | — | 7.8 | 17.8 | 38.8 | — | — |
| MXF20 | 23.4 | — | — | 24.7 | 26.7 | 50.2 | 74.7 | — | 14.7 | 16.7 | 40.2 | 64.7 | — | 12.7 | 14.7 | 38.2 | 62.7 | — | — |

Solid State Auto Switch: D-M9BV, D-M9NV, D-M9PV, D-M9BWV, D-M9NWV, D-M9PWV, D-M9□AV (mm)

| Model | A | B | | | | | | E | | | | | | E (D-M9□AV) | | | | | |
|-------|------|--------|------|------|------|------|------|--------|------|------|------|------|-----|-------------|------|------|------|----|-----|
| | | Stroke | | | | | | Stroke | | | | | | Stroke | | | | | |
| | | 10 | 20 | 30 | 50 | 75 | 100 | 10 | 20 | 30 | 50 | 75 | 100 | 10 | 20 | 30 | 50 | 75 | 100 |
| MXF8 | 13.5 | 14 | 9 | 14 | — | — | — | 6 | 1 | 6 | — | — | — | 4 | -1 | 4 | — | — | — |
| MXF12 | 16 | — | 17.1 | 17.1 | 33.1 | — | — | 9.1 | 9.1 | 25.1 | — | — | — | 7.1 | 7.1 | 23.1 | — | — | — |
| MXF16 | 21.2 | — | — | 19.8 | 29.8 | 50.8 | — | — | 11.8 | 21.8 | 42.3 | — | — | — | 9.8 | 19.8 | 40.3 | — | — |
| MXF20 | 23.4 | — | — | 24.7 | 26.7 | 50.2 | 74.7 | — | 16.7 | 18.7 | 42.2 | 66.7 | — | 14.7 | 16.7 | 40.2 | 64.7 | — | — |

* (): Denotes the values of D-A93.

Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

Auto Switch Mounting



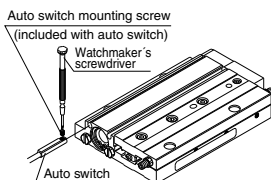
Auto Switch Mounting Tool

• When adjusting the auto switch mounting screw (included with auto switch), use a watchmaker's screwdriver with a handle about 5 to 6 mm in diameter.

Tightening Torque

Tightening Torque of Auto Switch Mounting Screw (N·m)

| Auto switch model | Tightening torque |
|-------------------|-------------------|
| D-A9□(V) | 0.10 to 0.20 |
| D-M9□(V) | 0.05 to 0.15 |
| D-M9□W(V) | |
| D-M9□A(V) | 0.05 to 0.10 |



Operating Range

| Auto switch model | Applicable bore size (mm) | | | |
|-------------------|---------------------------|----|-----|----|
| | 8 | 12 | 16 | 20 |
| D-A9□(V) | 4.5 | 5 | 6 | 7 |
| D-M9□, M9□V | 3 | 3 | 4.5 | 5 |
| D-M9□W, M9□WV | | | | |
| D-M9□A, M9□AV | | | | |

* Since the operating range is provided as a guideline including hysteresis, it cannot be guaranteed (assuming approximately ±30% dispersion). It may vary substantially depending on an ambient environment.

Other than the models listed in "How to Order", the following auto switches are applicable.

* Normally closed (NC = b contact) solid state auto switches (D-M9□E(V)) and solid state auto switch D-F8 are also available. For details, refer to pages 1307 and 1308.

1 PTFE Grease Symbol -X7

MXF Standard model no. — X7
 PTFE grease

PTFE grease is used for all parts that grease is applied.

Specifications

| Type | PTFE grease |
|----------------|---------------|
| Bore size (mm) | 8, 12, 16, 20 |

* Dimensions other than the above is the same as the standard type.

Warning

Precautions

Be aware that smoking cigarettes, etc. after your hands have come into contact with the grease used in this cylinder can create a gas that is hazardous to humans.

2 Grease for Food Processing Machines Symbol -X9

MXF Standard model no. — X9
 Grease for food processing machines

Grease for food processing machines is used for all parts that grease is applied.

Specifications

| Type | Grease for food processing machines (NSF-H1 certified)/Aluminum complex soap base grease |
|----------------|--|
| Bore size (mm) | 8, 12, 16, 20 |

* Dimensions other than the above is the same as the standard type.

Caution

1. Do not use in a food contact environment.
2. Do not use in a liquid splash environment, e.g. water, detergent, liquid chemicals.

<Not installable>

Food zone

An environment where food which will be sold as merchandise directly touches the cylinder's components

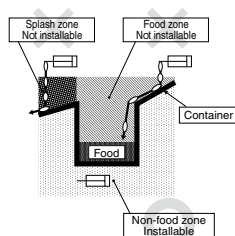
Splash zone

An environment where food which will not be sold as merchandise directly touches the cylinder's components

<Installable>

Non-food zone

An environment where there is no contact with food



3 Without Built-in Auto Switch Magnet Symbol -X33

MXF Standard model no. — X33
 Without built-in auto switch magnet

Auto switch magnet is not built in.

Specifications

| Type | Without built-in auto switch magnet |
|----------------|-------------------------------------|
| Bore size (mm) | 8, 12, 16, 20 |
| Auto switch | Not mountable |

* Dimensions other than the above is the same as the standard type.

4 Fluororubber Seal Symbol -X39

MXF Standard model no. — X39
 Fluororubber seal

Change the materials for the piston seal, rod seal and O-rings to fluororubber.

Specifications

| Type | Fluororubber seal |
|----------------|-------------------|
| Bore size (mm) | 8, 12, 16, 20 |
| Seal material | Fluororubber |

* Dimensions other than the above is the same as the standard type.

5 Anti-corrosive Specifications for Guide Unit Symbol -X42

MXF Standard model no. — X42
 Anti-corrosive specifications for guide unit

Rail and guide are given anti-corrosive treatment.

Specifications

| Type | Anti-corrosive guide unit |
|-------------------|---|
| Bore size (mm) | 8, 12, 16, 20 |
| Surface treatment | Special anti-corrosive treatment ⁽²⁾ |

* 1 Dimensions other than the above is the same as the standard type.

* 2 Special anti-corrosive treatment makes the rail and the guide black.

6 Adjusting Bolt, Long Specification (Adjustment range: 15 mm)

Symbol

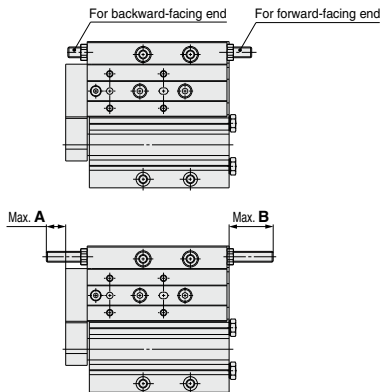
-X11

MXF Standard model no. — X11

- Adjusting bolt, long specification
(Adjustment range: 15 mm)

The average adjusting stroke range was extended from 5 mm to 15 mm with a long adjusting bolt.

Dimensions



| (mm) | | |
|--------------|----|------|
| Model | A | B |
| MXF8 | 10 | 19 |
| MXF12 | 10 | 20.5 |
| MXF16 | 10 | 19 |
| MXF20 | 10 | 19.5 |



MXF Series

Specific Product Precautions 1

Be sure to read this before handling the products. Refer to page 8 for safety instructions and pages 9 to 18 for actuator and auto switch precautions.

Selection

⚠ Caution

1. Operate a load within the range of the operating limits.

Select the model considering maximum loading mass and allowable moment. For details, refer to "Model Selection" on pages 350 and 351. When actuator is used outside of operating limits, eccentric loads on guide will be in excess of this causing vibration on guide, inaccuracy, and shortened life.

2. If intermediate stops by external stopper is done, avoid ejection.

If lurching occurs, damage can result. When making an intermediate stop with an external stopper to be followed by continued forward movement, first supply pressure to momentarily reverse the table, then retract the intermediate stopper, and finally apply pressure to the opposite port to operate the table again.

3. Do not use it in such a way that excessive external force or impact force could work on it.

This could result in damage.

Mounting

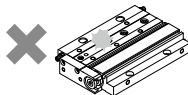
⚠ Caution

1. Do not scratch or dent the mounting side of the body, table or end plate.

The damage will result in a decrease in parallelism, vibration of the guide or an increase in moving part resistance.

2. Do not scratch or dent on the forward side of the rail or guide.

This could result in looseness, increased operating resistance, etc.



3. Do not apply excessive power and load when work is mounted.

If the external force more than the allowable moment were applied, looseness of the guide unit or increased operating resistance could take place.

4. Flatness of mounting surface should be 0.02 mm or less.

Poor parallelism of the workpiece mounted on the body, the base, and other parts can cause vibration in the guide unit and increased operating resistance, etc.

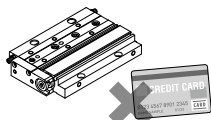
5. Select the proper connection with the load which has external support and/or guide mechanism on the outside, and align it properly.

6. Avoid contact with the body during operation.

Hands, etc. may get caught in the stroke adjuster. Install a cover as a safety measure if there are instances to be near the slide table during operation.

7. Keep away from objects which are influenced by magnets.

Since an body has magnets built-in, do not allow close contact with magnetic disks, magnetic cards or magnetic tapes. Data may be erased.



8. When mounting the body, use screws of an appropriate length and do not exceed the maximum tightening torque.

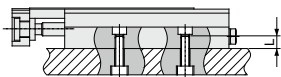
Tightening with a torque above the limit could cause malfunction. Whereas tightening insufficiently could result in misalignment or dropping.

9. Be careful when adjusting stroke not to allow cylinder end plate to bottom out against cylinder body.

Mounting of Body

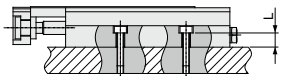
The slide table can be mounted from 2 directions. Select the best direction according to your application.

1. Body Tapped



| Model | Bolt | Maximum tightening torque (N·m) | Maximum screw-in depth (L mm) |
|-------|----------|---------------------------------|-------------------------------|
| MXF8 | M4 x 0.7 | 2.1 | 4.7 |
| MXF12 | M4 x 0.7 | 2.1 | 6.5 |
| MXF16 | M5 x 0.8 | 4.4 | 6.7 |
| MXF20 | M5 x 0.8 | 4.4 | 8.5 |

2. Body Through-hole



| Model | Bolt | Maximum tightening torque (N·m) | Maximum screw-in depth (L mm) |
|-------|----------|---------------------------------|-------------------------------|
| MXF8 | M3 x 0.5 | 1.2 | 4.7 |
| MXF12 | M3 x 0.5 | 1.2 | 6.5 |
| MXF16 | M4 x 0.7 | 2.8 | 6.7 |
| MXF20 | M4 x 0.7 | 2.8 | 8.5 |



MXF Series

Specific Product Precautions 2

Be sure to read this before handling the products. Refer to page 8 for safety instructions and pages 9 to 18 for actuator and auto switch precautions.

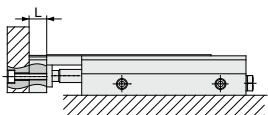
Mounting

⚠ Caution

Mounting of Workpiece

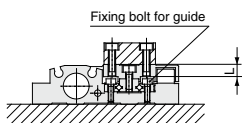
Work can be mounted on two sides of the body.

1. Front Mounting



| Model | Bolt | Maximum tightening torque (N·m) | Maximum screw-in depth (L mm) |
|-------|----------|---------------------------------|-------------------------------|
| MXF8 | M3 x 0.5 | 0.9 | 6 |
| MXF12 | M3 x 0.5 | 0.9 | 6 |
| MXF16 | M4 x 0.7 | 2.1 | 10 |
| MXF20 | M5 x 0.8 | 4.4 | 12 |

2. Top Mounting



| Model | Bolt | Maximum tightening torque (N·m) | Maximum screw-in depth (L mm) |
|-------|----------|---------------------------------|-------------------------------|
| MXF8 | M3 x 0.5 | 0.9 | 6.5 |
| MXF12 | M3 x 0.5 | 0.9 | 5.5 |
| MXF16 | M4 x 0.7 | 2.1 | 6.5 |
| MXF20 | M5 x 0.8 | 4.4 | 9.5 |

⚠ Caution

To prevent the workpiece holding bolts from touching the guide holding bolts, use bolts that are 0.5 mm or more shorter than the maximum screw-in depth. If the bolts are too long, they hit the end plate and may cause malfunctions.

Positioning

⚠ Caution

1. The positioning hole on the table and on the bottom of the body does not have the same center. Positioning hole is meant to be for reproducibility for mounting and dismounting.

Operating Environment

⚠ Caution

1. Do not use in an environment, where the product could be exposed to liquids such as cutting oil, etc.

Using in an environment where the product could be exposed to cutting oil, coolant, oil, etc. could result in looseness, increased operating resistance, air leakage, etc.

2. Do not use in an environment, where the product could be exposed directly to foreign materials such as powder dust, blown dust, cutting chips, spatter, etc.

This could result in looseness and increased operating resistance, and air leakage, etc.

3. Do not use in direct sunlight.

4. When there are heat sources in the surrounding area, block them off.

When there are heat sources in the surrounding area, radiated heat may cause the product's temperature to rise and exceed the operating temperature range. Block off the heat with a cover, etc.

5. Do not subject it to excessive vibration and/or impact.

This can cause damage or a malfunction.

Other

⚠ Warning

1. Do not put hands or fingers between the end plate and body.

Never put hands or fingers in the gap between the end plate and body when retracted. Doing so will result in injury to the hands, or fingers.

2. Be aware that smoking cigarettes, etc., after your hands have come into contact with the grease used in the cylinder section of this product can create a gas that is hazardous to humans.

⚠ Caution

1. Do not disassemble or modify the product.

2. Performance stability

The piston speed in the specification table shows the average speed. The actual speed of this product may vary slightly during the stroke depending on the operating conditions, such as the change of load resistance and pressure.