Low profile air gripper with space-saving design
Low Profile Air Gripper

**MHF2 Series**

Height is approximately 1/3 the size of an equivalent MHZ2 series.

<table>
<thead>
<tr>
<th>Bore size</th>
<th>Height (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>16</td>
<td>33</td>
</tr>
<tr>
<td>20</td>
<td>41</td>
</tr>
</tbody>
</table>

The low profile design saves space and reduces bending moments.

Improved accuracy with smooth operation

Stroke selection is available.

3 standard stroke lengths are available for each bore size. Stroke can be selected to suit the workpiece.
Improved mounting repeatability
With positioning pin holes

Linear guide provides:
High precision and high rigidity with martensitic stainless steel

Easy positioning for mounting attachments
With positioning pin holes

Auto switches can be mounted on both sides.

Piping is available from 2 directions
Piping port position can be specified using a part number.

Centralized wiring and piping are possible.

High degree of mounting flexibility
As no brackets are required, mounting height can be minimized.

Strong gripping force
Double piston construction achieves compact design with strong gripping force.

<table>
<thead>
<tr>
<th>Model</th>
<th>Bore size</th>
<th>Gripping force (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF2-8D</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>MHZ2-10D</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>MHF2-12D</td>
<td>12</td>
<td>48</td>
</tr>
<tr>
<td>MHZ2-20D</td>
<td>20</td>
<td>42</td>
</tr>
<tr>
<td>MHF2-16D</td>
<td>16</td>
<td>90</td>
</tr>
<tr>
<td>MHZ2-25D</td>
<td>25</td>
<td>65</td>
</tr>
<tr>
<td>MHF2-20D</td>
<td>20</td>
<td>141</td>
</tr>
<tr>
<td>MHZ2-32D</td>
<td>32</td>
<td>158</td>
</tr>
</tbody>
</table>

MHZ
MHF
MHL
MHR
MHK
MHS
MHC
MHT
MHY
MHW
X
MRHQ
MA
D

Mounting is possible from 4 directions.
Model Selection

Selection Procedure

Step 1 Confirm gripping force → Step 2 Confirm gripping point → Step 3 Confirm external force on fingers

Step 1 Confirmation of Gripping Force

Confirmation of conditions → Calculation of required gripping force → Model selection from gripping force graph

Example

Workpiece mass: 0.15 kg

Gripping method: External gripping

Length of gripping point: 30 mm

Operating pressure: 0.4 MPa

Model Selection Illustration

Gripping force at least 10 to 20 times the workpiece weight

The "10 to 20 times or more of the workpiece weight" recommended by SMC is calculated with the safety margin of \( a = 4 \), which allows for impacts that occur during normal transportation, etc.

When gripping a workpiece as in the figure to the left and with the following definitions,

\[ F: \text{Gripping force (N)} \]
\[ \mu: \text{Coefficient of friction between attachments and workpieces} \]
\[ m: \text{Workpiece mass (kg)} \]
\[ g: \text{Gravitational acceleration } (= 9.8 \text{ m/s}^2) \]
\[ mg: \text{Workpiece weight (N)} \]

the conditions under which the workpiece will not drop are

\[ 2 \times \mu F > mg \]

\( \mu \) - Number of fingers

and therefore,

\[ F > \frac{mg}{2 \times \mu} \]

With "a" as the safety margin, \( F \) is determined as follows:

\[ F = \frac{mg}{2 \times \mu} \times a \]

(Note) - Even in cases where the coefficient of friction is greater than \( \mu = 0.2 \), for safety reasons, SMC recommends selecting a gripping force which is at least 10 to 20 times the workpiece weight.

- It is necessary to allow a greater safety margin for high accelerations and strong impacts, etc.
Step 1 Effective Gripping Force: MHF2 Series

- Expressing the effective gripping force
  The effective gripping force shown in the graphs below is expressed as F, which is the thrust of one finger when both fingers and attachments are in full contact with the workpiece as shown in the figure below.
- Both the external and internal gripping forces are the values shown in the figure below.

MHF2-8D

- Gripping force N
  - Pressure 0.7MPa
  - Pressure 0.6MPa
  - Pressure 0.5MPa
  - Pressure 0.4MPa
  - Pressure 0.3MPa
  - Pressure 0.2MPa

MHF2-12D

- Gripping force N
  - Pressure 0.7MPa
  - Pressure 0.6MPa
  - Pressure 0.5MPa
  - Pressure 0.4MPa
  - Pressure 0.3MPa
  - Pressure 0.2MPa

MHF2-16D

- Gripping force N
  - Pressure 0.7MPa
  - Pressure 0.6MPa
  - Pressure 0.5MPa
  - Pressure 0.4MPa
  - Pressure 0.3MPa
  - Pressure 0.2MPa

MHF2-20D

- Gripping force N
  - Pressure 0.7MPa
  - Pressure 0.6MPa
  - Pressure 0.5MPa
  - Pressure 0.4MPa
  - Pressure 0.3MPa
  - Pressure 0.2MPa
Model Selection

Step 2 Effective Gripping Force: MHF2 Series

External Gripping

Internal Gripping

The air gripper should be operated so that the amount of overhang "H" will stay within the range given in the graphs below.

If the workpiece gripping point goes beyond the range limits, this will have an adverse effect on the life of the air gripper.

MHF2-8D

MHF2-12D

MHF2-16D

MHF2-20D
**Step 3 Confirmation of External Force on Fingers: MHF2 Series**

**Calculation of allowable external force (when moment load is applied)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Allowable vertical load $F_v$ (N)</th>
<th>Maximum allowable moment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$F_v$ (N)</td>
<td>Pitch moment $M_p$ (N·m)</td>
</tr>
<tr>
<td>MHF2-8D</td>
<td>58</td>
<td>0.26</td>
</tr>
<tr>
<td>MHF2-12D</td>
<td>98</td>
<td>0.68</td>
</tr>
<tr>
<td>MHF2-16D</td>
<td>176</td>
<td>1.4</td>
</tr>
<tr>
<td>MHF2-20D</td>
<td>294</td>
<td>2</td>
</tr>
</tbody>
</table>

Note) The load and moment values in the table indicate static values.

**Calculation example**

When a load $f = 10$ N is operating, which applies pitch moment to point $L = 30$ mm from the end of the MHF2-12D finger.

\[\text{Allowable load } F = \frac{0.68}{30 \times 10^3} \times 10^3 = 22.7 \text{ N}\]

Therefore, it can be used.
**Low Profile Air Gripper**

**MHF2 Series**

ø8, ø12, ø16, ø20

---

### How to Order

**MHF 2**

- **12 D**
- **M9BW**

- **Number of fingers**
  - 2 finger

- **Bore size (mm)**
  - 8
  - 12
  - 16
  - 20

- **Action**
  - D: Double acting

- **Stroke**
  - Nil: Short stroke
  - 1 pc.: Medium stroke
  - n pcs.: Long stroke

- **Auto switch**
  - Nil: Without auto switch (Built-in magnet)

- **Made to Order**
  - Refer to page 473 for details.

- **Body option**
  - Nil: Axial piping type
  - R: Side piping type

---

### Applicable Auto Switches

Refer to pages 797 to 850 for further information on auto switches.

<table>
<thead>
<tr>
<th>Type</th>
<th>Special function</th>
<th>Electrical entry</th>
<th>Indicator light</th>
<th>Wiring (Output)</th>
<th>Load voltage</th>
<th>Auto switch model</th>
<th>Lead wire length (m)*</th>
<th>Pre-wired connector</th>
<th>Applicable load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5 (Nil)</td>
<td>1 (M)</td>
<td>3 (L)</td>
<td>5 (Z)</td>
<td></td>
</tr>
<tr>
<td>Solid state auto switch</td>
<td></td>
<td></td>
<td>Grommet</td>
<td>3-wire (NPN)</td>
<td>5 V, 12 V</td>
<td>M9NV</td>
<td>M9N</td>
<td>IC circuit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>12 V</td>
<td>M9PV</td>
<td>M9P</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>24 V</td>
<td>M9BV</td>
<td>M9B</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-wire (NPN)</td>
<td>5 V, 12 V</td>
<td>M9NWV</td>
<td>M9NW</td>
<td>IC circuit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>12 V</td>
<td>M9PVV</td>
<td>M9PW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>24 V</td>
<td>M9BWV</td>
<td>M9BW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-wire (NPN)</td>
<td>5 V, 12 V</td>
<td>M9NAV**</td>
<td>M9NA**</td>
<td>IC circuit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>12 V</td>
<td>M9PAV**</td>
<td>M9PA**</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>24 V</td>
<td>M9BAY**</td>
<td>M9BA**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
- Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.
- 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
- Auto switches marked with “**” are made to order specification.
- When using the 2-color indicator type, please make the setting so that the indicator is lit in red to ensure the detection at the proper position of the air gripper.
Low Profile Air Gripper  

**MHF2 Series**

### Specifications

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Air</th>
</tr>
</thead>
</table>
| Operating pressure | \( \phi 8: 0.15 \) to 0.7 MPa  
| \( \phi 12 \) to 20: 0.1 to 0.7 MPa |
| Ambient and fluid temperature | \(-10 \) to 60°C (with no condensation) |
| Repeatability | \( \pm 0.05 \) mm [Note 1) |
| Maximum operating frequency | Short stroke: 120 c.p.m.  
| Medium stroke: 120 c.p.m.  
| Long stroke: 60 c.p.m. |
| Lubrication | Not required |
| Action | Double acting |
| Auto switch (Option) [Note 2) | Solid state auto switch (3-wire, 2-wire) |

**Note 1:** This is the value when no offset load is applied to the finger.

When an offset load is applied to the finger, the maximum value is \( \pm 0.15 \) mm due to the influence of backlash of the rack and pinion.

**Note 2:** Refer to pages 797 to 850 for further information on auto switches.

### Model

<table>
<thead>
<tr>
<th>Action</th>
<th>Model</th>
<th>Cylinder bore (mm)</th>
<th>Gripping force [Note 1)]</th>
<th>Effective gripping force per finger N</th>
<th>Opening / closing stroke (Both sides)</th>
<th>Note 2) Weight (g)</th>
<th>Unobstructed capacity (cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHF2-8D</td>
<td>8</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHF2-8D1</td>
<td>8</td>
<td>16</td>
<td>85</td>
<td>1.1</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHF2-8D2</td>
<td>12</td>
<td>12</td>
<td>155</td>
<td>1.9</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHF2-12D</td>
<td>12</td>
<td>48</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHF2-12D1</td>
<td>12</td>
<td>24</td>
<td>190</td>
<td>3.3</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHF2-12D2</td>
<td>16</td>
<td>48</td>
<td>275</td>
<td>6.1</td>
<td>5.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHF2-16D</td>
<td>16</td>
<td>64</td>
<td>350</td>
<td>4.9</td>
<td>4.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHF2-16D1</td>
<td>16</td>
<td>64</td>
<td>445</td>
<td>8.2</td>
<td>7.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHF2-16D2</td>
<td>20</td>
<td>64</td>
<td>650</td>
<td>14.9</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHF2-20D</td>
<td>20</td>
<td>20</td>
<td>845</td>
<td>8.7</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHF2-20D1</td>
<td>20</td>
<td>40</td>
<td>850</td>
<td>15.1</td>
<td>13.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHF2-20D2</td>
<td>20</td>
<td>80</td>
<td>1,225</td>
<td>28.0</td>
<td>26.6</td>
<td></td>
</tr>
</tbody>
</table>

**Note 1:** At the pressure of 0.5 MPa, when gripping point L is 20 mm.

**Note 2:** Excluding the auto switch weight.

---

**Symbol**

- **Double acting:**
  - Internal grip
  - External grip

**Made to Order:**

- **Individual Specifications**
  - Refer to pages 725 to 748 for details.

**Symbol Specifications/Description**

- **-X4**
  - Heat resistance (100°C)

- **-X5**
  - Fluororubber seal

- **-X50**
  - Without magnet

- **-X53**
  - EPDM seal/Fluorine grease

- **-X63**
  - Fluorine grease

- **-X79**
  - Grease for food processing machines, Fluorine grease

- **-X79A**
  - Grease for food processing machines

- **-X81A**
  - Anti-corrosive treatment of finger

- **-X81B**
  - Anti-corrosive treatment of finger, guide and joint

- **-X83**
  - With an adjustable opening/closing finger positioning

---

**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 IDK series in the Best Pneumatics No. 6.
Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>Aluminum alloy</td>
<td>Hard anodized</td>
</tr>
<tr>
<td>2</td>
<td>Piston</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Joint</td>
<td>Stainless steel</td>
<td>Heat treatment</td>
</tr>
<tr>
<td>4</td>
<td>Guide rail</td>
<td>Stainless steel</td>
<td>Heat treatment</td>
</tr>
<tr>
<td>5</td>
<td>Finger</td>
<td>Stainless steel</td>
<td>Heat treatment</td>
</tr>
<tr>
<td>6</td>
<td>Roller stopper</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Pinion</td>
<td>Carbon steel</td>
<td>Nitriding</td>
</tr>
<tr>
<td>8</td>
<td>Cap A</td>
<td>Aluminum alloy</td>
<td>Clear anodized</td>
</tr>
<tr>
<td>9</td>
<td>Cap B</td>
<td>Aluminum alloy</td>
<td>Clear anodized</td>
</tr>
<tr>
<td>10</td>
<td>Cap C</td>
<td>Aluminum alloy</td>
<td>Clear anodized</td>
</tr>
</tbody>
</table>

Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Head damper</td>
<td>Urethane rubber</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Clip</td>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>13</td>
<td>Rack</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Magnet</td>
<td>—</td>
<td>Nickel plated</td>
</tr>
<tr>
<td>15</td>
<td>Steel balls</td>
<td>High carbon chromium bearing steel</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Wear ring</td>
<td>Synthetic resin</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Roller</td>
<td>High carbon chromium bearing steel</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Needle roller</td>
<td>High carbon chromium bearing steel</td>
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</tr>
<tr>
<td>19</td>
<td>Parallel pin</td>
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<td></td>
</tr>
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<td>20</td>
<td>Piston seal</td>
<td>NBR</td>
<td></td>
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<tr>
<td>21</td>
<td>Gasket</td>
<td>NBR</td>
<td></td>
</tr>
</tbody>
</table>

Replacement Parts

<table>
<thead>
<tr>
<th>Description</th>
<th>Kit no.</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal kit</td>
<td>MHF8-PS</td>
<td>12, 20, 21</td>
</tr>
<tr>
<td>Finger assembly</td>
<td>MHF-A0802</td>
<td>3, 4, 5, 6, 15, 17, 19 Mounting screw</td>
</tr>
</tbody>
</table>

Bolts for Body Through-hole Mounting

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Number of pieces</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF-B08</td>
<td>2 pieces/unit</td>
</tr>
<tr>
<td>MHF2-8D</td>
<td>2 pieces/unit</td>
</tr>
<tr>
<td>MHF2-8D1</td>
<td>4 pieces/unit</td>
</tr>
</tbody>
</table>

Replacement part/Grease pack part no.:  
Guide unit: GR-S-010 (10 g)  
Cylinder unit: GR-L-006 (6 g)
## Construction

### MHF2-12D to 20D

![Diagram of MHF2-12D to 20D](image)

### Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>Aluminum alloy</td>
<td>Hard anodized</td>
</tr>
<tr>
<td>2</td>
<td>Piston</td>
<td>Aluminum alloy</td>
<td>Clear anodized</td>
</tr>
<tr>
<td>3</td>
<td>Joint</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Guide rail</td>
<td>Stainless steel</td>
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<tr>
<td>5</td>
<td>Finger</td>
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<tr>
<td>6</td>
<td>Roller stopper</td>
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<tr>
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<td>Pinion</td>
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<tr>
<td>12</td>
<td>Rack</td>
<td>Stainless steel</td>
<td>Nitrizing</td>
</tr>
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</table>

### Replacement Parts

<table>
<thead>
<tr>
<th>Description</th>
<th>Kit no.</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal kit</td>
<td>MHF12-PS</td>
<td>MHF12-PS MHF12-PS 20, 21, 22</td>
</tr>
<tr>
<td>Finger assembly</td>
<td>MHF-A1202</td>
<td>MHF-A1202 MHF-A1202-1 MHF-A1202-2 3, 4, 5, 6, 14, 16, 19 Mounting screw</td>
</tr>
<tr>
<td>Seal kit</td>
<td>MHF16-PS</td>
<td>MHF16-PS MHF16-PS 20, 21, 22</td>
</tr>
<tr>
<td>Finger assembly</td>
<td>MHF-A1602</td>
<td>MHF-A1602 MHF-A1602-1 MHF-A1602-2 3, 4, 5, 6, 14, 16, 19 Mounting screw</td>
</tr>
<tr>
<td>Seal kit</td>
<td>MHF20-PS</td>
<td>MHF20-PS MHF20-PS 20, 21, 22</td>
</tr>
</tbody>
</table>

**Bolts for Body Through-hole Mounting**

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Number of pieces</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF-B12</td>
<td>MHF2-12D 2 pieces/unit</td>
</tr>
<tr>
<td></td>
<td>MHF2-12D1 2 pieces/unit</td>
</tr>
<tr>
<td></td>
<td>MHF2-12D2 4 pieces/unit</td>
</tr>
</tbody>
</table>

- The bolts for body through-hole mounting are attached to the product. They are also provided at an order of 1 piece or more with the above part numbers.
- When mounting MHF2-16D or MHF2-20D with the body through-holes, use hexagon socket head screws available on the market.

### Replacement part/Grease pack part no.:

- MHF2-12D, D1 (ø12, 16, 20) GR-S-010 (10 g) (Guide unit)
- MHF2-12D2 (ø12) GR-L-005 (5 g) (Cylinder unit)
- MHF2-16D2 (ø16, 20) GR-S-010 (10 g) (Guide unit)
- MHF2-20D2 (ø16, 20) GR-L-010 (10 g) (Cylinder unit)
Auto Switch Mounting Groove Dimensions

- **Groove for auto switch mounting**
- **Finger reference plane**
- **M3 x 0.5 Finger opening port**
- **M3 x 0.5 Finger closing port**
- **2 x M3 x 0.5 thread depth 7 (Mounting thread)**
- **2 x M3 x 0.5 thread depth 4 (Mounting thread)**
- **4 x M3 x 0.5 thread depth 4 (Mounting thread)**
- **4 x M2.5 x 0.45 thread depth 3 (Attachment mounting thread)**
- **2 x ø2H9 +0.025 depth 2**
- **2 x M2.5 x 0.45 Hexagon socket head screw (special screws)**
- **2 x ø4.5 through (Mounting hole)**
- **2 x ø2.6 through (Mounting hole)**
- **Use the attached hexagon socket head screws for mounting holes.**

---

**MHF2-8D**

- **Dimensions**

---

**MHF2 Series**

---

**Detail of part A**

---

**Accessories option:**

- Hexagon socket head screw (special screws)
**Low Profile Air Gripper MHF2 Series**

**Dimensions**

**MHF2-8D1**

![Diagram of MHF2-8D1 dimensions]

**Auto Switch Mounting Groove Dimensions**

- Groove for auto switch mounting
- 4 x M3 x 0.5 thread depth 4 (Mounting thread)
- 4 x M2.5 x 0.45 thread depth 3 (Attachment mounting thread)
- 2 x ø2H9 +0.025 depth 2
- 2 x M3 x 0.5 thread depth 4 (Mounting thread)

*Use the attached hexagon socket head screws for mounting holes.*
**MHF2 Series**

**Dimensions**

**MHF2-8D2**

![Diagram of MHF2-8D2 dimensions]

- **Finger closing port**: M3 x 0.5
- **Finger opening port**: M3 x 0.5
- **Open**: 32 ± 1
- **Close**: 0 +0.1
- **4 x ø2.6 through (Mounting hole)**

*Note: Use the attached hexagon socket head screws for mounting holes.*

**Auto Switch Mounting Groove Dimensions**

- **4 x M3 x 0.5 thread depth 4**
- **8 x M2.5 x 0.45 thread depth 3**

*Accessory option: Hexagon socket head screw (special screws)*

---

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Low Profile Air Gripper  MHF2 Series

**Dimensions**

**MHF2-12D**

![Diagram of MHF2-12D dimensions]

- **Finger opening port**: M5 x 0.8
- **Finger closing port**: M5 x 0.8
- **Finger reference plane**: M5 x 0.8
- **Mounting thread**: 4 x M3 x 0.5, thread depth 4
- **Attachment mounting thread**: 4 x M4 x 0.7, thread depth 5
- **Groove for auto switch mounting**: 2 x ø3.4, thread depth 2.5
- **Hexagon socket head screws**: 2 x ø2.5H9 +0.025, depth 2.5
- **Finger opening**: Width: 12 ± 1
- **Finger closing**: Width: 0

*Use the attached hexagon socket head screws for mounting holes.*

**Auto Switch Mounting Groove Dimensions**

- **Mounting thread**: 4 x M4 x 0.7, thread depth 5
- **Attachment mounting thread**: 4 x M3 x 0.5, thread depth 4
- **Hexagon socket head screw (special screws)**: Accessory option

---

**Note:**

- All dimensions are in millimeters (mm).
- Tolerances and specific instructions are indicated in the diagrams and text.
- Ensure all parts are correctly aligned and fastened as per the specifications provided.
MHF2 Series

Dimensions

MHF2-12D1

Detail of part A

Finger opening port

Finger closing port

Finger reference plane

2 x M4 x 0.7 thread depth 10 (Mounting thread)

Depth 3

2 x ø3.4 through (Mounting hole)*

8 x M3 x 0.5 thread depth 4 (Attachment mounting thread)

2 x M3 x 0.5 thread depth 4

Accessory option: Hexagon socket head screw (special screws)

Groove for auto switch mounting

4 x M4 x 0.7 thread depth 5 (Mounting thread)

8 x M3 x 0.5 thread depth 4

Depth 2.5

2 x ø2.5H9 +0.025

2 x M4 x 0.7 thread depth 5 (Mounting thread)

Open: 24 ± 1

Close: 0 +0.1

* Use the attached hexagon socket head screws for mounting holes.

Auto Switch Mounting Groove Dimensions
**Low Profile Air Gripper MHF2 Series**

**Dimensions**

**MHF2-12D2**

- **Groove for auto switch mounting**
- **Auto Switch Mounting Groove Dimensions**
  - 4 x M4 x 0.7 thread depth 5 (Mounting thread)
  - 8 x M3 x 0.5 thread depth 4 (Attachment mounting thread)
  - 2 x ø2.5H9 +0.025 depth 2.5
- **Finger opening port**
  - M5 x 0.8
  - Finger reference plane
- **Finger closing port**
  - M5 x 0.8
  - Finger reference plane
- **Use the attached hexagon socket head screws for mounting holes.**
- **Accessory option:** Hexagon socket head screw (special screws) 3H9 +0.025 depth 3
- **Detail of part A**
- **Open: 48 ± 1**
- **Close: 0 +0.1**

---

**MHZ**

**MHR**

**MHC**

**MHT**

**MHY**

**MHW**

**MRHQ**

**MA**

**D-□**
**MHF2 Series**

**Dimensions**

**MHF2-16D**

- 2 x M5 x 0.8 thread depth 12 (Mounting thread)

**Auto Switch Mounting Groove Dimensions**

- 4 x M5 x 0.8 thread depth 5.5 (Mounting thread)
- 8 x M4 x 0.7 thread depth 4 (Attachment mounting thread)
- 2 x M5 x 0.8 thread depth 5.5 (Mounting thread)

**Detail of part A**

- 2 x ø4.3 through (Mounting hole)

**Finger reference plane**

- Finger closing port
- Finger opening port
- Groove for auto switch mounting
Low Profile Air Gripper **MHF2 Series**

**Dimensions**

**MHF2-16D1**

![Diagram of MHF2-16D1 with dimensions and tolerances]

**Auto Switch Mounting Groove Dimensions**

![Diagram of auto switch mounting groove]

- **Finger reference plane**
- **M5 x 0.8**
- **2 x M5 x 0.8 thread depth 12**
  - (Mounting thread)

**Detail of part A**

- **2 x ø4.3 through**
  - (Mounting hole)
- **2 x ø7.5**
- **E-E**

**Low Profile Air Gripper**

- **MHF2 Series**
- **MA**
- **D-**
- **MHZ**
- **MHF**
- **MHL**
- **MHR**
- **MHL**
- **MHC**
- **MHT**
- **MHY**
- **MHW**
- **MRHQ**
- **MH**
- **MHW**
- **D-**

---

**Dimensions**

- **Groove for auto switch mounting**
- **Finger closing port**
- **Finger opening port**
- **4 x M5 x 0.8 thread depth 5.5**
  - (Mounting thread)
- **8 x M4 x 0.7 thread depth 4**
  - (Attachment mounting thread)
- **2 x ø3H9° +0.025 depth 3**
- **2 x M5 x 0.8 thread depth 5.5**
  - (Mounting thread)
MHF2 Series

Dimensions

MHF2-16D2

Auto Switch Mounting Groove Dimensions

Finger reference plane

Groove for auto switch mounting

Detail of part A

Open: 64±1

Close: 0.1

4 x ø4.3 through (Mounting hole)

4 x ø7.5

8 x M4 x 0.7 thread depth 4

(Mounting thread)

2 x ø3H9 +0.025 depth 3

2 x M5 x 0.8 thread depth 5.5

(Mounting thread)

4 x M5 x 0.8 thread depth 12

(Mounting thread)

4 x ø7.5

20

E-E

106

122

142

26

33

24

50

2.2

1.2

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Low Profile Air Gripper  

MHF2 Series

Dimensions

MHF2-20D

**Auto Switch Mounting Groove Dimensions**

- Groove for auto switch mounting
- 2 x M6 x 1 thread depth 6 (Mounting thread)
- 8 x M4 x 0.7 thread depth 4 (Attachment mounting thread)
- 4 x M6 x 1 thread depth 6 (Mounting thread)
- 2 x ø3H9 +0.025 depth 3
- 2 x ø10 through (Mounting hole)
- 2 x ø6.2 through (Mounting hole)
- M5 x 0.8 Finger closing port
- M5 x 0.8 Finger reference plane
- Groove for auto switch mounting
MHF2 Series

Dimensions

MHF2-20D1

Auto Switch Mounting Groove Dimensions

Detail of part A
Low Profile Air Gripper  **MHF2 Series**

### Dimensions

**MHF2-20D2**

**Auto Switch Mounting Groove Dimensions**

- **Finger opening port**: 80 ± 1
- **Finger closing port**: 0 + 0.1

**Finger reference plane**

- **Open**: 80 ± 1
- **Close**: 0 + 0.1

**Groove for auto switch mounting**

- **2 x ø5.2 through (Mounting hole)**
- **8 x M4 x 0.7 thread depth 4 (Attachment mounting thread)**

**Finger opening port**

- **2 x M6 x 1 thread depth 6 (Mounting thread)**
- **8 x M4 x 0.7 thread depth 4 (Attachment mounting thread)**

**Finger closing port**

- **2 x M6 x 1 thread depth 6 (Mounting thread)**
- **2 x M6 x 1 thread depth 6 (Mounting thread)**

**Attachment mounting thread**

- **2 x ø3H9 +0.035 depth 3**

**Auto Switch Mounting Groove Dimensions**

- **Groove for auto switch mounting**

- **2 x M6 x 1 thread depth 6 (Mounting thread)**

**Detail of part A**

- **4 x ø10**
- **4 x ø5.2 through (Mounting hole)**
- **2 x M6 x 1 thread depth 6 (Mounting thread)**
- **8 x M4 x 0.7 thread depth 4 (Attachment mounting thread)**

**Dimensions**

- **ø5H9 +0.030 depth 4**
- **2 x M6 x 1 thread depth 15 (Mounting thread)**
- **4 x M6 x 1 thread depth 6 (Mounting thread)**
- **M5 x 0.8 Finger opening port**
- **M5 x 0.8 Finger closing port**

**Low Profile Air Gripper**

- **MHF2 Series**

**S M C**

**MHZ MHT MHL MHR MHS MHC MHK MHY MHW MRHQ MA D-**

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**MHF2 Series**

**Body Option: Side Piping Type**

### MHF2-8DR
- MHF2-8D1R

<table>
<thead>
<tr>
<th>Model</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>C (mm)</th>
<th>D (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF2-8DR</td>
<td>5.5</td>
<td>25</td>
<td>11</td>
<td>M3 x 0.5</td>
</tr>
<tr>
<td>MHF2-8D1R</td>
<td>37</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Port side of axial piping type

(- Finger closing port)

(- Finger opening port)

### MHF2-8D2R
- MHF2-12D1R
- MHF2-16D1R
- MHF2-20D1R

<table>
<thead>
<tr>
<th>Model</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>C (mm)</th>
<th>D (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF2-8D2R</td>
<td>5.5</td>
<td>61</td>
<td>11</td>
<td>M3 x 0.5</td>
</tr>
<tr>
<td>MHF2-12DR</td>
<td></td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MHF2-12D1R</td>
<td>7</td>
<td>54</td>
<td>14.8</td>
<td>M5 x 0.8</td>
</tr>
<tr>
<td>MHF2-12D2R</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MHF2-16DR</td>
<td></td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MHF2-16D1R</td>
<td>9</td>
<td>76</td>
<td>19</td>
<td>M5 x 0.8</td>
</tr>
<tr>
<td>MHF2-16D2R</td>
<td>124</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MHF2-20DR</td>
<td></td>
<td>66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MHF2-20D1R</td>
<td>10</td>
<td>94</td>
<td>23</td>
<td>M5 x 0.8</td>
</tr>
<tr>
<td>MHF2-20D2R</td>
<td>154</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For dimensions not given above, please refer to the table of dimensions on pages 476 to 487.
Various auto switch applications are possible through different combinations of auto switch quantities and detecting positions.

1) Detection when Gripping Exterior of Workpiece

<table>
<thead>
<tr>
<th>Detection example</th>
<th>Position to be detected</th>
<th>Operation of auto switch</th>
<th>Detection combinations</th>
<th>How to determine auto switch installation position</th>
</tr>
</thead>
</table>
| 1. Confirmation of fingers in reset position | Position of fingers fully opened | Auto switch turned on when fingers return. (Light ON) | One auto switch
- One position, any of q, w, and e can be detected. | Step 1) Fully open the fingers. |
| 2. Confirmation of workpiece held | Position when gripping workpiece | Auto switch turned on when gripping a workpiece. (Light ON) | Two auto switches
- Two positions of q, w, and e can be detected. | Step 1) Position fingers for gripping a workpiece. |
| 3. Confirmation of workpiece released | Position of fingers fully closed | When a workpiece is not held (Abnormal operation): Auto switch to turn ON (Light ON) | A | Step 1) Fully close the fingers. |
| | | | B | |
| | | | C | |

At no pressure or low pressure, connect the auto switch to a power supply, and follow the directions.

Step 2) Insert the auto switch into the auto switch installation groove in the direction shown in the drawing.

Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.

Step 4) Slide the auto switch further in the direction of the arrow until the indicator light goes out.

Step 5) Move the auto switch in the opposite direction and fasten it at a position 0.3 to 0.5 mm beyond the position where the indicator light illuminates.

Note 1) It is recommended that gripping of a workpiece be performed close to the center of the finger stroke.

Note 2) When holding a workpiece close at the end of open/close stroke of fingers, detecting performance of the combinations listed in the above table may be limited, depending on the hysteresis of an auto switch, etc.
Various auto switch applications are possible through different combinations of auto switch quantities and detecting positions.

2) Detection when Gripping Interior of Workpiece

<table>
<thead>
<tr>
<th>Detection example</th>
<th>1. Confirmation of fingers in reset position</th>
<th>2. Confirmation of workpiece held</th>
<th>3. Confirmation of workpiece released</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position to be detected</td>
<td>Position of fingers fully closed</td>
<td>Position when gripping workpiece</td>
<td>Position of fingers fully opened</td>
</tr>
<tr>
<td>Operation of auto switch</td>
<td>Auto switch turned on when fingers return. (Light ON)</td>
<td>Auto switch turned on when gripping a workpiece. (Light ON)</td>
<td>When a workpiece is not held (Abnormal operation): Auto switch to turn ON (Light ON)</td>
</tr>
<tr>
<td>Detection combinations</td>
<td>One auto switch (One position, any of Q, W and E can be detected.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Two auto switches (Two positions of Q, W and E can be detected.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How to determine auto switch installation position</td>
<td>Step 1) Fully close the fingers.</td>
<td>Step 1) Position fingers for gripping a workpiece.</td>
<td>Step 1) Fully open the fingers.</td>
</tr>
<tr>
<td>At no pressure or low pressure, connect the auto switch to a power supply, and follow the directions.</td>
<td>Step 2) Insert the auto switch into the auto switch installation groove in the direction shown in the drawing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 3) Slide the auto switch in the direction of the arrow until the light illuminates and fasten it at a position 0.3 to 0.5 mm in the direction of the arrow beyond the position where the indicator light illuminates.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicator lighting position</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fitting position</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note 1) It is recommended that gripping of a workpiece be performed close to the center of the finger stroke. Note 2) When holding a workpiece close at the end of open/close stroke of fingers, detecting performance of the combinations listed in the above table may be limited, depending on the hysteresis of an auto switch, etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Auto Switch Hysteresis

Auto switches have hysteresis similar to micro switches. Use the table below as a guide when adjusting auto switch positions.

<table>
<thead>
<tr>
<th>Hysteresis</th>
<th>D-M9(V)</th>
<th>D-M9(W)</th>
<th>D-M9(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF2-8D</td>
<td>0.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MHF2-12D</td>
<td>0.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MHF2-16D</td>
<td>0.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MHF2-20D</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Auto Switch Mounting

Insert the auto switch into the auto switch mounting groove in the air chuck in the direction shown below, and after setting the mounting position, tighten the attached switch mounting screw with a flat head watchmaker’s screwdriver.

Protrusion of Auto Switch from Edge of Body

- The amount of auto switch protrusion from the body end surface is shown in the table below.
- Use this as a standard when mounting, etc.

Protrusion of Auto switch

<table>
<thead>
<tr>
<th>Lead wire type</th>
<th>In-line entry</th>
<th>Perpendicular entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illustration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>D-M9(V)</td>
<td>D-M9(W)</td>
</tr>
<tr>
<td>MHF2-8D</td>
<td>Open 6.5</td>
<td>Close 6.5</td>
</tr>
<tr>
<td>MHF2-8D1</td>
<td>Open 6.5</td>
<td>Close 6.5</td>
</tr>
<tr>
<td>MHF2-8D2</td>
<td>Open 6.5</td>
<td>Close 6.5</td>
</tr>
<tr>
<td>MHF2-12D</td>
<td>Open 3</td>
<td>Close 3</td>
</tr>
<tr>
<td>MHF2-12D1</td>
<td>Open 1</td>
<td>Close 1</td>
</tr>
<tr>
<td>MHF2-16D</td>
<td>Open —</td>
<td>Close —</td>
</tr>
<tr>
<td>MHF2-16D1</td>
<td>Open —</td>
<td>Close —</td>
</tr>
<tr>
<td>MHF2-20D</td>
<td>Open —</td>
<td>Close —</td>
</tr>
<tr>
<td>MHF2-20D1</td>
<td>Open —</td>
<td>Close —</td>
</tr>
<tr>
<td>MHF2-20D2</td>
<td>Open —</td>
<td>Close —</td>
</tr>
</tbody>
</table>

Note) There is no protrusion for sections of the table with no values entered.

Caution

When using an auto switch on the mounting plate side, the switch will protrude from the end face as shown in the right figure. Please provide a run off space of 2 mm or more on the mounting plate.
## Various strokes

- Standardized 3 stroke types and 2 stroke adjustment types for fine tuning.

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>Short stroke</th>
<th>Medium stroke</th>
<th>Long stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full stroke</td>
<td>Stroke adjustable width</td>
<td></td>
</tr>
<tr>
<td>ø8</td>
<td>Short Adjuster 4 mm</td>
<td>8 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long Adjuster 8 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ø12</td>
<td>Short Adjuster 8 mm</td>
<td>12 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long Adjuster 12 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ø16</td>
<td>Short Adjuster 10 mm</td>
<td>16 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long Adjuster 14 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ø20</td>
<td>Short Adjuster 8 mm</td>
<td>20 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long Adjuster 18 mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### How to Order

MHF2 – [Standard part number] – X83 A 2

- **Stroke adjustable width**
  - 1 Short Adjuster
  - 2 Long Adjuster

- **Stroke adjustable side**
  - A Both sides
  - B Opening side
  - C Closed side

- With an adjustable opening/closing finger positioning
### Specifications

#### Finger stroke adjustable width for opening/closing position (mm)

<table>
<thead>
<tr>
<th>Model</th>
<th>Full stroke</th>
<th>Adjustable stroke width</th>
<th>Adjustable stroke width</th>
<th>Adjustable stroke width</th>
<th>Adjustable stroke width</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF2-8D</td>
<td>8</td>
<td>4 to 4</td>
<td>4 to 8</td>
<td>4 to 8</td>
<td>0 to 4</td>
</tr>
<tr>
<td>MHF2-8D1</td>
<td>16</td>
<td>6 to 6</td>
<td>10 to 16</td>
<td>10 to 16</td>
<td>0 to 6</td>
</tr>
<tr>
<td>MHF2-8D2</td>
<td>32</td>
<td>12 to 22</td>
<td>20 to 32</td>
<td>20 to 32</td>
<td>0 to 12</td>
</tr>
<tr>
<td>MHF2-12D</td>
<td>12</td>
<td>8 to 8</td>
<td>4 to 12</td>
<td>4 to 12</td>
<td>0 to 8</td>
</tr>
<tr>
<td>MHF2-12D1</td>
<td>24</td>
<td>8 to 14</td>
<td>10 to 24</td>
<td>10 to 24</td>
<td>0 to 14</td>
</tr>
<tr>
<td>MHF2-12D2</td>
<td>48</td>
<td>12 to 28</td>
<td>20 to 48</td>
<td>20 to 48</td>
<td>0 to 28</td>
</tr>
<tr>
<td>MHF2-16D</td>
<td>16</td>
<td>8 to 16</td>
<td>16 to 24</td>
<td>16 to 24</td>
<td>0 to 16</td>
</tr>
<tr>
<td>MHF2-16D1</td>
<td>32</td>
<td>14 to 22</td>
<td>14 to 32</td>
<td>14 to 32</td>
<td>0 to 14</td>
</tr>
<tr>
<td>MHF2-16D2</td>
<td>64</td>
<td>16 to 36</td>
<td>28 to 64</td>
<td>28 to 64</td>
<td>0 to 36</td>
</tr>
<tr>
<td>MHF2-20D</td>
<td>20</td>
<td>10 to 20</td>
<td>10 to 32</td>
<td>10 to 32</td>
<td>0 to 20</td>
</tr>
<tr>
<td>MHF2-20D1</td>
<td>40</td>
<td>10 to 20</td>
<td>20 to 40</td>
<td>20 to 40</td>
<td>0 to 20</td>
</tr>
<tr>
<td>MHF2-20D2</td>
<td>80</td>
<td>10 to 20</td>
<td>20 to 40</td>
<td>20 to 40</td>
<td>0 to 20</td>
</tr>
</tbody>
</table>

Note: Specifications and details other than above are the same as standard type.

#### How to Adjust Finger Stroke

After adjusting the opening/closing width adjustment thread, tighten the nut to fix.

<table>
<thead>
<tr>
<th>Nut tightening torque</th>
<th>Part no.</th>
<th>Thread size</th>
<th>Tightening torque N·m</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF2-8D/-X83</td>
<td>M4 x 0.7</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>MHF2-8D/-R-X83</td>
<td>M5 x 0.8</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>MHF2-8D/-R-X83</td>
<td>M6 x 1.0</td>
<td>5.2</td>
<td></td>
</tr>
<tr>
<td>MHF2-8D/-R-X83</td>
<td>M8 x 1.25</td>
<td>12.5</td>
<td></td>
</tr>
</tbody>
</table>

**Warning**

1. Adjust the stroke adjustment screw within the adjustable width.

   If you adjust the adjustment screw beyond the maximum value, the adjustment screw may fall out and may cause damage to human bodies or equipment/devices.

2. Do not adjust stroke when air pressure is applied to the adjustment screw side.

   If air pressure is applied to the adjustment screw, the adjustment screw may fall out in some adjustment statuses. When applying pressure, make sure the adjustment screw is tightened enough.
MHF2 Series

Dimensions (The dimensions below are the same as the standard type.)

Adjustable finger opening/closing position type/MHF2-□-X83A1
MHF2-□-X83A2

Adjustable finger opening/closing position type/MHF2-□-X83B1
MHF2-□-X83B2

Adjustable finger closing position type/MHF2-□-X83C1
MHF2-□-X83C2

Dimensions (The table below indicates the symbol for stroke adjustable: (A) Adjusted finger opening/closing position type, (B) Adjustable finger opening position type, or (C) Adjustable finger closing position type.) (mm)

<table>
<thead>
<tr>
<th>Model</th>
<th>A Adjustable finger opening/closing position type</th>
<th>B Adjustable finger opening position type</th>
<th>C Adjustable finger closing position type</th>
<th>D (E)</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF2-6D□</td>
<td>X83-1</td>
<td>0 to 4</td>
<td>4 to 8</td>
<td>48</td>
<td>5</td>
<td>M4 x 0.7</td>
<td>15.8</td>
<td>5.9</td>
<td>2</td>
<td>7</td>
<td>4.6</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>X83-2</td>
<td>0 to 8</td>
<td>8 to 8</td>
<td>48</td>
<td>5</td>
<td>M4 x 0.7</td>
<td>15.8</td>
<td>5.9</td>
<td>2</td>
<td>7</td>
<td>4.6</td>
<td>16</td>
</tr>
<tr>
<td>MHF2-8D1□</td>
<td>X83-1</td>
<td>0 to 6</td>
<td>6 to 16</td>
<td>52</td>
<td>5</td>
<td>M5 x 0.8</td>
<td>20</td>
<td>7.7</td>
<td>2.5</td>
<td>8</td>
<td>5.4</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>X83-2</td>
<td>0 to 12</td>
<td>12 to 24</td>
<td>52</td>
<td>5</td>
<td>M5 x 0.8</td>
<td>20</td>
<td>7.7</td>
<td>2.5</td>
<td>8</td>
<td>5.4</td>
<td>24</td>
</tr>
<tr>
<td>MHF2-12D□</td>
<td>X83-1</td>
<td>0 to 8</td>
<td>8 to 16</td>
<td>15</td>
<td>7</td>
<td>M6 x 1</td>
<td>26</td>
<td>10.6</td>
<td>3</td>
<td>10</td>
<td>7.4</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>X83-2</td>
<td>0 to 14</td>
<td>14 to 24</td>
<td>15</td>
<td>7</td>
<td>M6 x 1</td>
<td>26</td>
<td>10.6</td>
<td>3</td>
<td>10</td>
<td>7.4</td>
<td>32</td>
</tr>
<tr>
<td>MHF2-12D1□</td>
<td>X83-1</td>
<td>0 to 18</td>
<td>18 to 32</td>
<td>19</td>
<td>9</td>
<td>M6 x 1.25</td>
<td>33</td>
<td>13</td>
<td>4</td>
<td>13</td>
<td>9.9</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>X83-2</td>
<td>0 to 28</td>
<td>28 to 48</td>
<td>19</td>
<td>9</td>
<td>M6 x 1.25</td>
<td>33</td>
<td>13</td>
<td>4</td>
<td>13</td>
<td>9.9</td>
<td>40</td>
</tr>
<tr>
<td>MHF2-16D□</td>
<td>X83-1</td>
<td>0 to 8</td>
<td>8 to 16</td>
<td>23</td>
<td>13</td>
<td>M8 x 1.25</td>
<td>33</td>
<td>13</td>
<td>4</td>
<td>13</td>
<td>9.9</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>X83-2</td>
<td>0 to 14</td>
<td>14 to 24</td>
<td>23</td>
<td>13</td>
<td>M8 x 1.25</td>
<td>33</td>
<td>13</td>
<td>4</td>
<td>13</td>
<td>9.9</td>
<td>40</td>
</tr>
<tr>
<td>MHF2-16D1□</td>
<td>X83-1</td>
<td>0 to 20</td>
<td>20 to 40</td>
<td>23</td>
<td>13</td>
<td>M8 x 1.25</td>
<td>33</td>
<td>13</td>
<td>4</td>
<td>13</td>
<td>9.9</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>X83-2</td>
<td>0 to 28</td>
<td>28 to 48</td>
<td>23</td>
<td>13</td>
<td>M8 x 1.25</td>
<td>33</td>
<td>13</td>
<td>4</td>
<td>13</td>
<td>9.9</td>
<td>40</td>
</tr>
</tbody>
</table>
## MHF2 Series

### Specific Product Precautions 1

Be sure to read this before handling the products.

### Mounting

#### Warning

1. **Do not scratch or dent the air gripper by dropping or bumping it when mounting.**
   Slight deformation can cause inaccuracy or a malfunction.

2. **Tighten the screw within the specified torque range when mounting the attachment.**
   Tightening with a torque above the limit can cause malfunction, while insufficient tightening can cause slippage and dropping.

### How to Mount Attachment to the Finger

Make sure to mount the attachments on fingers with the tightening torque in the table below by using bolts, etc., for the female threads on fingers.

<table>
<thead>
<tr>
<th>Model</th>
<th>Bolt</th>
<th>Max. tightening torque N·m</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF2-8D</td>
<td>M2.5 x 0.45</td>
<td>0.36</td>
</tr>
<tr>
<td>MHF2-12D</td>
<td>M3 x 0.5</td>
<td>0.63</td>
</tr>
<tr>
<td>MHF2-16D</td>
<td>M4 x 0.7</td>
<td>1.5</td>
</tr>
<tr>
<td>MHF2-20D</td>
<td>M4 x 0.7</td>
<td>1.5</td>
</tr>
</tbody>
</table>

3. **Tighten the screw within the specified torque range when mounting the air gripper.**
   Tightening with a torque above the limit can cause malfunction, while insufficient tightening can cause slippage and dropping.

### How to Mount Air Grippers

#### Top mounting (Body tapped)

<table>
<thead>
<tr>
<th>Model</th>
<th>Bolt</th>
<th>Max. tightening torque N·m</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF2-8D</td>
<td>M3 x 0.5</td>
<td>0.95</td>
</tr>
<tr>
<td>MHF2-12D</td>
<td>M4 x 0.7</td>
<td>2.2</td>
</tr>
<tr>
<td>MHF2-16D</td>
<td>M5 x 0.8</td>
<td>4.5</td>
</tr>
<tr>
<td>MHF2-20D</td>
<td>M6 x 1</td>
<td>7.8</td>
</tr>
</tbody>
</table>

#### Lateral mounting (Body tapped)

<table>
<thead>
<tr>
<th>Model</th>
<th>Bolt</th>
<th>Max. tightening torque N·m</th>
<th>Max. screw-in depth L mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF2-8D</td>
<td>M3 x 0.5</td>
<td>0.63</td>
<td>4</td>
</tr>
<tr>
<td>MHF2-12D</td>
<td>M4 x 0.7</td>
<td>1.5</td>
<td>5</td>
</tr>
<tr>
<td>MHF2-16D</td>
<td>M5 x 0.8</td>
<td>3</td>
<td>5.5</td>
</tr>
<tr>
<td>MHF2-20D</td>
<td>M6 x 1</td>
<td>5.2</td>
<td>6</td>
</tr>
</tbody>
</table>

#### Bottom mounting (Body tapped, body through-hole)

##### Body tapped

<table>
<thead>
<tr>
<th>Model</th>
<th>Bolt</th>
<th>Max. tightening torque N·m</th>
<th>Max. screw-in depth L mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF2-8D</td>
<td>M3 x 0.5</td>
<td>0.63</td>
<td>4</td>
</tr>
<tr>
<td>MHF2-12D</td>
<td>M4 x 0.7</td>
<td>1.5</td>
<td>5</td>
</tr>
<tr>
<td>MHF2-16D</td>
<td>M5 x 0.8</td>
<td>3</td>
<td>5.5</td>
</tr>
<tr>
<td>MHF2-20D</td>
<td>M6 x 1</td>
<td>5.2</td>
<td>6</td>
</tr>
</tbody>
</table>

##### Body through-hole

- When MHF2-8D and MHF2-12D are mounted body through-hole, use the attached special bolts.

### Operating Environment

#### Caution

Use caution for the anti-corrosiveness of the linear guide section.
Martensitic stainless steel is used for the finger guide rail, so make sure that anti-corrosiveness is inferior to the austenitic stainless steel.
In particular, watch for rust in environments where waterdrops are likely to adhere due to condensation.
How to Locate Finger and Attachment

Positioning in the finger’s open/close direction
Position the finger and the attachment by inserting the finger’s pin into the attachment’s pin insertion hole.
Provide the following pin insertion hole dimensions: shaft-basis fitting dimension C for the open/close direction; slotted hole with relief B for the cross direction.

Positioning in the finger’s cross direction
Perform the positioning from the reference plane of the finger and the side A of the attachment.

Finite orbit type guide is used in the actuator finger part. By using this, when there are inertial force which cause by movements or rotation to the actuator, steel ball will move to one side and this will cause a large resistance and degrade the accuracy. When there are inertial force which cause by movements or rotation to the actuator, operate the finger to full stroke.
Especially in long stroke type, the accuracy of finger may degrade.