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.
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>

Improved mounting repeatability
With positioning pin holes

Auto switches can be mounted on both sides.

Centralized wiring and piping are possible.

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

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

Easy positioning for mounting attachments
With positioning pin holes

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**MHF2 Series**

**Model Selection**

**Selection Procedure**

1. **Step 1** Confirm gripping force
2. **Step 2** Confirm gripping point
3. **Step 3** Confirm external force on fingers

**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

**Model Selection Illustration**

**Gripping force at least 10 to 20 times the workpiece weight**

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

- **F:** Gripping force (N)
- **µ:** Coefficient of friction between attachments and workpiece
- **m:** Workpiece mass (kg)
- **g:** Gravitational acceleration (= 9.8 m/s²)
- **mg:** Workpiece weight (N)

the conditions under which the workpiece will not drop are

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

Where \(a\) is the number of fingers.

When \(\mu = 0.2\),

\[
F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg
\]

When \(\mu = 0.1\),

\[
F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg
\]

(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.

**Selecting the MHF2-12D**

- The gripping force is obtained from the intersection point of the gripping point distance \(L = 30\) mm and a pressure of 0.4 MPa.
- A gripping force of 38 N satisfies the required gripping force of 29.4 N. Therefore, the selection of MHF2-12D is appropriate.

<table>
<thead>
<tr>
<th>Gripping Force N</th>
<th>Pressure (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1MPa</td>
<td>0.05</td>
</tr>
<tr>
<td>0.3MPa</td>
<td>0.2</td>
</tr>
<tr>
<td>0.4MPa</td>
<td>0.25</td>
</tr>
<tr>
<td>0.5MPa</td>
<td>0.3</td>
</tr>
<tr>
<td>0.7MPa</td>
<td>0.4</td>
</tr>
</tbody>
</table>

**MHF2-12D**

Gripping force obtained from the intersection point of the gripping point distance \(L = 30\) mm and a pressure of 0.4 MPa.

- The gripping force is 38 N.

**Example**

- When it is desired to set the gripping force at 20 times or more the workpiece weight. Required gripping force \(= 0.15 \text{ kg} \times 20 \times 9.8 \text{ m/s}^2 = \text{Approx.} 29.4 \text{ N or more}\)
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

MHF2-12D

MHF2-16D

MHF2-20D

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.
Step 3 Confirmation of External Force on Fingers: MHF2 Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Allowable vertical load Fv (N)</th>
<th>Maximum allowable moment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pitch moment Mp (N·m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yaw moment My (N·m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Roll moment Mr (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 of allowable external force (when moment load is applied)

\[
Fv = \frac{M (\text{Maximum allowable moment}) (N\cdot m)}{L \times 10^{-3}}
\]

\(\times \text{Unit converted invariable number}\)

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.

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

\(f = 10\) (N) < 22.7 (N)

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

**MHF2 Series**

8, 12, 16, 20

---

### How to Order

- **MHF 2**
- **12 D**
- **M9BW**
- **nil**

**Number of fingers**: 2

**Bore size (mm)**

| 8  | 8  |
| 12 | 12 |
| 16 | 16 |
| 20 | 20 |

**Action**: D Double acting

**Stroke**

| nil | Short stroke |
| 1   | Medium stroke |
| 2   | Long stroke |

**Number of auto switches**

| nil  | 2 pcs. |
| 1    | pc.    |
| n    | pcs.   |

**Auto switch**

- Nil: Axial piping type
- R: Side piping type

**Body option**

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

---

### 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>Solid state auto switch</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Diagnostic indication (2-color indicator)</td>
<td></td>
<td></td>
<td></td>
<td>3-wire (NPN)</td>
<td>5 V, 12 V</td>
<td>M9NV</td>
<td>0.5 (nil)</td>
<td>—</td>
<td>IC circuit</td>
</tr>
<tr>
<td>Water resistant (2-color indicator)</td>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>12 V</td>
<td>M9PV</td>
<td>1 (M)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>5 V, 12 V</td>
<td>M9BV</td>
<td>3 (L)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-wire (NPN)</td>
<td>12 V</td>
<td>M9NWV</td>
<td>5 (Z)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>24 V</td>
<td>M9PWV</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>5 V, 12 V</td>
<td>M9BWW</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-wire (NPN)</td>
<td>12 V</td>
<td>M9NAV**</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>5 V, 12 V</td>
<td>M9PAA**</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>12 V</td>
<td>M9BAY**</td>
<td>—</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>M9PA**</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>12 V</td>
<td>M9BAY**</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>5 V, 12 V</td>
<td>M9PAX**</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-wire (NPN)</td>
<td>12 V</td>
<td>M9BAY**</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

**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) M9WWZ

**Note:** 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.
### Specifications

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Air</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating pressure</strong></td>
<td>ø8: 0.15 to 0.7 MPa&lt;br&gt;ø12 to 20: 0.1 to 0.7 MPa</td>
</tr>
<tr>
<td><strong>Ambient and fluid temperature</strong></td>
<td>–10 to 60°C (with no condensation)</td>
</tr>
<tr>
<td><strong>Repeatability</strong></td>
<td>±0.05 mm &lt;sup&gt;Note 1&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Maximum operating frequency</strong></td>
<td>Short stroke: 120 c.p.m.&lt;br&gt;Medium stroke: 120 c.p.m.&lt;br&gt;Long stroke: 60 c.p.m.</td>
</tr>
<tr>
<td><strong>Lubrication</strong></td>
<td>Not required</td>
</tr>
<tr>
<td><strong>Action</strong></td>
<td>Double acting</td>
</tr>
<tr>
<td><strong>Auto switch (Option) &lt;sup&gt;Note 2&lt;/sup&gt;</strong></td>
<td>Solid state auto switch (3-wire, 2-wire)</td>
</tr>
</tbody>
</table>

<sup>Note 1</sup> 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 ±0.15 mm due to the influence of backlash of the rack and pinion.

<sup>Note 2</sup> 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</th>
<th>Opening/closing stroke (Both sides) &lt;sup&gt;Note 1&lt;/sup&gt;</th>
<th>Weight (g)</th>
<th>Unobstructed capacity (cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effective gripping force per finger N</td>
<td>mm</td>
<td></td>
<td>Finger open side</td>
</tr>
<tr>
<td></td>
<td>MHF2-8D</td>
<td>8</td>
<td>19</td>
<td>8</td>
<td>65</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>MHF2-8D1</td>
<td>8</td>
<td>19</td>
<td>16</td>
<td>85</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>MHF2-8D2</td>
<td>8</td>
<td>19</td>
<td>32</td>
<td>120</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>MHF2-12D</td>
<td>12</td>
<td>48</td>
<td>12</td>
<td>155</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>MHF2-12D1</td>
<td>12</td>
<td>48</td>
<td>24</td>
<td>190</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td>MHF2-12D2</td>
<td>12</td>
<td>48</td>
<td>48</td>
<td>275</td>
<td>6.1</td>
</tr>
<tr>
<td></td>
<td>MHF2-16D</td>
<td>16</td>
<td>90</td>
<td>16</td>
<td>350</td>
<td>4.9</td>
</tr>
<tr>
<td></td>
<td>MHF2-16D1</td>
<td>16</td>
<td>90</td>
<td>32</td>
<td>445</td>
<td>8.2</td>
</tr>
<tr>
<td></td>
<td>MHF2-16D2</td>
<td>16</td>
<td>90</td>
<td>64</td>
<td>650</td>
<td>14.9</td>
</tr>
<tr>
<td></td>
<td>MHF2-20D</td>
<td>20</td>
<td>141</td>
<td>20</td>
<td>645</td>
<td>8.7</td>
</tr>
<tr>
<td></td>
<td>MHF2-20D1</td>
<td>20</td>
<td>141</td>
<td>40</td>
<td>850</td>
<td>15.1</td>
</tr>
<tr>
<td></td>
<td>MHF2-20D2</td>
<td>20</td>
<td>141</td>
<td>80</td>
<td>1,225</td>
<td>28.0</td>
</tr>
</tbody>
</table>

<sup>Note 1</sup> At the pressure of 0.5 MPa, when gripping point L is 20 mm.

<sup>Note 2</sup> Excluding the auto switch weight.

---

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

**Made to Order: Individual Specifications**
- Made to Order: Individual Specifications (For details, refer to pages 492 to 494.)
- -X83 Specifications/Description
- With an adjustable opening/closing finger positioning

**Symbol**
- -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.
**MHF2 Series**

**Construction**

**MHF2-8D, MHF2-8D1**

![Diagram of MHF2-8D1]

**MHF2-8D2**

![Diagram of MHF2-8D2]

**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>Nitrizing</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>

**Replacement Parts**

<table>
<thead>
<tr>
<th>Description</th>
<th>Kit no.</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal kit</td>
<td>MHF2-8D-PS/MHF8-PS-PS/MHF8-PS-2</td>
<td>12, 20, 21</td>
</tr>
<tr>
<td>Finger assembly</td>
<td>MHF-A0802/MHF-A0802-1/MHF-A0802-2</td>
<td>3, 4, 5, 6, 15, 17, 19 Mounting screw</td>
</tr>
</tbody>
</table>

**Bolts for Body Through-hole Mounting**

- 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.

![Diagram of MHF2 Series Construction]

---

**MHF2-8D-8D1**

| Guide unit: GR-S-010 (10 g) |
| Cylinder unit: GR-L-006 (5 g) |

**MHF2-8D2**

| Guide unit: GR-S-010 (10 g) |
| Cylinder unit: GR-L-006 (5 g) |
**Construction**

**MHF2-12D to 20D**

![Diagram of MHF2 Series](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>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>
<tr>
<td>11</td>
<td>Head damper</td>
<td>Urethane rubber</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Rack</td>
<td>Stainless steel</td>
<td>Nitriding</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>MHF2-12D</td>
<td>MHF2-12D1 MHF2-12D2</td>
</tr>
<tr>
<td>Finger assembly</td>
<td>MHF-A1202</td>
<td>MHF-A1202-1 MHF-A1202-2</td>
</tr>
<tr>
<td>Seal kit</td>
<td>MHF2-16D</td>
<td>MHF2-16D1 MHF2-16D2</td>
</tr>
<tr>
<td>Finger assembly</td>
<td>MHF-A1602</td>
<td>MHF-A1602-1 MHF-A1602-2</td>
</tr>
<tr>
<td>Seal kit</td>
<td>MHF2-20D</td>
<td>MHF2-20D1 MHF2-20D2</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></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.:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Part no.</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF2-12D, D1</td>
<td>GR-S-010</td>
<td>(10 g) (Guide unit)</td>
</tr>
<tr>
<td>MHF2-16D</td>
<td>GR-L-005</td>
<td>(5 g) (Cylinder unit)</td>
</tr>
<tr>
<td>MHF2-20D</td>
<td>GR-S-010</td>
<td>(10 g) (Guide unit)</td>
</tr>
<tr>
<td></td>
<td>GR-L-010</td>
<td>(10 g) (Cylinder unit)</td>
</tr>
</tbody>
</table>
MHF2 Series

Dimensions

MHF2-8D

Auto Switch Mounting Groove Dimensions

Groove for auto switch mounting

Accessory option: Hexagon socket head screw (special screws)

Detailed diagrams and dimensions are shown for various parts and features of the MHF2-8D model, including:

- Groove for auto switch mounting
- Finger closing port
- Finger opening port
- Auto Switch Mounting Groove Dimensions
- Various thread depths and dimensions
- Hexagon socket head screws

Each section provides specific dimensions and tolerances for precise engineering and manufacturing.
**MHF2 Series**

**Dimensions**

**MHF2-8D2**

**MHF2-8D2**

4 x ø4.5

ø4

1.3

ø4

15.8

12

Finger reference plane

M3 x 0.5

M3 x 0.5

Finger closing port

Finger opening port

Open: 32 ± 1

Close: 0 ± 0.1

4 x M3 x 0.5 thread depth 7

(Mounting thread)

2 x M3 x 0.5 thread depth 4

(Mounting thread)

4 x ø2.5 through (Mounting hole)*

4 x ø4.5

Auto Switch Mounting

Groove Dimensions

4 x M3 x 0.5 thread depth 4

(Mounting thread)

2 x øH9 +0.025

depth 2

8 x M2.5 x 0.45 thread depth 3

(Attachment mounting thread)

M2.5 x 0.45

Accessory option:

Hexagon socket head screw (special screws)

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.

**Detail of part A**

3.4 17 17 17

2.5 +0.025

depth 2.5

ø2.5H9

0

depth 2.5

4 x M3 x 0.5 thread depth 7

(Mounting thread)

2 x M3 x 0.5 thread depth 4

(Mounting thread)
**Low Profile Air Gripper MHF2 Series**

**Dimensions**

MHF2-12D

**Auto Switch Mounting Groove Dimensions**

Use the attached hexagon socket head screws for mounting holes.

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

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

Accessory option:
Hexagon socket head screw (special screws)

2 x M3 x 0.5

2 x ø2.5H9°.025 depth 2.5

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

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MHF2 Series

Dimensions

MHF2-12D1

Finger opening port

M5 x 0.8

Finger closing port

Finger reference plane

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

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 M4 x 0.7 thread depth 5
(Mounting thread)

Groove for auto switch mounting

Auto Switch Mounting Groove Dimensions

"Use the attached hexagon socket head screws for mounting holes."
Auto Switch Mounting Groove Dimensions

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

Dimensions

MHF2-16D

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

**Dimensions**

**MHF2-16D1**

**Auto Switch Mounting Groove Dimensions**

- **Groove for auto switch mounting**

**Finger closing port**

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

**Finger opening port**

- M5 x 0.8

- Finger reference plane

**Finger reference plane**

- 2 x ø3H9 +0.025 depth 3
- 2 x øH9 +0.030 depth 3

**Detail of part A**

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

**Open: 32 ± 1**

**Close: 0 ± 0.1**

**Dimensions**

- 2 x M5 x 0.8 thread depth 5.5
- (Mounting thread)

**Auto Switch Mounting Groove Dimensions**

- 4 x M5 x 0.8 thread depth 5.5
- (Mounting thread)

**Attachment mounting thread**

- 8 x M4 x 0.7 thread depth 4

**MHF2 Series**

- 2 x M5 x 0.8 thread depth 5.5
- (Mounting thread)
MHF2 Series

Dimensions

MHF2-16D2

Auto Switch Mounting Groove Dimensions

- Groove for auto switch mounting

4 x M5 x 0.8 thread depth 5.5
(Mounting hole)

- 4 x ø7.5 through
(Mounting hole)

- 4 x ø4.3 through
(Mounting hole)

- 2 x M5 x 0.8 thread depth 5.5
(Mounting thread)

- 2 x M5 x 0.8 thread depth 5.5
(Mounting thread)

- 2 x ø3H9 +0.025
depth 3

- 8 x M4 x 0.7 thread depth 4
(Attachment mounting thread)

- 4 x M5 x 0.8 thread depth 5.5
(Mounting thread)

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

- 4 x ø4.3 through
(Mounting hole)

- Finger closing port

- Finger opening port

- Finger reference plane

- M5 x 0.8
Finger opening port

- M5 x 0.8
Finger closing port

- ø4H nine +0.030 depth 3

- 4H nine +0.030 depth 3

- Groove for auto switch mounting

Fabricated by SMC
Low Profile Air Gripper  **MHF2 Series**

### Dimensions

**MHF2-20D**

[Diagram of MHF2-20D dimensions with annotations for finger closing and opening ports, groove dimensions, and auto switch mounting groove.]
MHF2 Series

Dimensions

MHF2-20D1

Detail of part A

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

### Dimensions

**MHF2-20D2**

![Diagram of Low Profile Air Gripper MHF2-20D2]

- **Auto Switch Mounting Groove Dimensions**
  - Groove for auto switch mounting

- **Finger opening port**
  - Finger closing port
  - Finger reference plane

- **Dimensions**
  - Anchor: 0.8
  - Finger opening: 12
  - Finger closing: 46
  - Finger reference plane: 1.2

- **Attachment mounting thread**
  - 4 x ø10

- **Thread depth**
  - 6

- **Material**
  - M5 x 0.8

- **Tolerances**
  - M5 x 0.8
  - M6 x 1

- **Auto Switch Mounting Groove**
  - 4 x ø5.2 through (Mounting hole)

- **Mounting thread**
  - 4 x ø10
  - 8 x M4 x 0.7 thread depth 4

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

- **Finger closing port**
  - 2 x ø3H9 +0.025
  - 8 x M4 x 0.7 thread depth 4

- **Attachment mounting thread**
  - 2 x ø3H9 +0.025

- **Auto Switch Mounting Groove Dimensions**
  - 4 x ø10

- **Attachment mounting thread**
  - 2 x ø10

- **Material**
  - M5 x 0.8

- **Tolerances**
  - M5 x 0.8
  - M6 x 1

- **Thread depth**
  - 6

- **Material**
  - M5 x 0.8

- **Tolerances**
  - M5 x 0.8
  - M6 x 1

- **Thread depth**
  - 6

- **Material**
  - M5 x 0.8

- **Tolerances**
  - M5 x 0.8
  - M6 x 1

- **Thread depth**
  - 6

- **Material**
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- **Tolerances**
  - M5 x 0.8
  - M6 x 1

- **Thread depth**
  - 6

- **Material**
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- **Tolerances**
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- **Thread depth**
  - 6

- **Material**
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- **Tolerances**
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- **Tolerances**
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  - M6 x 1

- **Thread depth**
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- **Tolerances**
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  - M6 x 1

- **Thread depth**
  - 6

- **Material**
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- **Tolerances**
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  - M6 x 1

- **Thread depth**
  - 6

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- **Tolerances**
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  - M6 x 1

- **Thread depth**
  - 6

- **Material**
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- **Tolerances**
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  - M6 x 1

- **Thread depth**
  - 6

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- **Tolerances**
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  - M6 x 1

- **Thread depth**
  - 6

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- **Tolerances**
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  - M6 x 1

- **Thread depth**
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- **Tolerances**
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  - M6 x 1

- **Thread depth**
  - 6

- **Material**
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- **Tolerances**
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  - M6 x 1

- **Thread depth**
  - 6

- **Material**
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- **Thread depth**
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- **Material**
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- **Tolerances**
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- **Thread depth**
  - 6

- **Material**
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- **Tolerances**
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- **Thread depth**
  - 6

- **Material**
  - M5 x 0.8

- **Tolerances**
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  - M6 x 1

- **Thread depth**
  - 6

- **Material**
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- **Tolerances**
  - M5 x 0.8
  - M6 x 1

- **Thread depth**
  - 6

- **Material**
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- **Tolerances**
  - M5 x 0.8
  - M6 x 1

- **Thread depth**
  - 6

- **Material**
  - M5 x 0.8

- **Tolerances**
  - M5 x 0.8
  - M6 x 1

- **Thread depth**
  - 6

- **Material**
  - M5 x 0.8

- **Tolerances**
  - M5 x 0.8
  - M6 x 1

- **Thread depth**
  - 6

- **Material**
  - M5 x 0.8

- **Tolerances**
  - M5 x 0.8
  - M6 x 1

- **Thread depth**
  - 6

- **Material**
  - M5 x 0.8

- **Tolerances**
  - M5 x 0.8
  - M6 x 1

- **Thread depth**
  - 6

- **Material**
  - M5 x 0.8

- **Tolerances**
  - M5 x 0.8
  - M6 x 1

- **Thread depth**
  - 6

- **Material**
  - M5 x 0.8

- **Tolerances**
  - M5 x 0.8
  - M6 x 1

- **Thread depth**
  - 6
**MHF2 Series**

**Body Option: Side Piping Type**

MHF2-8DR
MHF2-8D1R

Port side of axial piping type

(+ Finger closing port)  (+ Finger opening port)

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</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>

MHF2-8D2R
MHF2-12D2R
MHF2-16D2R
MHF2-20D2R

Port side of axial piping type

(+ Finger closing port)  (+ Finger opening port)

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</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>7</td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MHF2-12D2R</td>
<td>90</td>
<td></td>
<td></td>
<td>M5 x 0.8</td>
</tr>
<tr>
<td>MHF2-16DR</td>
<td>9</td>
<td>54</td>
<td>14.8</td>
<td>M5 x 0.8</td>
</tr>
<tr>
<td>MHF2-16D2R</td>
<td>9</td>
<td>76</td>
<td>19</td>
<td>M5 x 0.8</td>
</tr>
<tr>
<td>MHF2-20DR</td>
<td>10</td>
<td>66</td>
<td></td>
<td>M5 x 0.8</td>
</tr>
<tr>
<td>MHF2-20D1R</td>
<td>154</td>
<td>94</td>
<td>23</td>
<td></td>
</tr>
</tbody>
</table>

* For dimensions not given above, please refer to the table of dimensions on pages 476 to 487.
**MHF2 Series**

**Auto Switch Installation Examples and Mounting Positions**

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>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 opened</td>
<td>Position when gripping workpiece</td>
<td>Position of fingers fully closed</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</td>
<td>Two auto switches</td>
<td>Two auto switches</td>
</tr>
<tr>
<td></td>
<td>One position, any of q, w, and e can be detected.</td>
<td>Two positions of q, w, and e can be detected.</td>
<td></td>
</tr>
<tr>
<td>Position to be detected</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation of auto switch</td>
<td>Auto switch turned on when gripping a workpiece. (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</td>
<td>Two auto switches</td>
<td>Two auto switches</td>
</tr>
<tr>
<td></td>
<td>One position, any of q, w, and e can be detected.</td>
<td>Two positions of q, w, and e can be detected.</td>
<td></td>
</tr>
</tbody>
</table>

**How to determine auto switch installation position**

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

**Step 1)** Fully open the fingers.

**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>
</tbody>
</table>

**Detection combinations**

- One auto switch:
  - One position, any of 1, 2, and 3 can be detected.

- Two auto switches:
  - Two positions of 1, 2, and 3 can be detected.

**How to determine auto switch installation position**

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

**Step 1)**
- Fully close the fingers.
- Fully open the fingers.

**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 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.
- 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.
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>Model</th>
<th>Hysteresis (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF2-8D</td>
<td>0.2</td>
</tr>
<tr>
<td>MHF2-12D</td>
<td>0.3</td>
</tr>
<tr>
<td>MHF2-16D</td>
<td>0.2</td>
</tr>
<tr>
<td>MHF2-20D</td>
<td>0.5</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.

Note) Use a watchmaker’s screwdriver with a grip diameter of 5 to 6 mm to tighten the auto switch mounting screw. Also, tighten with a torque of about 0.05 to 0.15 N·m, or about 0.05 to 0.10 N·m for D-M9□A(V).

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.

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>Model</th>
<th>Lead wire type</th>
<th>In-line entry</th>
<th>Perpendicular entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-M9□</td>
<td>D-M9□W</td>
<td>6.5</td>
<td>8.5</td>
</tr>
<tr>
<td>D-M9□A</td>
<td>D-M9□AV</td>
<td>6.5</td>
<td>8.5</td>
</tr>
</tbody>
</table>

Note) There is no protrusion for sections of the table with no values entered.
### 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>Stroke adjustable width</td>
<td>Stroke adjustable width</td>
<td>Stroke adjustable width</td>
</tr>
<tr>
<td>ø8</td>
<td>8 mm</td>
<td>16 mm</td>
<td>32 mm</td>
</tr>
<tr>
<td></td>
<td>Short Adjuster 8 mm</td>
<td>Long Adjuster 8 mm</td>
<td>Short Adjuster 12 mm</td>
</tr>
<tr>
<td>ø12</td>
<td>12 mm</td>
<td>24 mm</td>
<td>48 mm</td>
</tr>
<tr>
<td></td>
<td>Short Adjuster 8 mm</td>
<td>Long Adjuster 12 mm</td>
<td>Short Adjuster 18 mm</td>
</tr>
<tr>
<td>ø16</td>
<td>16 mm</td>
<td>32 mm</td>
<td>64 mm</td>
</tr>
<tr>
<td></td>
<td>Short Adjuster 16 mm</td>
<td>Long Adjuster 18 mm</td>
<td>Short Adjuster 36 mm</td>
</tr>
<tr>
<td>ø20</td>
<td>20 mm</td>
<td>40 mm</td>
<td>80 mm</td>
</tr>
<tr>
<td></td>
<td>Short Adjuster 18 mm</td>
<td>Long Adjuster 20 mm</td>
<td>Short Adjuster 40 mm</td>
</tr>
</tbody>
</table>

How to Order

**MHF2** – **Standard part number** – **X83** **A** **2**

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

- With an adjustable opening/closing finger positioning

- Stroke can be adjusted to suit the workpiece
- 3 types of opening/closing finger stroke adjustments (Adjustable finger opening/closing position type, Adjustable finger opening position type, Adjustable finger closed position type)
### Specifications

#### Finger stroke adjustable width for opening/closing position

<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 8</td>
<td>0 to 4</td>
<td>4 to 8</td>
<td>0 to 4</td>
</tr>
<tr>
<td>MHF2-8D1</td>
<td>16</td>
<td>6 to 8</td>
<td>0 to 8</td>
<td>10 to 16</td>
<td>0 to 6</td>
</tr>
<tr>
<td>MHF2-8D2</td>
<td>32</td>
<td>12 to 20</td>
<td>0 to 12</td>
<td>20 to 32</td>
<td>0 to 12</td>
</tr>
<tr>
<td>MHF2-12D</td>
<td>8</td>
<td>4 to 8</td>
<td>0 to 8</td>
<td>4 to 12</td>
<td>0 to 8</td>
</tr>
<tr>
<td>MHF2-12D1</td>
<td>24</td>
<td>10 to 24</td>
<td>0 to 12</td>
<td>16 to 24</td>
<td>0 to 12</td>
</tr>
<tr>
<td>MHF2-12D2</td>
<td>48</td>
<td>18 to 28</td>
<td>0 to 14</td>
<td>20 to 48</td>
<td>0 to 28</td>
</tr>
<tr>
<td>MHF2-16D</td>
<td>16</td>
<td>0 to 16</td>
<td>0 to 10</td>
<td>6 to 16</td>
<td>0 to 10</td>
</tr>
<tr>
<td>MHF2-16D1</td>
<td>32</td>
<td>0 to 24</td>
<td>0 to 14</td>
<td>14 to 32</td>
<td>0 to 14</td>
</tr>
<tr>
<td>MHF2-16D2</td>
<td>64</td>
<td>16 to 48</td>
<td>0 to 16</td>
<td>48 to 48</td>
<td>0 to 16</td>
</tr>
<tr>
<td>MHF2-20D</td>
<td>20</td>
<td>0 to 20</td>
<td>0 to 12</td>
<td>12 to 20</td>
<td>0 to 18</td>
</tr>
<tr>
<td>MHF2-20D1</td>
<td>40</td>
<td>0 to 30</td>
<td>0 to 18</td>
<td>30 to 40</td>
<td>0 to 10</td>
</tr>
<tr>
<td>MHF2-20D2</td>
<td>80</td>
<td>0 to 60</td>
<td>0 to 20</td>
<td>60 to 80</td>
<td>0 to 20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<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>
</tr>
<tr>
<td>MHF2-8D-R-X83</td>
<td>M5 x 0.8</td>
<td>3.0</td>
</tr>
<tr>
<td>MHF2-12D-X83</td>
<td>M6 x 1.0</td>
<td>5.2</td>
</tr>
<tr>
<td>MHF2-20D-X83</td>
<td>M8 x 1.25</td>
<td>12.5</td>
</tr>
</tbody>
</table>

### How to Adjust Finger Stroke

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

#### Nut tightening torque

<table>
<thead>
<tr>
<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>
</tr>
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<td>M5 x 0.8</td>
<td>3.0</td>
</tr>
<tr>
<td>MHF2-12D-X83</td>
<td>M6 x 1.0</td>
<td>5.2</td>
</tr>
<tr>
<td>MHF2-20D-X83</td>
<td>M8 x 1.25</td>
<td>12.5</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

(See the dimensions below as the standard type.)

#### Adjustable finger opening/closing position type/MHF2-

<table>
<thead>
<tr>
<th>Model</th>
<th>X83A1</th>
<th>X83A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Adjusting stroke width for closing position

<table>
<thead>
<tr>
<th>Model</th>
<th>X83B1</th>
<th>X83B2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Adjusting stroke width for opening position

<table>
<thead>
<tr>
<th>Model</th>
<th>X83C1</th>
<th>X83C2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
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<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table

<table>
<thead>
<tr>
<th>Model</th>
<th>X83A1</th>
<th>X83A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>X83B1</th>
<th>X83B2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>X83C1</th>
<th>X83C2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hexagon

<table>
<thead>
<tr>
<th>Model</th>
<th>X83A1</th>
<th>X83A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>X83B1</th>
<th>X83B2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>X83C1</th>
<th>X83C2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Adjustable width

<table>
<thead>
<tr>
<th>Model</th>
<th>X83A1</th>
<th>X83A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
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<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>X83B1</th>
<th>X83B2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>X83C1</th>
<th>X83C2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hexagon width across flats

<table>
<thead>
<tr>
<th>Model</th>
<th>X83A1</th>
<th>X83A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>X83B1</th>
<th>X83B2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>X83C1</th>
<th>X83C2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (Adjustable stroke width for closing position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2 (Adjustable stroke width for opening position)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#
**MWF2 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**

<table>
<thead>
<tr>
<th>Model</th>
<th>Bolt</th>
<th>Max. tightening torque N·m</th>
<th>Screw-in depth L mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHF2-8D</td>
<td>M2.5 x 0.45</td>
<td>0.36</td>
<td>4</td>
</tr>
<tr>
<td>MHF2-12D</td>
<td>M3 x 0.5</td>
<td>0.63</td>
<td>5.2</td>
</tr>
<tr>
<td>MHF2-16D</td>
<td>M4 x 0.7</td>
<td>1.5</td>
<td>—</td>
</tr>
<tr>
<td>MHF2-20D</td>
<td>M5 x 0.8</td>
<td>3</td>
<td>—</td>
</tr>
</tbody>
</table>

* 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.