**Rotary Actuated Air Gripper/3-Finger Type**

**MHR3/MDHR3 Series**

Size: 10, 15

---

**How to Order**

**Without auto switch**

MHR 3 - 10 R -

**With auto switch (Built-in magnet)**

MDHR 3 - 10 R - M9N S -

**Number of fingers**

3 fingers

**Nominal size**

10
15

**Connecting port**

R: Body side
E: Axial side

---

**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>Diagnosis (2-color indication)</td>
<td>Yes</td>
<td>Grommet</td>
<td>3-wire (NPN)</td>
<td>5V, 12V</td>
<td>M9NV M9N</td>
<td>○ ○ ○ ○ ○</td>
<td>IC circuit</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td>Solid state auto switch</td>
<td>Water resistant (2-color indicator)</td>
<td>-</td>
<td>-</td>
<td>3-wire (PNP)</td>
<td>12V</td>
<td>M9PV M9P</td>
<td>○ ○ ○ ○ ○</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>2-wire</td>
<td>12V</td>
<td>M9BV M9B</td>
<td>○ ○ ○ ○ ○</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>3-wire (NPN)</td>
<td>5V, 12V</td>
<td>M9NW M9W</td>
<td>○ ○ ○ ○ ○</td>
<td>IC circuit</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>3-wire (PNP)</td>
<td>12V</td>
<td>M9PVW M9PW</td>
<td>○ ○ ○ ○ ○</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>2-wire</td>
<td>12V</td>
<td>M9BWV M9BW</td>
<td>○ ○ ○ ○ ○</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>3-wire (NPN)</td>
<td>5V, 12V</td>
<td>M9NAV M9NAV&lt;sup&gt;**&lt;/sup&gt;</td>
<td>○ ○ ○ ○ ○</td>
<td>IC circuit</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>3-wire (PNP)</td>
<td>12V</td>
<td>M9PAV M9PA&lt;sup&gt;**&lt;/sup&gt;</td>
<td>○ ○ ○ ○ ○</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>2-wire</td>
<td>12V</td>
<td>M9BAV M9BA&lt;sup&gt;**&lt;/sup&gt;</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) M9N
1 m ········· M (Example) M9NM
3 m ········· L (Example) M9NL
5 m ········· Z (Example) M9NZ

**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.

---

**Diagnosis (2-color indication)**

**Water resistant (2-color indicator)**

---

* Solid state auto switches marked with a "<sup>**</sup>" symbol are produced upon receipt of order.
## Model/Specifications

<table>
<thead>
<tr>
<th>Nominal size</th>
<th>10</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
<td>Double acting</td>
<td></td>
</tr>
<tr>
<td>Holding force (N) (Effective value)</td>
<td><strong>External grip</strong></td>
<td>7</td>
</tr>
<tr>
<td>at 0.5 MPa</td>
<td><strong>Internal grip</strong></td>
<td>6.5</td>
</tr>
<tr>
<td><strong>Opening/Closing stroke</strong></td>
<td><strong>Finger closing width (mm)</strong></td>
<td>16</td>
</tr>
<tr>
<td>(Diameter)</td>
<td><strong>Finger opening width (mm)</strong></td>
<td>22</td>
</tr>
<tr>
<td></td>
<td><strong>Stroke (mm)</strong></td>
<td>6</td>
</tr>
<tr>
<td><strong>Weight (g)</strong></td>
<td>120 (125)</td>
<td>225 (230)</td>
</tr>
</tbody>
</table>

**Connection port**
- M3 x 0.5

**Repeatability**
- ±0.01 mm

**Fluid**
- Air

**Operating pressure**
- 0.2 to 0.6 MPa
- 0.15 to 0.6 MPa

**Ambient and fluid temperature**
- 0 to 60°C

**Max. operating frequency**
- 180 c.p.m

**Lubrication**
- Non-lube (3)

Note 1) Refer to page 532 “Effective Gripping Force” for details of gripping force at each gripping point. Value of effective gripping force is measured at the middle of opening/closing stroke.

Note 2) ( ) Value shows MDHR weight, but it does not include auto switch weight.

Note 3) This product should be used without lubrication. If it is lubricated, it could lead to sticking or slipping.

When the finger opening/closing speed is set as the total stroke of 0.2 seconds or more, it may cause the product to stick or completely stop its movement.

### Symbol

#### Without auto switch/ Double acting
- **Internal grip**
- **External grip**

#### With auto switch/ Double acting
- **Internal grip**
- **External grip**

### Made to Order: Individual Specifications

For details, refer to page 544.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Specifications/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-X32</td>
<td>Grease change for rotary actuated part</td>
</tr>
</tbody>
</table>

### Made to Order

Click here for details.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Specifications/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-X63</td>
<td>Fluorine grease</td>
</tr>
</tbody>
</table>

---

### Made to Order:

- MHZ
- MHF
- MHL
- MHR
- MHK
- MHS
- MHC
- MHT
- MHY
- MHW
- MRHQ
- MA
- D-
Gripping Point

External grip

Internal grip

Limitation of Gripping: External Grip/Internal Grip
- Workpiece gripping point should be within the gripping point range: L shown below, by operating pressure.
- When the gripping point distance becomes large, the finger attachment applies an excessively large load to the finger sliding section, causing excessive play of the fingers and possibly leading to premature failure.

Effective Gripping Force

Guidelines for the selection of the gripper with respect to workpiece mass
- Selection of the correct model depends upon the workpiece mass, the coefficient of friction between the finger attachment and the component, and their respective configurations. A model should be selected with a gripping force of 7 to 14 times that of the workpiece mass.
- If high acceleration, deceleration or impact forces are encountered during motion, a further margin of safety should be considered.

External Grip

Internal Grip

Indication of effective gripping force
The effective gripping force shown in the graphs to the right is the thrust of one finger, when three fingers and attachments are in full contact with the workpiece as shown in the figure to the right.
### Construction

![Diagram of MDHR3](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>Adaptor body</td>
<td>Aluminum alloy</td>
<td>Hard anodized</td>
</tr>
<tr>
<td>3</td>
<td>Guide holder</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cam</td>
<td>Cold rolled steel</td>
<td>Nitriding</td>
</tr>
<tr>
<td>5</td>
<td>Finger assembly</td>
<td>Stainless steel</td>
<td>Heat treated</td>
</tr>
<tr>
<td>6</td>
<td>Guide</td>
<td>Stainless steel</td>
<td>Heat treated</td>
</tr>
<tr>
<td>7</td>
<td>Pin</td>
<td>Carbon steel</td>
<td>Heat treated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Electroless nickel plated</td>
</tr>
<tr>
<td>8</td>
<td>Pin roller</td>
<td>Stainless steel</td>
<td>Nitriding</td>
</tr>
<tr>
<td>9</td>
<td>Vane shaft</td>
<td>Stainless steel, NBR</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Joint bolt</td>
<td>Chrome molybdenum steel</td>
<td>Zinc chromated</td>
</tr>
<tr>
<td>11</td>
<td>Stopper</td>
<td>Resin</td>
<td></td>
</tr>
</tbody>
</table>

#### Replacement Parts

<table>
<thead>
<tr>
<th>Description</th>
<th>MHR3-10</th>
<th>MHR3-15</th>
<th>Main parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover</td>
<td>P3313128</td>
<td>P3313228</td>
<td>19</td>
</tr>
</tbody>
</table>
Nominal Size 10

Without auto switch: MHR3-10R

3 x M3 x 0.5 thread depth 6
P.C.D.24 (Mounting thread)

Open: 11 Closed: 8

3 x M3 x 0.5 thread depth 6
(Thread for mounting attachment)
With auto switch (Built-in magnet): MDHR3-10R

MDHR3-10E Port Location

Dimensional Differences between MHR and MDHR

The following dimensions are different between the MHR and MDHR series. And also, body shapes are different depending on auto switch mounting groove.

<table>
<thead>
<tr>
<th>Model</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHR3-10R</td>
<td>5</td>
</tr>
<tr>
<td>MDHR3-10R</td>
<td>4.7</td>
</tr>
</tbody>
</table>
Nominal Size 15

Without auto switch: MHR3-15R

3 x M3 x 0.5 thread depth 6
P.C.D.29 (Mounting thread)

M3 x 0.5
Finger closing port

M3 x 0.5
Finger opening port

3 x M3 x 0.5 thread depth 6
(Thread for mounting attachment)

ø3.5e8 –0.020 –0.038
ø34
ø3.5e8 –0.005
(0.008)

ø12h6 –0.043
ø53
ø34

Open: 13.5
Closed: 9.5
With auto switch (Built-in magnet): MDHR3-15R

MDHR3-15E Port Location

Auto switch mounting groove

3 x M3 x 0.5 thread depth 6
P.C.D.29 (Mounting thread)

M3 x 0.5
Finger closing port

M3 x 0.5
Finger opening port

Open: 13.5 Closed: 9.5

6 x M3 x 0.5 thread depth 6
(A, B, C common view)

3 x ø3 \( \pm 0.02 \) depth 6
(A, B, C common view)

MHR3/MDHR3 Series
Rotary Actuated Air Gripper
3-Finger Type
MHR3/MDHR3 Series
### MDHR2/MDHR3 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/Auto Switch Mounted from Direction A**

<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 a 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>
</tbody>
</table>

#### Detection Combinations

<table>
<thead>
<tr>
<th>Pattern</th>
<th>One auto switch</th>
<th>Two auto switches</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>B</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>C</td>
<td>●</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.

#### In the case of mounting auto switch from A direction

- Step 1) Fully open the fingers.
- Step 2) Insert the auto switch into the auto switch installation groove from direction A.
- Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.
- Step 4) Slide the auto switch 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 in the direction of the arrow beyond the position where the indicator light illuminates.

#### Various auto switch applications

1. **Detection when Gripping Exterior of Workpiece/Auto Switch Mounted from Direction A**
   - One auto switch
     - One position, any of [q, w, and e] can be detected.
   - Two auto switches
     - Two positions of [q, w, and e] can be detected.

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.
# 2) Detection when Gripping Exterior of Workpiece/Auto Switch Mounted from Direction B

## Detection example

<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 a workpiece</td>
<td>Position of fingers fully closed</td>
</tr>
</tbody>
</table>

## Operation of auto switch

<table>
<thead>
<tr>
<th>Auto switch position</th>
<th>Auto switch turned ON when fingers return. (Light ON)</th>
<th>Auto switch turned ON when gripping a workpiece. (Light ON)</th>
<th>When a workpiece is not held (Abnormal operation): Auto switch to turn ON (Light ON)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One auto switch</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Two auto switches</td>
<td>●</td>
<td>●</td>
<td>—</td>
</tr>
</tbody>
</table>

## How to determine auto switch installation position

- **Step 1)** Fully open the fingers.
- **Step 2)** Insert the auto switch into the auto switch installation groove from direction B.
- **Step 3)** Slide the auto switch in the direction of the arrow until the indicator light illuminates. Move the switch an additional 0.3 to 0.5 mm in the direction of the arrow and fasten it.
- **Step 4)** Slide the auto switch 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.
### MDHR2/MDHR3 Series

**Auto Switch Installation Examples and Mounting Positions**

Various auto switch applications are possible through different combinations of auto switch quantities and detecting positions.

#### 3) Detection when Gripping Interior of Workpiece/Auto Switch Mounted from Direction A

<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 a workpiece</td>
<td>Position of fingers fully opened</td>
</tr>
</tbody>
</table>

**Operation of auto switch**

- **Auto switch turned ON when fingers return. (Light ON)**
- **Auto switch turned ON when gripping a workpiece. (Light ON)**
- **When a workpiece is not held (Abnormal operation): Auto switch to turn ON (Light ON)**

<table>
<thead>
<tr>
<th>Operation of auto switch</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection combinations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One auto switch</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Two auto switches</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

**How to determine auto switch installation position**

- **Step 1) Fully close the fingers.**
- **Step 1) Position fingers for gripping a workpiece.**
- **Step 1) Fully open the fingers.**

**In the case of mounting auto switch from A direction**

- **Step 2) Insert the auto switch into the auto switch installation groove from direction A.**

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

**Step 4) Slide the auto switch 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.**

**Position where light turns ON**

- **Position where light turns ON**
  - **Position to be secured**
  - **0.3 to 0.5 mm**

**Position to be secured**

- **0.3 to 0.5 mm**

**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.
4) Detection when Gripping Interior of Workpiece/Auto Switch Mounted from Direction B

<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>Operation of auto switch</td>
<td>Position of fingers fully closed</td>
<td>Position when gripping a workpiece</td>
<td>Position of fingers fully opened</td>
</tr>
<tr>
<td>Detection conditions</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>Two auto switches * Two positions of q, w, and e can be detected.</td>
<td>-</td>
</tr>
<tr>
<td>Pattern</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<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>
<td></td>
</tr>
<tr>
<td>In the case of mounting auto switch from B direction: Step 2) Insert the auto switch into the auto switch installation groove from direction B.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 Mounting

To set the auto switch, insert the auto switch into the installation groove of the gripper from the direction indicated in the following drawing. After setting the position, tighten the attached auto switch mounting set screw with a flat head watchmaker’s screwdriver.

![Auto switch mounting diagram](image1)

**Note:** Use a watchmaker’s screwdriver with a grip diameter of 5 to 6 mm to tighten the auto switch mounting screw. The tightening torque should be about 0.05 to 0.15 N·m.

### Protrusion of Auto Switch from Edge of Body

The maximum protrusion of an auto switch (when fingers are fully open) from the edge of the body is shown in the table below. Use the table as a guideline for mounting.

#### MDHR2-10, 15

Auto switches of D-M9N, D-M9P, D-M9B, and D-M9A are used.

<table>
<thead>
<tr>
<th>Air gripper model</th>
<th>Auto switch model</th>
<th>D-M9W</th>
<th>D-M9A</th>
<th>D-M9PV</th>
<th>D-M9AV</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDHR2-10</td>
<td>L</td>
<td>2.6</td>
<td>4.6</td>
<td>0.6</td>
<td>2.6</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>—</td>
<td>—</td>
<td>7</td>
<td>6.8</td>
</tr>
<tr>
<td>MDHR2-15</td>
<td>L</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>—</td>
<td>—</td>
<td>7</td>
<td>6.8</td>
</tr>
</tbody>
</table>

#### MDHR2-20, 30

Auto switches of D-M9NV, D-M9PV, D-M9BV, and D-M9AV are used.

<table>
<thead>
<tr>
<th>Air gripper model</th>
<th>Auto switch model</th>
<th>D-M9PV</th>
<th>M9WV</th>
<th>D-M9AV</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDHR2-20</td>
<td>7</td>
<td>6.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDHR2-30</td>
<td>7</td>
<td>6.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The auto switch will not protrude in the case of D-M9AV.

![Auto switch hysteresis](image2)

### Auto Switch Hysteresis

Please refer to the table as a guide when setting auto switch positions.

<table>
<thead>
<tr>
<th>Model</th>
<th>Hysteresis (Max. value) (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDHR2-10</td>
<td>0.3</td>
</tr>
<tr>
<td>MDHR2-15</td>
<td>0.2</td>
</tr>
<tr>
<td>MDHR2-20</td>
<td>0.6</td>
</tr>
<tr>
<td>MDHR2-30</td>
<td>0.3</td>
</tr>
</tbody>
</table>
Auto Switch Mounting

To set the auto switch, insert the auto switch into the installation groove of the gripper from the direction indicated in the following drawing. After setting the position, tighten the attached auto switch mounting set screw with a flat head watchmaker's screwdriver.

Auto switch mounting screw (M2.5 x 4L) α5 to 6

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. The tightening torque should be about 0.05 to 0.15 N·m.

Auto Switch Hysteresis

Please refer to the table as a guide when setting auto switch positions.

<table>
<thead>
<tr>
<th>Model</th>
<th>Hysteresis (Max.value) (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDHR3-10</td>
<td>0.2</td>
</tr>
<tr>
<td>MDHR3-15</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Protrusion of Auto Switch from Edge of Body

The maximum protrusion of an auto switch (when fingers are fully open) from the edge of the body is shown in the table below. Use the table as a guideline for mounting.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>H</td>
<td>—</td>
<td>—</td>
<td>2.5</td>
<td>2.3</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Max. Protrusion of Auto Switch from Edge of Body: L, H

When auto switches of D-M9□ and D-M9□AV are used.

Max. Protrusion of Auto Switch from Edge of Body: H

When auto switches of D-M9□V and D-M9□AV are used.

The auto switch will not protrude in the case of D-M9□.
1 Grease Change for Rotary Actuated Part

As a measure against condensation, grease used for the rotary actuated part has been changed to SMC-GF1.

How to Order

MHR2
MDHR2
MHR3
MDHR3

Grease Change for Rotary Actuated Part

Specifications

<table>
<thead>
<tr>
<th>Grease</th>
<th>Fluorine grease (SMC-GF1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specifications/dimensions other than the above</td>
<td>Same as the standard type</td>
</tr>
</tbody>
</table>

Note) Do not use for lubrication.
Mounting Air Grippers/MHR2/MHR3

Mounting direction of each model is different. Refer to the table at right.

### Axial side mounting

Model | Applicable bolt | Max. tightening torque N·m | Max. screw-in depth Lmm | Positioning boss Dmm | Hmm
---|---|---|---|---|---
MHR2-10 | M3 x 0.5 | 0.88 | 6 | 9.89 | 1
MHR2-20 | M4 x 0.7 | 2.1 | 8 | 10.98 | 2
MHR2-30 | M5 x 0.8 | 4.3 | 10 | 12.99 | 3
MDHR2-10 | M3 x 0.5 | 0.88 | 6 | 9.89 | 1
MDHR2-15 | M3 x 0.5 | 0.88 | 6 | 9.89 | 1.5

### Lateral mounting

Model | Applicable bolt | Max. tightening torque N·m | Max. screw-in depth Lmm | Positioning boss Dmm | Hmm
---|---|---|---|---|---
MHR2-10 | M3 x 0.5 | 0.88 | 6 | 3.134 | 6
MHR2-20 | M4 x 0.7 | 2.1 | 8 | 4.134 | 8
MHR2-30 | M5 x 0.8 | 4.3 | 10 | 5.134 | 10
MDHR2-10 | M3 x 0.5 | 0.88 | 6 | 3.134 | 6
MDHR2-15 | M3 x 0.5 | 0.88 | 6 | 3.134 | 1.5

### Vertical mounting

Model | Applicable bolt | Max. tightening torque N·m | Max. screw-in depth Lmm | Positioning boss Dmm | Hmm
---|---|---|---|---|---
MHR2-10 | M3 x 0.5 | 0.88 | 6 | 3.134 | 6
MHR2-20 | M4 x 0.7 | 2.1 | 8 | 4.134 | 8
MHR2-30 | M5 x 0.8 | 4.3 | 10 | 5.134 | 10
MDHR2-10 | M3 x 0.5 | 0.88 | 6 | 3.134 | 6
MDHR2-15 | M3 x 0.5 | 0.88 | 6 | 3.134 | 1.5

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
  - Position the finger and the attachment by placing the finger's width into the attachment's finger insertion groove A.

How to Mount the Attachment to the Finger

- To mount the attachment to the finger, make sure to use a wrench to support the attachment so as not to apply undue strain on the finger.
- Refer to the table below for the proper tightening torque on the bolt used for securing the attachment to the finger.

### Finger opening/closing speed: MHR2/MHR3

When the finger opening/closing speed is set as the total stroke of 0.2 seconds or more, it may cause the product to stick or completely stop its movement.

#### Operating Environment

**Warning**

Use caution for the anti-corrosiveness of the cross roller section.

Martensitic stainless steel is used for the finger guide, 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.

#### Lubrication/MHR2, MHR3

This product should be used without lubrication. If it is lubricated, it could lead to sticking or slipping.