**Angular Type Air Gripper/Standard Type**

**MHC2 Series**

ø10, ø16, ø20, ø25

### How to Order

**MHC2** - **20D** - **M9BW** -

- **Angular type air gripper**
- **Bore size**
  - 10 mm
  - 16 mm
  - 20 mm
  - 25 mm
- **Action**
  - D: Double acting
  - S: Single acting
- **Made to Order**
  - (Refer to page 676 for details.)
- **Number of auto switches**
  - Nil: 2 pcs.
  - S: 1 pc.

### Applicable Auto Switches

- **Solid state auto switch**
- **Diagnosis (2-color indicator)**
- **Water resistant (2-color indicator)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Special function</th>
<th>Electrical entry</th>
<th>Indicator</th>
<th>Wiring (Output)</th>
<th>Electrical entry direction</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>Perpendicular</td>
<td>Tr-line</td>
<td>0.5</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

- **Solid state auto switches** marked with a "※" symbol are produced upon receipt of order.
- **Water resistant type auto switches** can be mounted on the above models, but in such case SMC cannot guarantee water resistance.

### Notes

1) 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.
2) When ordering the air gripper with auto switch, auto switch mounting brackets are supplied with the air gripper.

When ordering the auto switch separately, auto switch mounting brackets (BMG2-012) are required.

**MHZ**

**MHC**

**MHC2**

**MHC**

**MHR**

**MHS**

**MHT**

**MHY**

**MHW**

**MRHQ**

**MA**

**D-**
MHC2 Series

- A large amount of gripping force is provided through the use of a double piston mechanism, while maintaining a compact design.
- Built-in variable throttle
- A solid state auto switch with an indicator light can be mounted.

Symbol

Double acting: External grip

Single acting/ Normally open: External grip

Specifications

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Doubleacting</th>
<th>Single acting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>0.1 to 0.6 MPa</td>
<td>0.25 to 0.6 MPa</td>
</tr>
<tr>
<td>Ambient and fluid temperature</td>
<td>–10 to 60°C</td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.01 mm</td>
<td></td>
</tr>
<tr>
<td>Max. operating frequency</td>
<td>180 c.p.m</td>
<td></td>
</tr>
<tr>
<td>Lubrication</td>
<td>Not required</td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>Double acting, Single acting</td>
<td></td>
</tr>
<tr>
<td>Auto switch (Option) Note)</td>
<td>Solid state auto switch (3-wire, 2-wire)</td>
<td></td>
</tr>
</tbody>
</table>

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

Model

<table>
<thead>
<tr>
<th>Action</th>
<th>Model</th>
<th>Bore size (mm)</th>
<th>Gripping moment (N·m) (Effective value) (1)</th>
<th>Opening/closing angle (Both sides)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double acting</td>
<td>MHC2-10D</td>
<td>10</td>
<td>0.10</td>
<td>30° to –10°</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>MHC2-16D</td>
<td>16</td>
<td>0.39</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHC2-20D</td>
<td>20</td>
<td>0.70</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHC2-25D</td>
<td>25</td>
<td>1.36</td>
<td>311</td>
<td></td>
</tr>
<tr>
<td>Single acting</td>
<td>MHC2-10S</td>
<td>10</td>
<td>0.070</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHC2-16S</td>
<td>16</td>
<td>0.31</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHC2-20S</td>
<td>20</td>
<td>0.54</td>
<td>183</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MHC2-25S</td>
<td>25</td>
<td>1.08</td>
<td>316</td>
<td></td>
</tr>
</tbody>
</table>

Note 1) At the pressure of 0.5 MPa. Refer to "Effective Gripping Force" data on page 677 for gripping force of each gripping point.
Note 2) Except auto switch.

Made to Order

(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
-X56 Axial Ported
-X58 Fluorine grease
-X64 Finger: Side tapped mounting
-X65 Finger: Through-hole mounting
-X79 Grease for food processing machines, Fluorine grease
-X79A Grease for food processing machines
-X81A Anti-corrosive treatment of finger

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.
Gripping Point

- Workpiece gripping point should be within the range indicated in the graph.

Effective Gripping Force

Double Acting

MHC2-10D

Single Acting

MHC2-10S

Although conditions differ according to the workpiece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 10 to 20 times the workpiece mass, or more.
- If high acceleration, deceleration or impact forces are encountered during motion, a further margin of safety should be considered.
- If there is an overhang, please consult with SMC.

Indication of 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.
**MHC2 Series**

**Construction**

**Double acting/With fingers open**

**Single acting**

**Double acting/With fingers closed**

**With auto switch**

### 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 A</td>
<td>Aluminum alloy</td>
<td>Hard anodized</td>
</tr>
<tr>
<td>3</td>
<td>Piston B assembly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Finger</td>
<td>ø10 to ø20: Stainless steel ø25: Carbon steel</td>
<td>Heat treated</td>
</tr>
<tr>
<td>5</td>
<td>Side roller</td>
<td>Carbon steel</td>
<td>Nitriding</td>
</tr>
<tr>
<td>6</td>
<td>Lever shaft</td>
<td>Carbon steel</td>
<td>Nitriding</td>
</tr>
<tr>
<td>7</td>
<td>Center roller</td>
<td>Carbon steel</td>
<td>Nitriding</td>
</tr>
<tr>
<td>8</td>
<td>Center pin</td>
<td>Carbon steel</td>
<td>Nitriding</td>
</tr>
<tr>
<td>9</td>
<td>Cap</td>
<td>Resin</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Bumper</td>
<td>Urethane rubber</td>
<td></td>
</tr>
</tbody>
</table>

### Replacement Parts

- **Description**
- **MHC2-10**: MHC2-10-PS, MHC2-16-PS
- **MHC2-16**: MHC2-16-PS, MHC2-16-PS
- **MHC2-20**: MHC2-20-PS, MHC2-25-PS
- **MHC2-25**: MHC2-25-PS, MHC2-25-PS

**Main parts**

- **Seal kit**: MHC2-010
- **Finger assembly**: MHC-A1003, MHC-A1603
- **Piston assembly set**: MHC-A1002, MHC-A1602
- **Piston A assembly**: MHC-A1001, MHC-A1601
- **Piston B assembly**: P3311145B, P3311245B
- **Needle assembly**: MH-A1006

**Order 1 piece finger assembly per one unit.**

Replacement part/Grease pack part no.: GR-5-010 (10 g)
**Angular Type Air Gripper/Standard Type MHC2 Series**

**Double Acting: Size 10, 16**

**MHC2-10**

- 2 x M3 x 0.5 thread depth 6 (Mounting thread)
- 4 x M3 x 0.5 thread depth 8 (Mounting thread)
- Bottom hole dia. 3.4 through (Mounting hole)
- Auto switch mounting groove (Both sides)

**MHC2-16**

- 2 x M4 x 0.7 thread depth 6.5 (Mounting thread)
- 4 x M4 x 0.7 thread depth 8 (Mounting thread)
- Bottom hole dia. 3.4 through (Mounting hole)
- Auto switch mounting groove (Both sides)

---

**Note**

When single acting type is used, one side port is breath port. No adjustment needle for finger speed is attached.

- When auto switches are used, through hole mounting is not available.

---

**Double Acting: Size 10, 16**

**MHC2 Series**

- MHC2-10
- MHC2-16

**Note**

When single acting type is used, one side port is breath port. No adjustment needle for finger speed is attached.

- When auto switches are used, through hole mounting is not available.
MHC2 Series

Double Acting: Size 20, 25

MHC2-20

2 x M5 x 0.8 thread depth 8
(Mounting thread)

4 x M5 x 0.8 thread depth 10 (Mounting thread)
Bottom hole dia. 4.3 through (Mounting hole)

2 x M5 x 0.8 thread depth 10
(Mounting thread)

Note: When single acting type is used, one side port is breath port.
No adjustment needle for finger speed is attached.

MHC2-25

2 x M6 x 1 thread depth 10
(Mounting thread)

4 x M6 x 1 thread depth 12 (Mounting thread)
Bottom hole dia. 5.1 through (Mounting hole)

2 x M6 x 1 thread depth 12
(Mounting thread)

Note: When single acting type is used, one side port is breath port.
No adjustment needle for finger speed is attached.

When auto switches are used, through hole mounting is not available.
### MHC2 Series

#### Auto Switch Installation Examples and Mounting Positions

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

**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><strong>Position to be detected</strong></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><strong>Operation of auto switch</strong></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><strong>Detection columns</strong></td>
<td>One auto switch</td>
<td>Two auto switches</td>
<td>Pattern</td>
</tr>
<tr>
<td></td>
<td>+ One position, any of 1, 2, and 3 can be detected.</td>
<td>+ Two positions of 1, 2, and 3 can be detected.</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td><strong>How to determine auto switch installation position</strong></td>
<td>Step 1) Fully open the fingers.</td>
<td>Step 1) Position fingers for gripping a workpiece.</td>
<td>Step 1) Fully close the fingers.</td>
</tr>
<tr>
<td><strong>At no pressure or low pressure, connect the auto switch to a power supply, and follow the directions.</strong></td>
<td>Step 2) Insert the auto switch into the auto switch installation groove in the direction shown in the following drawing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Step 4) Slide the auto switch further in the direction of the arrow until the indicator light goes out.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Position where light turns ON</strong></td>
<td>Position where light turns ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Position to be secured</strong></td>
<td>Position to be secured</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Note 1)** It is recommended to grip a workpiece when the fingers are in parallel with each other.
- **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.

---

MHZ
MHF
MHL
MHR
MHK
MHS
MHC
MHT
MHY
MHW
-X
MRHQ
MA
D-
Auto Switch Mounting

1. To set the auto switch, insert the auto switch into the installation groove of the cylinder as shown below and set it roughly.
2. Insert the auto switch into the auto switch bracket installation groove.
3. After confirming the detecting position, tighten the set screws (M2.5) attached to the auto switch and set it.
4. Be sure to change the detecting position in the state of (2).

Auto Switch Mounting Bracket: Part No.

<table>
<thead>
<tr>
<th>Auto switch part no.</th>
<th>Auto switch mounting bracket part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-M9□(V)/M9□W(V)/M9□A(V)</td>
<td>BMG2-012</td>
</tr>
</tbody>
</table>

Note) Use a screwdriver with a grip diameter of 5 to 6 mm to tighten the set screws (M2.5). The tightening torque should be 0.05 to 1 N·m. As a guide, it should be turned about 90° beyond the point at which tightening can be felt.

Handling of Mounting Brackets: Precautions

When auto switch is set on the mounting side as shown below, allow at least 2 mm run off space on mounting late since the auto switch is protruded from the gripper edge.

Protrusion of Auto Switch from Edge of Body

The maximum protrusion of an auto switch (when fingers are fully closed) from the edge of the body is shown in the table below.

Angular Type

When auto switch D-M9□/M9□W/M9□A/Y59□/Y7P/Y7□W is used

When auto switch D-M9□/M9□W/V/M9□AV/Y69□/Y7PV/Y7□WV is used

Max. Protrusion of Auto Switch from Edge of Body (L) (mm)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MHC2-10</td>
<td></td>
<td>8</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MHC2-16</td>
<td></td>
<td>7</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MHC2-20</td>
<td></td>
<td>6</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MHC2-25</td>
<td></td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note) The actual setting position should be adjusted after confirming the auto switch operating condition.

Auto Switch Hysteresis

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

Angular Type

Hysteresis degree (Max. value)

<table>
<thead>
<tr>
<th>Air gripper model</th>
<th>Hysteresis degree (Max. value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHC2-10</td>
<td>4</td>
</tr>
<tr>
<td>MHC2-16</td>
<td>3</td>
</tr>
<tr>
<td>MHC2-20</td>
<td>2</td>
</tr>
<tr>
<td>MHC2-25</td>
<td>2</td>
</tr>
</tbody>
</table>
**MHC2 Series**

**Specific Product Precautions**

Be sure to read this before handling the products.

---

**Mounting Air Grippers/MHC2 Series**

Possible to mount from 3 directions.

**Axial Mounting (Body tapped)**

![Axial Mounting Diagram]

Use the hole at the end of the body for positioning, etc.

**Lateral mounting (Body tapped and through-hole)**

- **Body tapped**

<table>
<thead>
<tr>
<th>Model</th>
<th>Applicable bolts</th>
<th>Max. tightening torque N·m</th>
<th>Max. screw-in depth L mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHC2-10</td>
<td>M3 x 0.5</td>
<td>0.69</td>
<td>5</td>
</tr>
<tr>
<td>MHC2-16</td>
<td>M4 x 0.7</td>
<td>2.1</td>
<td>8</td>
</tr>
<tr>
<td>MHC2-20</td>
<td>M5 x 0.8</td>
<td>4.3</td>
<td>10</td>
</tr>
<tr>
<td>MHC2-25</td>
<td>M6 x 1</td>
<td>7.3</td>
<td>12</td>
</tr>
</tbody>
</table>

- **Body through-hole**

<table>
<thead>
<tr>
<th>Model</th>
<th>Applicable bolts</th>
<th>Max. tightening torque N·m</th>
<th>Max. screw-in depth L mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHC2-10</td>
<td>M2.5 x 0.45</td>
<td>0.49</td>
<td></td>
</tr>
<tr>
<td>MHC2-16</td>
<td>M3 x 0.5</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>MHC2-20</td>
<td>M4 x 0.7</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>MHC2-25</td>
<td>M5 x 0.8</td>
<td>4.3</td>
<td></td>
</tr>
</tbody>
</table>

**Vertical Mounting (Body tapped)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Applicable bolts</th>
<th>Max. tightening torque N·m</th>
<th>Max. screw-in depth L mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHC2-10</td>
<td>M3 x 0.5</td>
<td>0.88</td>
<td>6</td>
</tr>
<tr>
<td>MHC2-16</td>
<td>M4 x 0.7</td>
<td>1.6</td>
<td>6.5</td>
</tr>
<tr>
<td>MHC2-20</td>
<td>M5 x 0.8</td>
<td>3.3</td>
<td>8</td>
</tr>
<tr>
<td>MHC2-25</td>
<td>M6 x 1</td>
<td>5.9</td>
<td>10</td>
</tr>
</tbody>
</table>

**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.

**Model Applicable bolts**

<table>
<thead>
<tr>
<th>Model</th>
<th>Max. screw-in depth L mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHC2-10</td>
<td></td>
</tr>
<tr>
<td>MHC2-16</td>
<td></td>
</tr>
<tr>
<td>MHC2-20</td>
<td></td>
</tr>
<tr>
<td>MHC2-25</td>
<td></td>
</tr>
</tbody>
</table>

**Operating Environment**

**Caution**

Use caution for the anti-corrosiveness of finger guide section.

Martensitic stainless steel is used for the finger. However, be aware that its anti-corrosion performance is inferior to austenitic stainless steel. In particular, the finger might be rusted in an environment where water droplets are adhered to it due to dew condensation.