Compact Type Parallel Style Air Gripper
\(\varnothing8, \varnothing12, \varnothing16, \varnothing20\)

Although downsized, gripping point is maintained. \((\varnothing20 \rightarrow \varnothing16)\)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall length</td>
<td>Max. 21.7 mm shorter</td>
</tr>
<tr>
<td></td>
<td>102.7 mm → 81 mm</td>
</tr>
<tr>
<td>Thickness</td>
<td>Max. 7.6 mm shorter</td>
</tr>
<tr>
<td></td>
<td>33.6 mm → 26 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>Max. 180 g lighter</td>
</tr>
<tr>
<td></td>
<td>420 g → 240 g</td>
</tr>
</tbody>
</table>

*When comparing \(\varnothing25\) of MHZ2 and \(\varnothing20\) of JMHZ2

High rigidity and precision are achieved by integrating the guide and finger in one piece.

- With high-precision linear guide
- Repeatability: \(\pm 0.01\) mm
- Linear guide of the higher rigidity and precision is used.

Higher rigidity
(compared with the same size of the existing MHZ2)

JMHZ2 Series

CAT.ES20-262A
The same linear guide achieves one bore size smaller cylinder.

<table>
<thead>
<tr>
<th>Bore size [mm]</th>
<th>JMHZ2</th>
<th>MHZ2</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>25</td>
</tr>
</tbody>
</table>

Downsizing

Overall length reduction [mm]

<table>
<thead>
<tr>
<th>Bore size</th>
<th>JMHZ2</th>
<th>MHZ2</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>46.8</td>
<td>57</td>
<td>10.2</td>
</tr>
<tr>
<td>12</td>
<td>52</td>
<td>67.3</td>
<td>15.3</td>
</tr>
<tr>
<td>16</td>
<td>65.5</td>
<td>84.8</td>
<td>19.3</td>
</tr>
<tr>
<td>20</td>
<td>81</td>
<td>102.7</td>
<td>21.7</td>
</tr>
</tbody>
</table>

Thickness reduction [mm]

<table>
<thead>
<tr>
<th>Bore size</th>
<th>JMHZ2</th>
<th>MHZ2</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>13</td>
<td>16.4</td>
<td>3.4</td>
</tr>
<tr>
<td>12</td>
<td>17</td>
<td>23.6</td>
<td>6.6</td>
</tr>
<tr>
<td>16</td>
<td>20</td>
<td>27.6</td>
<td>7.6</td>
</tr>
<tr>
<td>20</td>
<td>26</td>
<td>33.6</td>
<td>7.6</td>
</tr>
</tbody>
</table>

Weight reduction [g]

<table>
<thead>
<tr>
<th>Bore size [mm]</th>
<th>JMHZ2</th>
<th>MHZ2</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>31</td>
<td>55</td>
<td>24</td>
</tr>
<tr>
<td>12</td>
<td>65</td>
<td>115</td>
<td>50</td>
</tr>
<tr>
<td>16</td>
<td>128</td>
<td>230</td>
<td>102</td>
</tr>
<tr>
<td>20</td>
<td>240</td>
<td>420</td>
<td>180</td>
</tr>
</tbody>
</table>
Guide performance is increased. Higher rigidity

- Linear guide equivalent to that of the larger bore size of the cylinder is used.
- Higher opening/closing stroke

Linear guide

<table>
<thead>
<tr>
<th>Model</th>
<th>Linear guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>JMHZ2-8D</td>
<td>Equivalent to MHZ2-10D</td>
</tr>
<tr>
<td>JMHZ2-12D</td>
<td>Equivalent to MHZ2-16D</td>
</tr>
<tr>
<td>JMHZ2-16D</td>
<td>Equivalent to MHZ2-20D</td>
</tr>
<tr>
<td>JMHZ2-20D</td>
<td>Equivalent to MHZ2-25D</td>
</tr>
</tbody>
</table>

MHZ2-20D

Longer gripping point

Longer gripping point is possible in cylinder one bore smaller.

Gripping point range limit (at 0.4 MPa)

Overhang H [mm]

Gripping point L [mm]
Compact Type Parallel Style Air Gripper  **JMHZ2 Series**

**High precision**

With high-precision linear guide
Repeatability: ±0.01 mm

**Linear guide**

<table>
<thead>
<tr>
<th>Model</th>
<th>Linear guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>JMHZ2-8D</td>
<td>Equivalent to MHZ2-10D</td>
</tr>
<tr>
<td>JMHZ2-12D</td>
<td>Equivalent to MHZ2-16D</td>
</tr>
<tr>
<td>JMHZ2-16D</td>
<td>Equivalent to MHZ2-20D</td>
</tr>
<tr>
<td>JMHZ2-20D</td>
<td>Equivalent to MHZ2-25D</td>
</tr>
</tbody>
</table>

**Finger options**

Basic (Tapped in opening/closing direction) Side tapped mounting Through-holes in opening/closing direction

**Compact auto switches are mountable.**

Solid state auto switch D-M9

**Series Variations**

<table>
<thead>
<tr>
<th>Series</th>
<th>Bore size (mm)</th>
<th>Action</th>
<th>Opening/Closing stroke (Both sides) (mm)</th>
<th>Mounting orientation</th>
<th>Finger option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>JMHZ2</strong></td>
<td>8</td>
<td>Double</td>
<td>4</td>
<td>Axial mounting</td>
<td>- Basic (Tapped in opening/closing direction)</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>actuating</td>
<td>6</td>
<td></td>
<td>- Side tapped mounting</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
<td>10</td>
<td></td>
<td>- Through-holes in opening/closing direction</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td></td>
<td>14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**High degree of mounting flexibility**

Can be mounted 3 ways from 2 directions

**Axial mounting**

**Lateral mounting**

**Solid state auto switch**

Can be mounted on the opposite side
Model Selection

Selection Procedure

Step 1 Check the effective gripping force.
Step 2 Check the gripping point.
Step 3 Check the external force on fingers.

Step 1 Check the gripping force.

Guidelines for the selection of the gripper with respect to workpiece mass

- 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 at least 10 to 20 times greater than the workpiece weight.
- Further allowance should be provided when great acceleration or impact is expected during workpiece transfer.

Example)

Workpiece mass: 0.1 kg
Gripping method: External gripping
Gripping point distance: 30 mm
Operating pressure: 0.6 MPa

JMHZ2-12D External Gripping Force

Guideline:

- When the JMHZ2-12D is selected, a gripping force of 21 N is obtained from the intersection point of gripping point distance L = 30 mm and a pressure of 0.6 MPa.
- The gripping force is 21 times greater than the workpiece weight, and therefore satisfies a gripping force setting value of 20 times or more.

Model Selection Illustration

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

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

the conditions under which the workpiece will not drop are

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

and therefore,

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

With “a” representing the margin, “F” is determined by the following formula:

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

* Even in cases where the coefficient of friction is greater than \( \mu = 0.2 \), for reasons of safety, select a gripping force which is at least 10 to 20 times greater than the workpiece weight, as recommended by SMC.
* If high acceleration, or impact forces are encountered during motion, a further margin should be considered.
**Step 1** Check the effective gripping force: JMHZ2 Series, Double Acting

External gripping state
- Indication of effective gripping force: The gripping force shown in the graphs to the right represents the gripping force of one finger when all fingers and attachments are in contact with the workpiece. $F$ = One finger thrust

Internal gripping state
- Indication of effective gripping force: The gripping force shown in the graphs to the right represents the gripping force of one finger when all fingers and attachments are in contact with the workpiece. $F$ = One finger thrust
Compact Type Parallel Style Air Gripper  JMHZ2 Series

**Step 2** Check the gripping point: JMHZ2 Series

- The air gripper should be operated so that the workpiece gripping point “L” and the amount of overhang “H” stay within the range shown for each operating pressure given in the graphs to the right.
- If the workpiece gripping point goes beyond the range limits, this will have an adverse effect on the life of the air gripper.
Inertial loads will be generated at the stroke end when the product is used for transportation. Consider the rate of acceleration.

Ensure moments and loads are the allowable values or less.

Even when the dimension L is short, the maximum load should not be exceeded.

<table>
<thead>
<tr>
<th>Model</th>
<th>Allowable vertical load Fv [N]</th>
<th>Maximum allowable moment/load</th>
</tr>
</thead>
<tbody>
<tr>
<td>JMHZ2-8</td>
<td>58</td>
<td>Pitch moment Mp [N·m] + Yaw moment My [N·m] + Roll moment Mr [N·m]</td>
</tr>
<tr>
<td>JMHZ2-12</td>
<td>98</td>
<td>0.26</td>
</tr>
<tr>
<td>JMHZ2-16</td>
<td>147</td>
<td>0.68</td>
</tr>
<tr>
<td>JMHZ2-20</td>
<td>255</td>
<td>1.32</td>
</tr>
</tbody>
</table>

+ Distance to the point at which the load is applied [mm]

1. Workpiece insertion
   When a moment in one direction is applied
   When a workpiece held by JMHZ2-16D at L = 30 mm, a roll moment Mr is generated due to load Fr = 20 [N].
   Mr = Fr x L x 10⁻³⁻¹ (⁺: Constant for unit conversion)
   = 20 x 30 x 10⁻³
   = 0.6 [N·m]
The moment Mr = 0.6 [N·m] is the allowable moment of 1.32 [N·m] or less. The load F = 20 [N] is the allowable load of 62 [N] or less. The product is suitable for the workpiece.

2. Workpiece transfer
   When moments in multiple directions are applied
   Hold the workpiece using JMHZ2-16D to transport it horizontally.
   Attachment mass (One side) m1: 0.05 [kg]
   Workpiece mass m2: 0.3 [kg]
   Acceleration load A is generated when stopping at the end of transportation: 3g (g: Gravitational acceleration = 9.8 m/s²)
   Calculate the followings: Load: Mass of the attachment and workpiece x acceleration (including their own weight). Moment: Mass x distance to the center of gravity of the attachment and mass x distance to the center of gravity of the workpiece.

   1. Pitch direction (Moment due to acceleration speed)
   Fp = (m1 x 2 + m2) x A
   = (0.05 x 2 + 0.3) x 3 x 9.8
   = 11.76 [N]
   Distance to the center of gravity of the attachment La = 20 mm,
   Distance to the center of gravity of the workpiece Lb = 30 mm

   2. Yaw direction (Moment due to acceleration speed)
   Fr = (m1 x La x 10⁻³⁻¹ x 2 + m2 x Lb x 10⁻³⁻¹) x A
   = (0.05 x 20 x 10⁻³ x 2 + 0.3 x 30 x 10⁻³) x 3 x 9.8
   = 3.28 [N·m]

   3. Roll direction (Moment due to the own weight of the attachment and workpiece)
   Mr = (m1 x La x 10⁻³⁻¹ x 2 + m2 x Lb x 10⁻³⁻¹) x g
   = (0.05 x 20 x 10⁻³ x 2 + 0.3 x 30 x 10⁻³) x 9.8
   = 0.33 [N·m]

   Moments: Mp + My + Mr = 0.32 + 0.20 + 0.11 = 0.63 [N·m] is the allowable moment of 1.32 [N·m] or less. Loads: Fp, Fy and Fr of each direction is the maximum allowable load of 62 [N] or less. The product is suitable for the workpiece.
When operating an actuator with a small bore size and a short stroke at a high frequency, dew condensation (water droplets) 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 Web Catalog and the Best Pneumatics Catalog.

Moisture Control Tube
IDK Series
When operating an actuator with a small bore size and a short stroke at a high frequency, dew condensation (water droplets) 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 Web Catalog and the Best Pneumatics Catalog.

Compact Type Parallel Style Air Gripper

JMHZ2 Series
ø8, ø12, ø16, ø20

How to Order

Bore Size

ø8 to ø20

JMHZ2-16D-M9BW

Number of fingers

2

Number of auto switches

Nil 2

Bore size

8 8 mm
12 12 mm
16 16 mm
20 20 mm

Action

D Double acting

Finger option

[Standard]
Nil: Basic

1: Side tapped mounting
2: Through-holes in opening/closing direction

Applicable Auto Switches
Refer to the Web Catalog and the Best Pneumatics Catalog for further information on auto switches.

<table>
<thead>
<tr>
<th>Type</th>
<th>Special function</th>
<th>Electrical entry</th>
<th>Wiring (Output)</th>
<th>Load voltage</th>
<th>Auto switch model</th>
<th>Lead wire length [m]</th>
<th>Pre-wired connector</th>
<th>Applicable load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DC</td>
<td>AC</td>
<td>0.5 (Nil) 1 3 5</td>
<td></td>
<td>IC circuit</td>
</tr>
<tr>
<td>Solid state auto switch</td>
<td>—</td>
<td>Grommet</td>
<td>3-wire (PNP)</td>
<td>5 V, 12 V</td>
<td>M9NV M9N</td>
<td>● ● ○ ○</td>
<td>Relay, PLC</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>12 V</td>
<td>M9PV M9P</td>
<td>● ● ● ○</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>5 V, 12 V</td>
<td>M9BV M9B</td>
<td>● ● ○ ○</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>12 V</td>
<td>M9NWV M9NW</td>
<td>● ● ● ○</td>
<td>IC circuit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>5 V, 12 V</td>
<td>M9PVW M9PW</td>
<td>● ● ● ○</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>12 V</td>
<td>M9BWW M9BW</td>
<td>● ● ○ ○</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>12 V</td>
<td>M9NAV M9NA</td>
<td>○ ○ ● ○</td>
<td>IC circuit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grommet</td>
<td>2-wire</td>
<td>24 V</td>
<td>M9PAV M9PA</td>
<td>○ ○ ● ○</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>12 V</td>
<td>M9BAV M9BA</td>
<td>○ ○ ● ○</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

+1 Lead wire length symbols: 0.5 m............. Nil
1 m................... M
3 m.................. L
5 m................. Z

+2 Water-resistant type auto switches can be mounted on the above models, but SMC cannot guarantee water resistance.

+ Auto switches marked with “ ○” are produced upon receipt of order.

+ 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.

+ An auto switch with a reduced overall length for the D-M9 is available upon request. (Produced upon receipt of order)

Please contact your local sales representative for more details.
JMHZ2 Series

Specifications

<table>
<thead>
<tr>
<th>Bore size [mm]</th>
<th>8</th>
<th>12</th>
<th>16</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating pressure</td>
<td>Ø8: 0.15 to 0.7 MPa</td>
<td>Ø12 to Ø20: 0.1 to 0.7 MPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temperatures</td>
<td>−10 to 60°C (No freezing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.01 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating frequency</td>
<td>120 c.p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubricant</td>
<td>Non-lube</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>Double acting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto switch (Option)*1</td>
<td>Solid state auto switch (3-wire, 2-wire)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 Refer to pages 15 to 17 for details on auto switches.

Model

<table>
<thead>
<tr>
<th>Model</th>
<th>Bore size [mm]</th>
<th>Action</th>
<th>Gripping force*1</th>
<th>Opening/ Closing stroke (Both sides) [mm]</th>
<th>Weight*2 [g]</th>
<th>Volume [cm³]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Effective gripping force per finger [N]</td>
<td>Finger opening port</td>
<td>Finger closing port</td>
<td></td>
</tr>
<tr>
<td>JMHZ2-8D</td>
<td>8</td>
<td>Double acting</td>
<td>7.8 10.5</td>
<td>4 31</td>
<td>0.3 0.2</td>
<td></td>
</tr>
<tr>
<td>JMHZ2-12D</td>
<td>12</td>
<td></td>
<td>17.5 23.3</td>
<td>6 65</td>
<td>0.6 0.4</td>
<td></td>
</tr>
<tr>
<td>JMHZ2-16D</td>
<td>16</td>
<td></td>
<td>32.7 43.5</td>
<td>10 128</td>
<td>1.6 1.1</td>
<td></td>
</tr>
<tr>
<td>JMHZ2-20D</td>
<td>20</td>
<td></td>
<td>54.2 72.2</td>
<td>14 240</td>
<td>3.3 2.2</td>
<td></td>
</tr>
</tbody>
</table>

*1 At the pressure of 0.5 MPa, when gripping point L is 20 mm
*2 Excluding the auto switch weight

Precautions

Be sure to read this before handling the products. Refer to pages 19 and 20 for details.
Compact Type Parallel Style Air Gripper  
**JMHZ2 Series**

**Construction: JMHZ2-8D to 20D**

With fingers open  
With fingers closed

![Diagram of the gripper with fingers open and closed]

**Component Parts**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body A</td>
<td>10</td>
<td>Rod cover</td>
</tr>
<tr>
<td>2</td>
<td>Piston assembly</td>
<td>11</td>
<td>Steel ball</td>
</tr>
<tr>
<td>3</td>
<td>Lever</td>
<td>12</td>
<td>Rod seal</td>
</tr>
<tr>
<td>4</td>
<td>Guide</td>
<td>13</td>
<td>Piston seal</td>
</tr>
<tr>
<td>5</td>
<td>Finger</td>
<td>14</td>
<td>Gasket</td>
</tr>
<tr>
<td>6</td>
<td>Roller stopper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Body B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Lever shaft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Seal support</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Replacement Parts**

<table>
<thead>
<tr>
<th>Description</th>
<th>JMHZ2-8</th>
<th>JMHZ2-12</th>
<th>JMHZ2-16</th>
<th>JMHZ2-20</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal kit</td>
<td>JMHZ2-D</td>
<td>JMHZ8-PS</td>
<td>JMHZ12-PS</td>
<td>JMHZ16-PS</td>
<td>13</td>
</tr>
<tr>
<td>Finger assembly</td>
<td>JMHZ2-A0802</td>
<td>JMHZ-A0802</td>
<td>JMHZ-A1202</td>
<td>JMHZ-A1602</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>JMHZ2-A0802-1</td>
<td>JMHZ-A1202-1</td>
<td>JMHZ-A1602-1</td>
<td>JMHZ-A2002-1</td>
<td>1</td>
</tr>
<tr>
<td>Piston assembly</td>
<td>JMHZ2-D</td>
<td>JMHZ-A0803</td>
<td>JMHZ-A1203</td>
<td>JMHZ-A1603</td>
<td>2</td>
</tr>
<tr>
<td>Lever assembly</td>
<td>JMHZ-A0804</td>
<td>JMHZ-A1204</td>
<td>JMHZ-A1604</td>
<td>JMHZ-A2004</td>
<td>3</td>
</tr>
</tbody>
</table>

* Finger option
1 = Side tapped, 2 = Through-hole

* The seal kit does not include a grease pack. Order it separately. **Grease pack part number: GR-S-010 (10 g)**
**JMHZ2 Series**

**Dimensions**

**Basic Type**  
**JMHZ2-8D**

---

**Side tapped mounting** \(^1\)  
**JMHZ2-8D1**

**Through-holes in opening/closing direction** \(^1\)  
**JMHZ2-8D2**

\(^1\) Other dimensions are the same as the basic type.
Compact Type Parallel Style Air Gripper JMHZ2 Series

Dimensions

Basic Type
JMHZ2-12D

Side tapped mounting*1
JMHZ2-12D1

Through-holes in opening/closing direction*1
JMHZ2-12D2

Dimensions of auto switch mounting groove

Other dimensions are the same as the basic type.
JMHZ2 Series

Dimensions

Basic Type
JMHZ2-16D

Side tapped mounting *1
JMHZ2-16D1

Through-holes in opening/closing direction *1
JMHZ2-16D2

*1 Other dimensions are the same as the basic type.
Compact Type Parallel Style Air Gripper  
**JMHZ2 Series**

**Dimensions**

### Basic Type  
**JMHZ2-20D**

![Diagram of dimensions]

- **Dimensions of auto switch mounting groove**
  - $\Phi 4H9 (\frac{+0.030}{0})$ depth 4
  - $2\times M5 \times 0.8$ thread depth 10

- **Through-holes in opening/closing direction**
  - $4\times M5 \times 0.8$ thread depth 10
  - $\phi 4H9 (\frac{+0.030}{0})$ depth 3

- **Side tapped mounting**
  - $4\times M4 \times 0.7$ through

- **Through-holes in opening/closing direction**
  - $4\times M4 \times 0.7$ through

- **Other dimensions**
  - $8.10 \pm 0.02$
  - $12.0 \pm 0.02$
  - $20.7$
  - $5\times 9$

- **When open**
  - $50 \pm 1.8 - 0.5$

- **When closed**
  - $36 \pm 0.5 - 0.5$

### Side tapped mounting  
**JMHZ2-20D1**

- $4\times M4 \times 0.7$ through

### Through-holes in opening/closing direction  
**JMHZ2-20D2**

- $4\times M4 \times 0.7$ through

---

*Other dimensions are the same as the basic type.*
Various auto switch applications are possible through different combinations of auto switch quantities and detecting positions.

1) Detection when Gripping Exterior of a Workpiece

<table>
<thead>
<tr>
<th>Detection example</th>
<th>① Confirmation of fingers in reset position</th>
<th>② Confirmation of a workpiece held</th>
<th>③ Confirmation of a workpiece released</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position to be detected</td>
<td>Position of fingers fully open</td>
<td>Position when gripping a workpiece</td>
<td>Position of fingers fully closed</td>
</tr>
<tr>
<td>Operation of auto switches</td>
<td>When fingers return: Auto switch to turn ON (Light ON)</td>
<td>When gripping a workpiece: Auto switch to turn ON (Light ON)</td>
<td>When a workpiece is not held (Abnormal operation): Auto switch to turn ON (Light ON)</td>
</tr>
</tbody>
</table>

**Detector combination**
- 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.

**Pattern**
- A
- B
- C

**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.

1. Step 1) Fully open the fingers.
   - Position where light turns ON
   - Position to be secured

2. Step 2) Insert the auto switch into the auto switch mounting groove in the direction as shown in the illustration below.

3. Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.
   - Position where light turns ON
   - 0.3 to 0.5 mm

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

5. Step 5) Slide 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 to be secured

**Note:**
- It is recommended that gripping of a workpiece be performed close to the center of the finger stroke.
- When holding a workpiece close at the end of opening/closing stroke of fingers, detecting performance of the combinations listed in the table above may be limited, depending on the hysteresis of an auto switch, etc.
2) Detection when Gripping Interior of a Workpiece

### Detection example

<table>
<thead>
<tr>
<th>Detection example</th>
<th>① Confirmation of fingers in reset position</th>
<th>② Confirmation of a workpiece held</th>
<th>③ Confirmation of a workpiece released</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position to be detected</td>
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<td>Position of fingers fully open</td>
</tr>
<tr>
<td>Operation of auto switches</td>
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<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.

#### Pattern

<table>
<thead>
<tr>
<th>A</th>
<th>V</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>C</td>
<td>V</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 close the fingers.
  **Step 2)** Insert the auto switch into the auto switch mounting groove in the direction as shown in the illustration below.
  **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.

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

- **Step 5)** Slide 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.

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

**2) Detection when Gripping Interior of a Workpiece**

- **Step 1)** Fully close the fingers.
  - **Step 2)** Insert the auto switch into the auto switch mounting groove in the direction as shown in the illustration below.
  - **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)** Slide 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.

---

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

When holding a workpiece close at the end of opening/closing stroke of fingers, detecting performance of the combinations listed in the table above 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, etc.

<table>
<thead>
<tr>
<th>Auto switch model</th>
<th>Hysteresis</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-M9 m</td>
<td>0.7</td>
</tr>
<tr>
<td>D-M9 m W</td>
<td>0.6</td>
</tr>
<tr>
<td>D-M9 m A</td>
<td>0.7</td>
</tr>
</tbody>
</table>

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 m A(V).

Auto Switch Mounting
To set the auto switch, insert the auto switch into the auto switch installation groove of the gripper from the direction as shown in the illustration below. After setting the position, tighten the attached auto switch mounting screw with a flat blade watchmaker’s screwdriver.

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 m A(V).

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.

<table>
<thead>
<tr>
<th>Lead wire type</th>
<th>In-line entry</th>
<th>Perpendicular entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illustration</td>
<td>L</td>
<td>L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Lead wire type</th>
<th>D-M9 m</th>
<th>D-M9 m W</th>
<th>D-M9 m A</th>
<th>D-M9 m V</th>
<th>D-M9 m WV</th>
<th>D-M9 m AV</th>
</tr>
</thead>
<tbody>
<tr>
<td>JMHZ2-8D</td>
<td>Open</td>
<td>5</td>
<td>7</td>
<td>3</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Closed</td>
<td>7.5</td>
<td>9.5</td>
<td>5.5</td>
<td>7.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JMHZ2-12D</td>
<td>Open</td>
<td>3.5</td>
<td>5.5</td>
<td>1.5</td>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Closed</td>
<td>7.5</td>
<td>9.5</td>
<td>5.5</td>
<td>7.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JMHZ2-16D</td>
<td>Open</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Closed</td>
<td>5.5</td>
<td>7.5</td>
<td>3.5</td>
<td>5.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JMHZ2-20D</td>
<td>Open</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Closed</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* There is no protrusion for sections of the table with no values entered.
Prior to Use
Auto Switch Connections and Examples

**Sink Input Specifications**

<table>
<thead>
<tr>
<th>3-wire, NPN</th>
<th>2-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto switch</td>
<td>Brown</td>
</tr>
<tr>
<td></td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td>Black</td>
</tr>
<tr>
<td>COM</td>
<td>(PLC internal circuit)</td>
</tr>
</tbody>
</table>

**Source Input Specifications**

<table>
<thead>
<tr>
<th>3-wire, PNP</th>
<th>2-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto switch</td>
<td>Brown</td>
</tr>
<tr>
<td></td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td>Black</td>
</tr>
<tr>
<td>COM</td>
<td>(PLC internal circuit)</td>
</tr>
</tbody>
</table>

Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

**Examples of AND (Series) and OR (Parallel) Connections**

* When using solid state auto switches, ensure the application is set up so the signals for the first 50 ms are invalid. Depending on the operating environment, the product may not operate properly.

**3-wire AND connection for NPN output**

(Using relays)

**3-wire AND connection for PNP output**

(Using relays)

**2-wire AND connection**

When two auto switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state. The indicator lights will light up when both of the auto switches are in the ON state. Auto switches with a load voltage less than 20 V cannot be used.

**2-wire OR connection**

(Solid state) When two auto switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

**2-wire OR connection**

(Reed) Because there is no current leakage, the load voltage will not increase when turned OFF. However, depending on the number of auto switches in the ON state, the indicator lights may sometimes grow dim or not light up, due to the dispersion and reduction of the current flowing to the auto switches.

**Example:**

Load voltage at ON = Power supply voltage – Residual voltage x 2 pcs.
= 24 V – 4 V x 2 pcs.
= 16 V

Example: Power supply is 24 VDC Internal voltage drop in auto switch is 4 V.
JMHZ2 Series
Specific Product Precautions 1

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For air gripper and auto switch precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: https://www.smcworld.com

Operating Environment

⚠️ Caution

Use caution for the anti-corrosiveness of the linear guide unit.
Martensitic stainless steel is used for the finger guide. However, the anti-corrosiveness of this steel is inferior to that of austenitic stainless steel. In particular, rust may be generated in environments where waterdrops are likely to adhere due to condensation, etc.

⚠️ Caution

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.

How to Mount Air Grippers

Possible to mount from 2 directions

How to mount air grippers

Axial mounting (Body tapped)

How to mount air grippers

Lateral mounting (Body tapped and through-holes)

○ Body tapped

How to mount air grippers

Lateral mounting (Body tapped and through-holes)

○ Body through-holes

How to mount attachments to the finger

The attachment must be mounted on fingers using bolts such as finger mounting female threads, etc., which should be tightened with the tightening torque in the table below.

Considerations for attachment mass

A long or heavy attachment increases the inertia force required to open or close the fingers. This may cause unsteady movement of fingers and decrease the life of the gripper. Design the attachment as short and light as possible referring to the mass specified in the table below.

Model | Applicable bolt | Max. tightening torque [N·m] | Max. screw-in depth L [mm]
--- | --- | --- | ---
JMHZ2-8 | M3 x 0.5 | 0.88 | 6
JMHZ2-12 | M3 x 0.5 | 0.88 | 6
JMHZ2-16 | M4 x 0.7 | 2.1 | 8
JMHZ2-20 | M5 x 0.8 | 4.3 | 10

Model | Hole diameter | Hole depth [mm]
--- | --- | ---
JMHZ2-8 | ø9H9 +0.036 | 2
JMHZ2-12 | ø13H9 +0.043 | 2
JMHZ2-16 | ø17H9 +0.043 | 2
JMHZ2-20 | ø21H9 +0.052 | 3

Model | Applicable bolt | Max. tightening torque [N·m]
--- | --- | ---
JMHZ2-8 | M2.5 x 0.45 | 0.31
JMHZ2-12 | M2.5 x 0.45 | 0.31
JMHZ2-16 | M3 x 0.5 | 0.59
JMHZ2-20 | M4 x 0.7 | 1.4

Model | Attachment mass (One side) [g]
--- | ---
JMHZ2-8 | 18
JMHZ2-12 | 35
JMHZ2-16 | 70
JMHZ2-20 | 140
Precautions when Using Elbow Fittings

When elbow piping fittings are used, they may interfere with each other or part of gripper, limiting the range for piping entry. Please use extended male elbow, KQ2W, or extension fittings listed in the table below to avoid this situation.

<table>
<thead>
<tr>
<th>Model</th>
<th>Extension fitting</th>
</tr>
</thead>
<tbody>
<tr>
<td>JMHZ2-8</td>
<td>P3311176A</td>
</tr>
<tr>
<td>JMHZ2-12</td>
<td></td>
</tr>
<tr>
<td>JMHZ2-16</td>
<td>P3311276A</td>
</tr>
<tr>
<td>JMHZ2-20</td>
<td></td>
</tr>
</tbody>
</table>

Note: Width across flats is measured in millimeters.
These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)\(^1\), and other safety regulations.

\(^1\) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety. etc.

---

### Safety Instructions

**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

---

### Safety Instructions

**Caution**

<table>
<thead>
<tr>
<th>1</th>
<th>The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications. Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Only personnel with appropriate training should operate machinery and equipment. The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.</td>
</tr>
<tr>
<td>3</td>
<td>Do not service or attempt to remove product and machinery/equipment until safety is confirmed. 1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed. 2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully. 3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.</td>
</tr>
<tr>
<td>4</td>
<td>Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions. 1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight. 2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog. 3. An application which could have negative effects on people, property, or animals requiring special safety analysis. 4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.</td>
</tr>
</tbody>
</table>

---

### Safety Instructions

**Warning**

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited. Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

---

### Caution

1. The product is provided for use in manufacturing industries. The product herein described is basically provided for peaceful use in manufacturing industries. If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary. If anything is unclear, contact your nearest sales branch.

---

### Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

---

### Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.\(^2\) Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

---

### Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited. Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

---

**Warning**

Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.